

CURRICULUM-Speciality "MEDICINE"

Period of education- 6 years (10 semesters + clinical clerkship); Form of education - Full- time

Education Qualification Degree - "Master" and Professional Qualification - "Doctor of Medicine"

№	Compulsatory Disciplines	USR	Exam	Academic Hours				ECTS non-auditorium classes	Total ECTS	Academic hours in years and semesters																			
										I year				II year				III year				IV year				V year			
										I		II		III		IV		V		VI		VII		VIII		IX		X	
1	Human Biology	105	II	105	60	45	3,5	6,5	10,0	2	1	2	2																
2	Physics	90	I	90	45	45	3,0	3,0	6,0	3	3																		
3	Chemistry	90	I	90	45	45	3,0	3,0	6,0	3	3																		
4	Latin wih Medical Terms	60	II	60	0	60	2,0	3,0	5,0		2		2																
5	Human Anatomy and Histology	315	II, IV	315	90	225	10,5	16,5	27,0	1	3	2	4	2	4	1	4												
6	Cytology, General Histology and Human Embryology	90	I	90	30	60	3,0	3,0	6,0	2	4																		
7	Biophysics	60	II	60	30	30	2,0	5,0	7,0			2	2																
8	Physical Education and Sports		II	60	0	60	2,0	2,0	4,0		2		2																
9	Biochemistry	180	IV	180	90	90	6,0	8,0	14,0					3	3	3	3												
10	Human Physiology	195	IV	195	75	120	6,5	8,5	15,0					2	4	3	4												
11	Social Medicine with Medical Ethics: I part	120	III	60	30	30	2,0	3,0	5,0					2	2														
	VI		60	30	30	2,0	1,0	3,0									2	2											
12	Microbiology	135	V	135	60	75	4,5	3,5	8,0							2	3	2	2										
13	Medical Genetics	60	VII	60	15	45	2,0	1,0	3,0												1	3							
14	Pathological Physiology	105	VI	105	45	60	3,5	1,5	5,0									2	2	1	2								
15	Pharmacology with Clinical Pharmacology	150	VII	135	60	75	4,5	2,2	6,7										2	2	2	3							
16	Pathoanatomy and Cytopathology	210	V, VII	210	90	120	7,0	4,0	11,0									2	4	2	2	2	2						
17	Propaedeutics of Internal Diseases	240	VI	240	60	180	8,0	6,0	14,0									2	6	2	6								
18	General and Operative Surgery	165	VI	165	75	90	5,5	3,5	9,0									3	4	2	2								
19	Disaster Medicine	45	V	45	15	30	1,5	0,5	2,0									1	2										
20	Roentgenology and Radiology	105	VI	108	48	60	3,6	1,4	5,0									1	2	2	2								
21	Otorhinolaryngology	90	VII/VIII	90	45	45	3,0	1,5	4,5													3	3						
22	Hygiene, Ecology and Occupational Diseases: - Hygiene and Ecology;	150	VI	120	60	60	4,0	2,0	6,0									2	2	2	2								
	VI		45	15	30	1,5	0,5	2,0											1	2									
				Academic Hours				ECTS		Academic hours in years and semesters																			

№	Compulsatory Disciplines	USR	Exam	Academic hours				ECTS non-auditorium classes	Total ECTS	I year				II year				III year				IV year				V year			
				total	lectures	practices	ECTS			I		II		III		IV		V		VI		VII		VIII		IX		X	
										l	p	l	p	l	p	l	p	l	p	l	p	l	p	l	p	l	p	l	p
23	Ophthalmology	75	VII / VIII	75	30	45	2,5	1,2	3,7																				
24	Neurology	120	VIII	120	60	60	4,0	2,0	6,0												2	2	2	2					
25	Obstetrics and Gynaecology	210	X	210	90	120	7,0	4,0	11,0																				
26	Dermatology and Venerology	90	IX	90	30	60	3,0	1,5	4,5																				
27	Psychiatry and Medical Psychology	75	X	60	30	30	2,0	1,0	3,0																		2	2	
			IV	30	15	15	1,0	1,0	2,0						1	1													
28	Internal Diseases and Therapy, Clinical Laboratory and Immunology: - I-part: Rheumatology, Pneumology, Phthisiatrics, Cardiology, Haematoloav - II-part- Nephrology,Endocrinology, Gastroenterology - Clinical Laboratory - Clinical Immonology	600	VIII	300	90	210	10,0	5,3	15,3												4	9	2	5					
			X	210	60	150	7,0	4,0	11,0																2	5	2	5	
			VI	60	30	30	2,0	1,0	3,0								2	2											
			VII	36	18	18	1,2	0,6	1,8										1	1									
29	Surgical Diseases Special Surgerv - Specialized Surgeries	270	VIII	180	60	120	6,0	3,1	9,1												2	4	2	4					
			VIII / IX	90	30	60	3,0	1,7	4,7																2	4			
30	Orthopaedics and Traumatology	90	VIII / IX	90	30	60	3,0	1,5	4,5														2	4					
31	Paediatrics	210	X	210	90	120	7,0	4,0	11,0																3	4	3	4	
32	Epidemiology, Infectious Diseases, Medical Parasitology and Tropical Medicine	150	X	150	75	75	5,0	3,2	8,2																1	2	4	3	
33	Forensic Medicine and Deontology	75	X	75	45	30	2,5	1,5	4,0																		3	2	
34	Urology	45	VIII / IX	50	20	30	1,7	0,8	2,5														1	2					
35	Anaesthesiology and Intesive Care Medicine	60	VIII / IX	60	30	30	2,0	1,0	3,0																2	2			
36	Physiotherapy and Rehabilitation	45	IX	45	15	30	1,5	0,7	2,2																1	2			
37	Clinical Pharmacology	30	IX	45	30	15	1,5	0,7	2,2																2	1			
38	General Medicine	60	IX	60	30	30	2,0	0,8	2,8																2	2			
39	Clinical Oncology		X	30	20	10	1,0	0,3	1,3																		1	1	
	Total :	4965		5099	2041	3058	170,0	131,0	301,0	29	18	22	25	39	42	44	38	45	37										
	Lectures:				2041					11	6	9	10	15	18	17	14	18	17										
	Practices:					3058				17	12	13	15	24	24	27	24	27	20										
	Exams:									3	5	1	5	3	8	5	6	6	7										
40	Foreign Language for Bulgarian students		IV	60	0	60	2,0	3,0	5,0					2		2													
	Bulgarian for foreign students, education in Bulgarian language		IV	120	0	120	4,0	5,0	9,0		2		2		2														
	Bulgarian for foreign students, education in English language		IV	360	0	360	12,0	12,0	24,0		6		6		6		6												

Total	Academic Hours	Lectures	Practices	ECTS auditorium	ECTS non-auditorium	Total ECTS
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				classes	classes	ECTS
Bulgarian students	5159	2041	3118	172,0	134,0	306,0
Foreign students, education in Bulgarian language	5219		3178	174,0	136,0	310,0
Foreign students, education in English language	5459		3418	182,0	143,0	325,0

	Elective Disciplines дисциплини	semester	Academic hours				ECTS non-auditorium classes	Total ECTS
			Total	lectures	practices	ECTS		
1	History of Medicine	I и II	30	15	15	1,0	1,0	2,0
2	Biology of Parasites	II	15	15	0	0,5	0,5	1,0
3	Molecular, Personalized and Regenerative Medicine	II	15	15	0	0,5	0,5	1,0
4	Sexology	II	20	20	0	0,7	0,6	1,3
5	Philosophical Anthropology	III и IV	30	30	0	1,0	1,0	2,0
6	Medical Communication	III и IV	30	30	0	1,0	1,0	2,0
7	Clinical Anatomy	III, IV и V	60	48	12	2,0	2,0	4,0
8	Creating Skills and Developing Multimedia presentations	IV	20	0	20	0,7	0,6	1,3
9	Applied Neuroscience	IV	20	10	10	0,7	0,6	1,3
10	Health Technology Assessment	IV	20	20	0	0,7	0,6	1,3
11	Fetal and Placental pathology	VIII	16	16	0	0,5	0,5	1,0
12	Cross- Cultural Psychiatry	V	20	10	10	0,7	0,6	1,3
13	Person- Centered Medicine	V	20	10	10	0,7	0,6	1,3
14	Medical Bulgarian	V	20	0	20	0,7	0,6	1,3
15	Sports Physiology and Sports Medicine	VII и VIII	40	30	10	1,4	1,3	2,7
16	First Physician Aid Challenges in Disasterous Events	VII и VIII	40	16	24	1,4	1,3	2,7
17	Functional Diagnostics of oxygen transport	VII и VIII	20	16	4	0,7	0,6	1,3
18	Clinical Homeopathy	VIII	20	20	0	0,7	0,6	1,3
19	Clinical Allergology	IX	20	12	8	0,7	0,6	1,3
20	Clinical Epidemiology	IX и X	30	20	10	1,0	1,0	2,0
21	Emergency medicine	IX и X	40	40	0	1,4	1,3	2,7
22	Emergencies in Neurosurgery	X	20	10	10	0,7	0,6	1,3
23	Plastic, Reconstructive and Aesthetic Surgery	X	16	16	0	0,6	0,5	1,1

	Optional Disciplines	Year	Academic hours				ECTS	Total ECTS
1	Management Psychology	2	30	30	0	1,0	1,0	2,0

2	Business Ethics in Healthcare Management	2	30	30	0	1,0	1,0	2,0
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	CLINICAL CLERKSHIP	Year	Semester	Calendar days	Hours	ECTS
1	Internal Diseases	3	after 6th	15 calendar days	75 (100 ac. h.)	3,3
2	Surgical Diseases	3	after 6th	15 calendar days	75 (100 ac. h.)	3,3
3	Internal Diseases	4	after 8th	15 calendar days	75 (100 ac. h.)	3,3
4	Surgical Diseases	4	after 8th	15 calendar days	75 (100 ac. h.)	3,3

	Pre-Diploma Clinical Clerkship/ State exam	Calendar days	Hours	ECTS PRE-Diploma clerkship	ECTS State exam
1	Internal Diseases	98	420 (560 ac. h.)	19,0	3,0
2	Surgical Diseases	91	390 (520 ac. h.)	17,0	3,0
3	Obstetrics and Gynaecology	42	180 (240 ac. h.)	8,0	3,0
4	Paediatrics	42	180 (240 ac. h.)	8,0	3,0
5	Hygiene, Epidemiology, Infectious Diseases and Social Medicine	35	150 (200 ac. h.)	7,0	3,0
6	Elective clerkship	21	90 (120 ac. h.)	4,0	
	Total:	329	1410 (1880 ac. h.)	63,0	15,0

After V year -

1. Internal Diseases

329 calendar days clinical clerkship, divided in the following disciplines:

- 98 calendar days
including

- 70 calendar days in Internal Diseases

- 14 calendar days in Neurology

- 7 calendar days Phthsiatrics

- 7 calendar days Dermatology

- 28 calendar days Surgery

- 7 calendar days Anaesthesiology

- 7 calendar days Ophthalmology

- 7calendar days Paediatric Surgery

- 7 calendar days Neurosurgery

- 7 calendar days Otorhinolaryngology

- 7 calendar days Cardiovascular Surgery

- 10 calendar days Urology

- 11 calendar days Orthopaedics

2. Surgical Diseases

- 91calendar day
including

3. Obstetrics and Gynaecology

- 42 calendar days

4. Paediatrics

- 42 calendar days

5. Hygiene, Epidemiology, Infectious Diseases and Social Medicine

- 35 calendar days,
including

- 12 calendar days

Hygiene

- 14 calendar days Infectious Diseases

- 7 calendar days Epidemiology

- 2 calendar days Social Medicine

6. Elective clerkship

- 21 calendar days

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
HUMAN BIOLOGY

Approved by the Department Council on 2 June 2022
Confirmed by the Faculty Council - Protocol №6/15.06.2022

HUMAN BIOLOGY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								1 st year	
		Total	Lectures	Practices	ECTS			I	II
Human Biology	II	105	60	45	3.5	6.5	10.0	2/1	2/2

DISCIPLINE:

Human Biology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master degree /M/

FORMS OF TRAINING:

Lecture courses, practical courses, self-training.

YEAR OF TRAINING:

1st year

DURATION OF TRAINING:

1st and 2nd semesters

ACADEMIC HOURS:

60 hours of lecture courses, 45 hours of practical courses.

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Microscopes, permanent and temporary microscopic preparations, cell cultures, audiovisual equipment, tools and technical devices for illustration and performance of molecular, cellular and immunological methods, laboratory protocols, test books.

FORMS OF EVALUATION:

lecture courses, practical courses, seminars, individual work with outstanding students.

EVALUATION CRITERIA:

✓ *Ongoing evaluation* – weekly tests, oral examinations, colloquia on different syllabus sections, participation in seminars and elective courses.

✓ *Final evaluation* – combined written test and practical exam.

ASPECTS OF EVALUATION CRITERIA:

Participation in seminars, weekly tests, practical exam on microscopic slides.

SEMESTER EXAM:

Yes / written and oral examination, practical exam /

STATE EXAM:

No

LECTURER:

Full Professor from the Department of “Medical Biology”

DEPARTMENT:

“Medical Biology”

ANNOTATION

The discipline Biology allows students to acquire knowledge and skills in the following basic biological concepts:

- Molecular foundations of life – biological macromolecules
- Realization of genetic information and Genetic code
- Organization of the genetic material in the cell
- Karyotype
- Genetic engineering
- Biology of the cell
- Reproduction
- Individual development
- Immunological homeostasis
- Molecular evolution
- Biology of parasites

BASIC AIMS OF THE DISCIPLINE:

The objective of the biology course is to develop:

- The understanding that living systems, including humans, have hierarchically ordered levels of organization with their own specificity and rules that determine biological features and functions.
- The notion that humans, as a product of biological evolution, are ecologically connected to the development of nature and of the biosphere as a whole.
- The ability to apply biological rules as scientific theory and methodology of medicine.
- Practical skills and knowledge of basic biological techniques with medical application.
- The understanding that disorders in molecular-biological, cell-biological and immunological mechanisms are related to the development of human pathology.
- Knowledge of modern methods of diagnostics and treatment based on medical-biological principles.

COURSE TASKS

Proficiency in the most important properties and manifestations of the organismal world and humans in particular:

- heredity and variability;
- molecular and cell biology;
- reproduction and individual development of organisms;
- immunological homeostasis;
- morphology and biological cycle of medically important parasites.

EXPECTED RESULTS

1. *Theoretical knowledge* – mastering and analysis of:
 - ✓ hierarchical levels and structural organization of the human organism (molecular, cellular and systemic)
 - ✓ genetic structures and processes of transfer of genetic and epigenetic information
 - ✓ mechanisms of immunological homeostasis
 - ✓ morphology and biology of parasites
2. *Practical skills*:
 - ✓ preparation of temporary and permanent microscopic slides
 - ✓ detection of parasites
 - ✓ light microscopy
 - ✓ cell culture training
 - ✓ karyotyping
 - ✓ basic immunological reactions
 - ✓ blood typing
 - ✓ basic molecular biology methods
 - ✓ basic cellular biology methods

LECTURES

PROGRAM OF BIOLOGY LECTURES FIRST SEMESTER

№	LECTURE COURSES	HOURS
1.	Organization of genetic material in eukaryotic cell. Structure of the chromosomes.	2
2.	Karyotype. Pathological karyotype.	2
3	Cell division.	2
4.	Apoptosis.	2
5.	Meiosis. Gametogenesis.	2
6.	Fertilization.	2
7.	Nucleic acids.	2
8.	Replication of DNA.	2
9.	Transcription. Translation. Genetic code.	2
10.	Epigenetics. Gene and chromosomal mutations.	2
11.	Tumor biology.	2
12.	Genetic engineering.	2

13.	Molecular engineering. Gene therapy.	2
14.	Immunological homeostasis.	2
15.	Innate immunity.	2
	TOTAL	30

SECOND SEMESTER

№	LECTURE COURSES	HOURS
1.	Antigens. Characterization and classification of antigens.	2
2.	Immune system. Fate of the antigen in the body.	2
3.	Immunocompetent cells - types, characteristics, functions. Differentiation.	2
4.	Antibodies – classification, structure and types. Complement.	2
5.	Immunology of blood group antigens. Secretor status. Alloantigens – blood group antigens. System AB0(H) and Rhesus.	2
6.	Essence of the immune response. Types, kinetics and genetics of the immune response.	2
7.	Major histocompatibility complex (MHC).	2
8.	Antigen recognition, processing and presentation. Cellular interactions in the immune response.	2
9.	Immunological tolerance. Reproductive immunology.	2
10.	Immunology of transplantations.	2
11.	Tumor immunology.	2
12.	Immunology of HIV. AIDS	2
13.	Immunity in stress.	2
14.	Hypersensitivity reactions.	2
15.	Immunity in immunosenescence (aging).	2
	TOTAL	30

PRACTICES

PROGRAM OF BIOLOGY PRACTICAL COURSES

FIRST SEMESTER

№	PRACTICAL COURSES	HOURS
1.	Microscope. Microscopy techniques. Basic laboratory equipment.	2
2.	Organization of genetic material in cell. Karyotype.	2
3.	Nucleic acids. Replication of DNA.	2
4.	Transfer of genetic information. Transcription.	2
5.	Translation. Genetic code. Gene mutations.	2
6.	Numerical and Structural chromosomal mutations.	2
7.	Molecular Medicine. Application of PCR methods.	2
8.	Cell division. Mitosis. Apoptosis. Tumor biology.	2
9.	Meiosis. Gametogenesis. Fertilization.	2
	TOTAL	18

SECOND SEMESTER

1.	Introduction to parasitology. Parasite-host interactions.	2
2.	Subkingdom Protozoa. Subphylum Sarcodina. Phylum Ciliophora.	2
3.	Subkingdom Protozoa. Subphylum Mastigophora.	2
4.	Subkingdom Protozoa. Class Sporozoa.	2
5.	Phylum Platyhelminthes. Class Trematoda.	2
6.	Phylum Platyhelminthes. Class Cestoda.	2
7.	Phylum Nematelminthes. Class Nematoda.	2
8.	Phylum Arthropoda. Order Acarina. Class Insecta.	2
9.	Seminar with presentations and practical exam.	1
10.	Innate and acquired immunity. Antigens. Blood-Group Antigens.	2
11.	Primary and secondary immune organs. Immune cells. Intercellular interactions.	2
12.	Cellular and humoral immunity. Antibodies. Complement.	2
13.	Major histocompatibility complex (MHC). Tumor immunology.	2
14.	Hypersensitivity reactions. Immunological tolerance. Antibody	2

	synthesis genetics.	
	TOTAL	27

LECTURES

LECTURE №1 - 2 hours. Organization of genetic material in eukaryotic cell. Structure of the chromosomes.

Submicroscopic structure of chromosomes – levels of organization of chromatin. Microscopic structure of chromosomes: a) types; b) eu- and heterochromatin. Sex chromatin.
c) linear differentiation of chromosomes; d) Lamp-brush chromosome; (e) polyten chromosomes.

LECTURE №2 – 2 hours. Karyotype. Pathological karyotype.

Normal human karyotype, types of chromosomes, karyotyping. Abnormal karyotype - autosomal and gonosomal anomalies.

LECTURE №3 – 2 hours. Cell division.

Individual development of the cells. Cell cycle. Mitosis – phases and mechanisms. Cytokinesis. Regulation of the cell cycle.

LECTURE №4 – 2 hours. Apoptosis.

Programmed cell death. Characteristics, mechanisms, and genetic control.

LECTURE №5 – 2 hours. Meiosis. Gametogenesis.

Sexual reproduction – essence. Cytological foundations of sexual reproduction (meiosis): a) mechanism; b) significance of meiosis. Gametogenesis: a) oogenesis; b) spermatogenesis. Origin of germ cells.

LECTURE №6 – 2 hours. Fertilization.

Fertilization: a) types; b) fertilization in mammals and humans – mechanism.

LECTURE №7 – 2 hours. Nucleic acids.

Nucleic acid structure. DNA: a) helicoidal model; b) conformation; c) DNA functions. RNA – types, structure and functions. RNA – types, structure and functions

LECTURE №8 – 2 hours. Replication of DNA.

Semi-conservative type of replication - essence, experimental evidence. Required elements for DNA replication. Replication of linear DNA molecules: a) replication in prokaryotes; (b) virus and phage replication; c) replication in eukaryotes. Replication of circular DNA molecules. Replicative synthesis: a) accuracy of DNA synthesis; (b) correction of errors and repair of DNA damage.

LECTURE №9 – 2 hours. Transcription. Translation. Genetic code.

Transcription- characteristics, required elements for Transcription. Transcription in prokaryotes: a) characteristics; b) mechanism. Transcription in eukaryotes: a) characteristics; b) mechanism c) maturation of the primary transcript. Translation – definition, required elements. Mechanism of translation. Post-translational modifications of proteins. Characteristics of the genetic code.

LECTURE №10 - 2 hours. Epigenetics. Gene and chromosomal mutations.

Epigenetics. Mutations: (a) characteristics and classification; (b) gene mutations; c) chromosomal mutations; d) genomic mutations. Mutagenic factors. Hereditary diseases.

LECTURE №11 - 2 hours. Tumor Biology.

Biological characteristics of tumor cells. Genetic control of tumorigenesis.

LECTURE №12 - 2 hours. Genetic engineering

Methods on population, organisms and cellular level.

LECTURE №13 – 2 hours. Molecular engineering. Gene therapy.

Gene therapy. Methods for isolation and synthesis of genes. Obtaining of recombinant DNA. Methods for introducing genes into somatic cells. Vectors. Control of gene expression. Gene therapy. Achievements and perspectives.

LECTURE №14 – 2 hours. Immunological homeostasis.

Immunological homeostasis – essence. Mechanisms for maintenance of immunological homeostasis. Types of immune response. Innate and acquired immunity, cellular and humoral.

LECTURE №14 – 2 hours. Innate immunity.

Innate immunity - mechanisms: a) barrier mechanisms; (b) phagocytosis; (c) complement; (d) soluble factors.

LECTURE №15 – 2 hours. Antigens. Characterization and classification of antigens.

Antigens – characteristics. Natural antigens – classification. Types of antigenic specificity.

LECTURE №16 – 2 hours. Immune system. Fate of the antigen in the body.

Functions and features of the immune system. Central and peripheral organs. Routes for antigen elimination.

LECTURE №17 – 2 hours. Immunocompetent cells - types, characteristics, functions. Differentiation.

Cells of the immune response: a) types, characteristics, functions; b) stages in the differentiation of immunocompetent cells.

LECTURE №18 – 2 hours. Antibodies – classification, structure and properties. Basic antibody classes. Complement.

Antibodies: a) classification; b) structure and properties; c) mechanism of action. Basic classes of antibodies. Antibody functions. Complement.

LECTURE №19 – 2 hours. Alloantigenic systems in humans. The ABO (H) system. Rhesus system.

Human alloantigenic systems. Genetics and biochemistry of ABO (H) and Rhesus systems. Origin and biological significance of alloantigens.

LECTURE №20 – 2 hours. Nature of the immune response. Types, kinetics and genetics of the immune response.

Nature of the immune response. Kinetics of the immune response. Immunoglobulin genes. Mechanism of allelic exclusion and somatic recombination. Genetic mechanism of differentiation of immunocompetent cells. Antibody class switching - mechanism and biological importance.

LECTURE №21 – 2 hours. Major histocompatibility complex.

Antigens of tissue compatibility. Genes of the MHC complex. Genetics, structure and functions.

LECTURE №22 – 2 hours. Antigenic recognition, processing and presentation. Cellular interactions.

Antigenic recognition, processing and presentation. Mediators of the immune response. Cytokines and cytokine network. Cellular interactions in the immune response.

LECTURE №23 – 2 hours. Immunological tolerance. Reproductive immunology.

Types of immune tolerance: a) natural b) induced - conditions and mechanisms of development. Immunobiology of gametes and fertilization. Immunobiology of the placenta. Immunity in pregnancy.

LECTURE №24 – 2 hours. Transplantation immunology.

Transplantation immunology. Types of transplantation. Basic biological principles. Immune response in graft rejection. GVHD.

LECTURE №25 – 2 hours. Tumor immunology.

Tumor antigens: (a) tumor-specific antigens; b) tumor-associated antigens. Mechanisms of anti-tumor protection. Immunological aspects of tumor growth.

LECTURE №26 – 2 hours. Immunology of HIV. AIDS.

Biological characteristics of HIV. Reproduction mechanism. Modes of transmission. Immunological aspects of AIDS.

LECTURE №27 – 2 hours. Immunity in stress.

Definition for stress. Acute and chronic stress. Inducible factors. The effects of stress on the innate and adaptive immunity. Clinical consequences of the crosstalk between stress proteins and immune signaling molecules.

LECTURE №28 – 2 hours. Hypersensitivity reactions.

Hypersensitivity reactions – classification, mechanisms, basic characteristics, immunopathology.

LECTURE №29 – 2 hours. Immunity in immunosenescence (aging).

Aging at the cellular level. Age-associated developmental changes in primary lymphoid tissue and immune cells. The effects of aging on the innate and adaptive immunity. Interplay between the immune, endocrine, and nervous systems.

PRACTICES

PRACTICAL №1 – 2 hours. Microscope. Microscopy techniques. Basic laboratory equipment.

Structure of the microscope. Rules for microscopy: a) dry system; b) oil immersion system. Observation of a microscopic slide of blood smears and human fibroblasts in cell culture. Basic rules. Laboratory algorithm. Work with laboratory scales. The principles of centrifugation.

PRACTICAL №2 – 2 hours. Organization of genetic material in cell. Karyotype.

Microscopic and submicroscopic structure of eukaryotic chromosomes. Levels of DNA packaging. Genetic and epigenetic control of gene expression. Euchromatin and heterochromatin. X-chromosomal inactivation. Normal human karyotype. Grouping of human chromosomes. Chromosome staining. Preparation and examination of microscopic metaphase plates and Barr body. Clinical cases.

PRACTICAL №3 – 2 hours. Nucleic acids. Replication of DNA.

Structure of DNA. Differences with RNA. Chargaff's rules. Helicoidal model. Factors and mechanism of circular and linear DNA molecule replication. Genetic tasks.

PRACTICAL №4 – 2 hours. Transfer of genetic information. Transcription.

Transcription units in eukaryotes and prokaryotes. Mechanism and stages of transcription. Necessary factors. RNA processing and splicing. Post-transcriptional modifications. Genetic tasks.

PRACTICAL №5 – 2 hours. Translation. Genetic code. Gene mutations.

Mechanism and stages of translation. Necessary factors. Characteristics of the genetic code. Classification of gene mutations. Effects of point mutations. Genetic tasks. Clinical cases.

PRACTICAL №6 – 2 hours. Numerical and Structural chromosomal aberrations.

Mechanism of occurrence and classification of chromosomal mutations. Genomic mutations. Medical significance of trisomies and monosomies. Pathological human karyotype. Clinical cases.

PRACTICAL №7 – 2 hours. Molecular Medicine. Application of PCR methods.

Isolation of genomic DNA from buccal mucosa. Basic steps and protocols for isolation of genomic DNA. Spectrophotometric measurement of DNA and RNA. Principle of PCR - reaction. Steps and

necessary reagents. PCR for detection of X- and Y-linked genes. Analysis of PCR products on agarose gel electrophoresis. Quantitative PCR (qPCR). DNA sequencing. Clinical cases.

PRACTICAL №8 – 2 hours. Cell division. Mitosis. Apoptosis. Tumor biology.

Phases of the cell cycle. Types of cell death. Characteristics of apoptosis and necrosis of normal and tumor cell. Mechanisms of tumor growth. Oncogenes and protooncogenes. Comet assay for apoptosis. Clinical cases.

PRACTICAL №9 – 2 hours. Meiosis. Gametogenesis. Fertilization.

Main features of sexual reproduction. Stages of meiosis. Differences between mitosis and meiosis. Mechanism and stages of fertilization. Preparation of permanent microscopic slides and staining of sperms from different species. Observation of cell division in cell cultures. Work with inverted microscope. Clinical cases.

PRACTICAL №10 – 2 hours. Introduction to parasitology. Parasite-host interactions.

Introduction to parasitology. Basic terms. Relationships between parasites and hosts. Classification of parasites. Modes of transmission. Methods for detection of parasites.

PRACTICAL №11 – 2 hours. Subkingdom Protozoa. Subphylum Sarcodina. Phylum Ciliophora.

Subphylum Sarcodina – general characteristic. Genus *Entamoeba*: *Entamoeba histolytica*; *Entamoeba coli*. Genus *Balantidium*: *Balantidium coli*. Observation of permanent microscopic slides. Clinical cases.

PRACTICAL №12 – 2 hours. Subkingdom Protozoa. Subphylum Mastigophora.

Subphylum Mastigophora – general characteristic. Genus *Trypanosoma*: *Trypanosoma gambiense*, *Trypanosoma cruzi*. Genus *Leishmania*: *Leishmania donovani*, *Leishmania tropica*. Genus *Trichomonas*: *Trichomonas vaginalis*, *Trichomonas tenax*, *Trichomonas hominis*. Род *Giardia*: *Giardia lamblia*. Observation of permanent microscopic slides. Clinical cases.

PRACTICAL №13 – 2 hours. Subkingdom Protozoa. Class Sporozoa.

Class Sporozoa – general characteristic. Genus *Plasmodium*: *Plasmodium vivax*; *Plasmodium malarie*; *Plasmodium falciparum*; *Plasmodium ovale*. Observation of the ring trophozoite, schizont, merozoites, gametocytes in blood smears (permanent microscopic slides). *Toxoplasma gondii*. Clinical cases.

PRACTICAL №14 – 2 hours. Phylum Platyhelminthes. Class Trematoda.

Class Trematoda (flukes) – general characteristic. Genus Fasciola – *Fasciola hepatica*. Genus Dicrocoelium – *Dicrocoelium dendriticum*. Genus Opisthorchis – *Opisthorchis felinus*. Genus Schistosoma – *Schistosoma haematobium*; *Schistosoma japonicum*; *Schistosoma mansoni*. Observation of eggs and adult forms on permanent microscopic slides. Clinical cases.

PRACTICAL №15 – 2 hours. Phylum Platyhelminthes. Class Cestoda.

Class Cestoda – general characteristic. Genus Taenia: *Taenia solium*. Taeniarhynchus: *Taeniarhynchus saginatus*; Genus Echinococcus: *Echinococcus granulosus*. Genus Diphyllbothrium: *Diphyllbothrium latum*. Observation of eggs, scolex, proglottides, strobila on permanent microscopic slides. Clinical cases.

PRACTICAL №16 – 2 hours. Phylum Nematelminthes. Class Nematoda.

Class Nematoda – general characteristic. Genus Ascaris: *Ascaris lumbricoides*. Genus Enterobius: *Enterobius vermicularis*. Genus Trichuris: *Trichuris trichiura*. Genus Trichinella: *Trichinella spiralis*. Observation of eggs on permanent microscopic slides. Clinical cases.

PRACTICAL №17 – 2 hours. Phylum Arthropoda. Order Acarina. Class Insecta.

General characteristics, distribution, classification, biological cycle, medical significance. Observation of eggs, larvae, nymphs. Microscopic slide of: *Sarcoptes scabiei*, *Pediculus capitis*; *Pediculus hominis*; *Phthirus pupis*; *Pulex irritans*; *Culex*, *Anopheles*. Comparison of eggs, larvae, wings, adult forms of malarial and non-malarial mosquitoes. Clinical tasks. Seminar.

PRACTICAL №18 – 2 hours. Seminar with presentations and practical exam.

Presentations on topics related to Arthropods: Lyme Disease, Japanese River Fever, Dengue fever, Plague, Marseilles fever, Chagas Disease, Zica Fever, Filariasis, Typhus, Babesiosis, Oncocercosis, Pediculosis and Phtyriasis, Scabies. Observation and analysis of microscopic and macroscopic preparations.

PRACTICAL №19 – 2 hours. Innate and acquired immunity. Antigens. Blood-Group Antigens.

Characteristics of innate and acquired immunity. Characteristics and classification of antigens. Blood Group ABO (H). Haemagglutination reaction for blood typing and Rh-factor detection. Blood typing with monoclonal antibodies. Determination of C-reactive protein with agglutination test. Interpretation of results. Clinical tasks.

PRACTICAL №20 – 2 hours. Primary and secondary immune organs. Immune cells.

Intercellular interactions.

Structure and function of lymphoid organs. Types and characteristics of immune cells - T- and B-cell subpopulations, NK cells, antigen-presenting cells, other cells. Intercellular interactions in the immune response. Reaction precipitation. Phagocytosis test. NBT-test. Clinical cases.

PRACTICAL №21 – 2 hours. Cellular and humoral immunity. Antibodies. Complement.

Specifics and connection between cellular and humoral immunity. Structure and function of antibodies. Key features of different antibody classes. Primary and secondary immune response. Complement. Types of ELISA methods for determining antigens and antibodies. Standard preparation. Protocol for ELISA. Clinical cases.

PRACTICAL №22 – 2 hours. Major histocompatibility complex (MHC). Tumor immunology.

Structure and function of the MHC. Tumor-associated and tumor-specific antigens. Mechanisms of tumor survival. Immunohistochemistry. Immunofluorescence. Protocol for determination of tumor antigens by immunohistochemistry. Clinical cases.

PRACTICAL №23 – 2 hours. Hypersensitivity reactions. Immunological tolerance. Genetics of antibody synthesis.

Hypersensitivity reactions – classification, mechanisms, cells or molecules involved, diseases. Western blot, immunoelectrophoresis, flowcytometry. Clinical cases.

BIBLIOGRAPHY

1. Bios instant notes. Molecular Biology by A. McLennan, A. Bates, P. Turner, M. White. 2013, 4th edition, Garland Science, Taylor & Francis Group.
2. Bios instant notes. Immunology by P. Lydyard, A. Whelan, M. Fanger. 2003, 3rd edition, Garland Science, Taylor & Francis Group.
3. Basic Immunology: Functions and Disorders of the Immune System by A. K. Abbas, A.H. Lichtman, Shiv Pillai. 2012, 4th edition, Elsevier.
4. Human Biology by C. Starr and B. McMillan B. 2014, 10th edition, BOOKS/COLE.
5. Alexandrov V., Feodorova Y., Filipova M., Kazakova M., Mehterov N., Sarafian V. Parasitology. Manual for first year students in medicine and dental medicine. Plovdiv, 2016.
6. Feodorova Y., M. Kazakova, V. Alexandrov, N. Mehterov, V. Sarafian. Ed. V. Sarafian. Tests in Medical Biology. ISBN: 978-619-7085-88-4, 2017.

7. Sarafian V., M. Kazakova, M. Draganova, N. Mehterov. Practical Book. Medical Biology for first year students. 3rd edition Medical University Plovdiv ISBN; 978-619-237-016-9, 2020.

CONSPECTUS

MOLECULAR AND CELL BIOLOGY

1. Nucleic acids. DNA – localization and structure. The double helix model. Chargaff's rules. DNA conformations.
2. Nucleic acids. Linear and circular DNA. DNA functions. Mitochondrial DNA – characteristics, functions.
3. Nucleic acids. RNA – structure and types, functions. Differences between RNA and DNA.
4. Replication of DNA. Necessary elements and mechanism. Replication of linear DNA molecules. Fidelity of replication.
5. Replication of circular DNA molecules. Differences between prokaryotic and eukaryotic replication.
6. Transcription. Necessary elements, stages and mechanism. Reverse transcription.
7. Transcription in prokaryotes and in eukaryotes – comparison. Processing of mRNA.
8. Translation. Necessary elements, stages and mechanism.
9. Transfer of genetic information. The Central dogma. The genetic code – characteristics.
10. Gene therapy – vectors, principles.
11. Mutations – characteristics and types. Gene rearrangements and point mutations.
12. Genetic engineering – pre and post – zygotic selection, in vitro fertilization.
13. Genetic engineering – cellular hybridization, fusion of embryos (hymeras), animal cloning.
14. Molecular engineering. Recombinant DNA technologies.
15. Submicroscopic structure of chromosomes. Chromatin.
16. Microscopic structure of chromosomes. Types of chromosomes.
17. Epigenetic control of gene expression. X – chromosome inactivation. Genomic imprinting.
18. The normal human karyotype. Numerical chromosomal mutations – aneuploidy and polyploidy.
19. Structural chromosomal mutations – deletions, duplications, inversions, translocations.
20. The eukaryotic cell cycle. Mitosis. Cell cycle regulation – cyclins and Cdk.
21. Apoptosis. Characteristics. Genetic control, mechanisms, detection.
22. Tumor biology.
23. Biology and genetics of cancer. Tumor-suppressor genes and oncogenes.

24. Meiosis – mechanism and stages. Differences between mitosis and meiosis.
25. Gametogenesis. Spermatogenesis. Oogenesis.
26. Fertilization.
27. Basic molecular biology techniques - PCR, DNA sequencing, DNA electrophoresis.

IMMUNOLOGY

28. Innate and adaptive immunity. Characteristics of the immune response.
29. Innate immunity – factors and mechanisms.
30. Adaptive immunity. Fate of the antigen.
31. The immune system. Central and peripheral lymphoid organs.
32. Antigens – characteristics, types. Haptens.
33. Human alloantigens. Blood group antigens ABO (H), Se and Rhesus.
34. Cells and molecules of the immune system. B-cells, T-cells. Characteristics and functions.
35. APC, NK-cells. Characteristics and functions.
36. Intercellular communications in the immune response. Activation of T- and B-cells. Cytokines.
37. Kinetics of the immune response. Humoral and cellular immunity. Primary and secondary immune response. Immunological memory.
38. The Complement system – characteristics and functions.
39. Antibodies – structure and function. Immunoglobulin classes and characteristics.
40. MHC – complex. Structure and function. MHC restriction.
41. Transplantation immunology. Immune response in graft rejection. Graft versus host reaction.
42. Tumor immunology. Tumor antigens. Tumor escape mechanisms. Immune response to tumors.
43. Immunobiology of HIV/AIDS. AIDS.
44. Hypersensitivity reactions – general characteristics and types.
45. Antigen-antibody reactions. Agglutination, precipitation, immunoelectrophoresis, Western blotting, ELISA, immunofluorescence, flowcytometry, immunohistochemistry - principles and application.

BIOLOGY OF PARASITES

46. Parasitism as a biological phenomenon. Parasites and hosts. Adaptation of the parasite to the host.
47. Relationships and interactions between the parasite and the host.
48. Subkingdom *Protozoa*. Subphylum *Sarcodina*. Genus *Entamoeba* – *Entamoeba histolytica*, *Entamoeba coli*, *Entamoeba gingivalis*.
49. Subkingdom *Protozoa*. Subphylum *Mastigophora*. Order *Kinetoplastida*. Genus *Trypanosoma* – *Trypanosoma gambiense*, *Trypanosoma cruzi*.

50. Subkingdom *Protozoa*. Subphylum *Mastigophora*. Order *Kinetoplastida*. Genus *Leishmania* – *Leishmania donovani*, *Leishmania tropica*.
51. Subkingdom *Protozoa*. Subphylum *Mastigophora*. Order *Diplomonadida*. Genus *Trichomonas* – *Trichomonas hominis*, *Trichomonas tenax*, *Trichomonas vaginalis*. Genus *Giardia* - *Giardia lamblia*.
52. Class *Sporozoa*. Malarial plasmodia - types. Morphology and biological cycle.
53. Class *Sporozoa*. *Toxoplasma gondii*.
54. Subkingdom *Protozoa*. Phylum *Ciliophora*. *Balantidium coli*.
55. Phylum *Platyhelminthes*. Class *Trematoda*. Morphology and general characteristics. *Fasciola hepatica*. *Dicrocoelium dendriticum*. *Opisthorchis felinus*.
56. Genus *Schistosoma*. *Sch. haematobium*. *Sch. japonicum*, *Sch. mansoni*.
57. Phylum *Platyhelminthes*. Class *Cestoda*. Morphology and general characteristics. *Diphyllobothrium latum*.
58. Phylum *Platyhelminthes*. Class *Cestoda*. *Taenia solium*. *Taenia saginata*.
59. Phylum *Platyhelminthes*. Class *Cestoda*. *Echinococcus granulosus*.
60. Phylum *Nemathelminthes*. Class *Nematoda*. Morphology and general characteristics. *Ascaris lumbricoides*.
61. Class *Nematoda*. *Enterobius vermicularis*. *Trichuris trichiura*. *Trichinella spiralis*.

62. Phylum *Nemathelminthes*. Class *Nematoda*. *Strongiloides stercorolis*. *Ancylostoma duodenale*. *Wuchereria bancrofti*. *Dracunculus medinensis*.
63. Phylum *Arthropoda*. Order *Acarina* - morphology, biological cycle, medical importance of ticks. *Sarcoptes scabiei*.
64. Class *Insecta*. Morphology and general characteristics. Order *Anoplura* /lice/. *Pediculus capitis*, *Pediculus vestimenti*, *Phthirus pubis*.
65. Order *Aphaniptera* /fleas/.
66. Order *Diptera* - genus *Culex*, genus *Anopheles*. *Phlebotomus papatasi*.
67. Family *Muscidae*, *Glossina palpalis*.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

PHYSICS

Approved by the Department Council - Protocol №93/09.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

**Physics
Syllabus**

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
								1 st year
Physics	I	Total	Lectures	Practices	ECTS	3.0	6.0	I
		90	45	45	3.0			3/3

DISCIPLINE: Physics

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: Mandatory

LEVEL OF QUALIFICATION: Master (MSc)

FORMS OF TRAINING: : Lectures, laboratory practicals, seminars, research involvement for talented students.

YEAR OF TRAINING: 1-st year

DURATION OF TRAINING: one semester

ACADEMIC HOURS: 45 hours of lectures, 45 hours of practicals

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Laboratory audiometers, portable Ultrasonography device, laboratory model of hemodialyzer, spectrophotometers, functional generators, oscilloscopes, electrotomy apparatus, optical and electrical transducers, microscopes, simulator of cardiac pacemaker, lasers.

FORMS OF EVALUATION: Practical tests, presentations, oral discussions, final exam

EVALUATION CRITERIA: The final grade (FG) is calculated according to the formula:
 $FG = 0.3 \cdot X + 0.7 \cdot Y$, where X is the accumulated grade from semestrial practical activity and tests, Y is grade from final exam.

ASPECTS OF EVALUATION CRITERIA:

1. **Running evaluation (criteria for the grade)** – activity and demonstration of knowledge during classes, participation in the laboratory exercises with building of manual technical and theoretical skills, ability to correctly measure, collect, analyze, and present data from experiments. Ability to make research (books, internet) in certain topics and to summarize useful information. Ability to present data in tables and graphs.
2. **Midterm evaluation** (average grade from all the running evaluations)
3. **Final grade** (result of final exam – combination of MCQ's test, written and oral exam).

SEMESTER EXAM: Written exam consisting of MCQ's test and open questions

STATE EXAM: no

LECTURER: Professor from department of Medical physics and Biophysics

DEPARTMENT: Medical physics and Biophysics

ANNOTATION

Medical physics subject has a place to build understanding and knowledge for the basic concepts significant as a ground for further educational upgrade for students in medicine and particularly in the fields related with:

- Mechanically based (sound and ultrasound) concepts and methods for diagnostics, imaging and therapy in medicine (including skills to measure blood pressure and to perform audiometry);
- Properties of surface of the liquids, abilities to modulate surface tension by surface-active substances, prediction of behavior and changes of certain physiological liquids properties by addition of positively and negatively active structures.
Possible clinical use;
- Haemodialysis machine simulator – application of physical methods in evaluation of purification process parameters;
- Transducers principles, applications, types of transducers. Skills to use different transducers in laboratory and preclinical measurements.
- Basics of electro-diagnostics: passive and active methods. Rheography. Skin impedance measure. Experimental electro-muscle stimulation.
- Electrophoresis – preparatory paper based separation of fractions.
- Medical procedures with direct and alternating currents. Theory of therapy by electromagnetic fields.
- Origin of magnetic field. Human tissue sensitivity to magnetic field. Magnetic resonance imaging (MRI). Image formation.
- Visible light photons properties. Wave-particle duality. Reflection, refraction, full inner light reflection, light absorption and scattering. Light based methods in medicine.
- Ultraviolet radiation parameters, bands and their specific properties. Biological action of A, B and C bands radiation. Protection methods against harmful action of ultraviolet radiation.
- Properties of Infrared radiation and application in medical diagnostics.
- Luminescence processes in biology and medicine. Luminescent analysis.
- Parameters of laser radiation Medical applications of different wavelengths of coherent laser radiation. High intensity lasers in surgery. Low intensity interactions: photobiological effects, stimulation, photodynamic therapy.
- Observation of micro-objects in biological and medical investigations. Principles of optical microscopy. Requirements for magnification, resolution and method of observation depending on the type of the objects.

- Optical system of human eye. Physiological aberration in vision and methods Optic disorders, correction. Spectral sensitivity of the eye.
- Directly and indirectly ionizing radiations. Interactions between radiation and biological matter.
- X-rays production – roentgen tube. Medical applications of X-rays in imaging Computed tomography.
- Radioactivity. Radio-pharmaceutics as diagnostics agents. Rules and requirements in medical diagnostics by radio-pharmaceutics.
- Gamma-camera, SPECT- and PET- systems.
- Dosimetry of the ionizing radiations.
- Basics of radio-therapy. Linear accelerators, cyber knife, brachytherapy.

BASIC AIMS OF THE DISCIPLINE

The goal of the subject of medical physics is:

1. To form theoretical fundament of principles underlying medical diagnostics, and therapy;
2. To build practical skills in laboratory simulation of medical data acquisition;
3. To give opportunity for work with measuring, recording and displaying devises used in laboratory practice and research.

The main tasks of the course program are to build understanding for:

Fundamental physical laws underlying biological phenomena in human body.

The physical principles applied in laboratory and clinical techniques of measurement in medicine.

Potential of different physical agents to serve as medical information transduction and therapeutic instruments.

EXPECTED RESULTS

Upon completion of the lecture and practical course in medical physics, and successful pass the final exam, students are expected to become competent in:

1. Theoretical knowledge:

1.1 Understanding of basic quantities and units

1.2 Analytical and graphical presentation of physical relationships

1.3 Understanding the principles of basic medical equipment used for diagnostic and therapy.

2. Practical skills:

2.1 Conduction and analysis of an audiometric test;

2.2 Measurement and calculation of blood speed using Doppler ultrasound device;

2.3 Measurement of blood pressure;

2.4 Use of different types of transducers in measurements and plotting of graphs by data obtained;

2.5 Measuring of electric signals with oscilloscope;

2.6 Collecting and presenting experimental data in tables and graphs, with statistical analysis;

2.7 Determination of the amount of radionuclide used for diagnostics, and the dose for radiation treatment;

2.8 Application of appropriate methods in observations by optical microscope

2.9. Determination of the type and refractive power of correction lenses in case of eye visibility disorders.

LECTURES

№	LECTURE COURSES	HOURS
1.	<p>1. Mechanical waves. Sound. Physical characteristics of sound: pressure, intensity, frequency, wavelength, propagation speed, acoustic impedance, spectrum.</p> <p>2. Psychophysical characteristics of sound: intensity level, loudness, pitch, timber. Auditory area.</p>	3
2.	<p>3. Sound diagnostics and therapy methods: auscultation, blood pressure measurement, audiometry, phonocardiography, extracorporeal lithotripsy.</p> <p>4. Ultrasound (US). Physical properties. Production and detection of US for medical purposes.</p>	3

	5. US imaging. Ultrasonography modes.	
3.	6. US therapy. Sonophoresis. HIFU 7. Infrasound (IS). Physical properties. IS sources. Influence of IS on human body.	3
4.	8. Gradients. Transfer processes: diffusion, internal friction, heat conduction. Medical methods based on transfer processes. 9. Structure of liquids. Molecule pressure and surface tension. Additional (Laplace) pressure. Embolism.	3
5.	10. Movement of fluids. Laminar and turbulent flow. Steady flow. Poiseuille's law. 11. Blood flow in cardiovascular system. Pulse wave. 12. Mechanics of breathing. Surfactant.	3
6.	13. Direct, pulsing and altering current. Ohm's law. Components of electric circuits and their properties. Impedance. 14. asound (IS). Physical properties. IS sources. Influence of IS on human body.	3
7.	15. One-way and two-way current rectification. 16. Electrodiagnostics: passive and active diagnostics. Transducers. EIT (electric impedance tomography). EMG, EEG, EKG. 17. Electrotherapy. Medical procedures with direct and alternating currents. Therapy by electromagnetic fields.	3
7.	18. Electro conductivity of electrolytes. Faraday's law. Medical electrophoresis. 19. Electric currents in gases. Aeroions. Biological influence of aeroions. Ozone therapy.	3
8.	20. Magnetic properties of matter. Origin of magnetic field. 21. Magnetic resonance imaging (MRI). Image forming parameters ρ , T_1 , T_2 .	3

9.	<p>22. Electromagnetic radiation – spectrum, parameters. Wave-particle duality.</p> <p>23. Reflection, refraction, full inner reflection of light. Light absorption and scattering.</p>	3
10.	<p>24. Ultraviolet (UV) radiation: parameters, bands, sources of UV radiation. Biological action. Protection.</p> <p>25. Infrared (IR) radiation: parameters, bands, properties, sources. Biological action and application in image diagnosis (thermovision).</p>	3
11.	<p>26. Luminescence. Atomic conversions in luminescent light emission. Characteristics and laws of luminescence. Diagnostic methods using luminescence.</p> <p>27. Optical quantum generators - Lasers. Stimulated emission. Population inversion, three and four level scheme of generation. Laser components. Types of lasers.</p> <p>28. Parameters of laser radiation Medical applications of laser radiation.</p>	3
12.	<p>29. Observation of microobjects in medicine. Microscope – optic scheme, magnification. Optical resolution. Observation modes by microscope.</p> <p>30. Human eye - optic system, refractive power, reduced schematic eye. Optic disorders, correction. Spectral sensitivity of the eye. Color vision.</p>	3
13.	<p>31. Ionizing radiation. Directly and indirectly ionizing radiations. Interactions between photon radiation and matter: photoelectric absorption, incoherent scattering (Compton effect), couple (e^-e^+) production. Attenuation of the radiation.</p> <p>32. X-rays (Roentgen radiation): nature, properties. Production of X-rays – roentgen tube. Characteristic and braking radiation.</p>	3
14.	<p>33. Medical applications of X-rays. X-ray imaging: radiography and radioscopy, conventional angiography, DSA, DEXA. Computed tomography. Hounsfield scale.</p> <p>34. Radioactivity. Radioactive decays, parameters, law. Radio-pharmaceutics.</p> <p>35. Nuclear medicine imaging. Gamma-camera, SPECT- and PET- systems.</p>	3
15.	<p>36. Dosimetry of the ionizing radiations. Dosimetric quantities and units: exposure, absorbed equivalent and effective dosage dose. Radiation and tissue weighting factor.</p> <p>37. Basics of radio-therapy. LINAC, cyber knife, brachytherapy.</p>	3

PRACTICES

Practical № 1 Error calculation of experimental results. Interpolation.	3h
Practical № 2 Audiogram – a method for diagnostics of the hearing apparatus	3h
Practical № 3 Physical basis of Doppler ultrasound imaging	3h
Practical № 4 Comparison of blood pressure values measured by two techniques – sphygmomanometry and oscillotonometry	3h
Practical № 5 Physical basis of hemodialysis. Hemodialyzer	3h
Practical №6 Transformation of non-electrical quantities. Calibration of semiconductor thermometer and photoelement	3h
Practical №7 Rectifiers. Determination of the parameters of low frequency alternating current pulses.	3h
Practical № 8 Generators of high frequency electromagnetic waves. Frequency ranges used in physiotherapy. Inductive and capacitive methods. Determination of the power of electromagnetic wave sources. Safety technique	3h
Practical № 9 Calculation of magnification and resolution of an optical microscope and choice of observation technique.	3h
Practical № 10 Possibilities for correcting myopia, hypermetropia, astigmatism and strabismus by optical lenses	3h
Practical № 11 Determination of beam divergence and power of a He-Ne laser	3h
Practical № 12 Practical assignments related to the types and quantities of radionuclides used in nuclear medicine	3h

Practical № 13 Obtaining the energy spectrum of the radionuclide ^{99m}Tc and determination of the position and width of the energy “window” of the installation for radionuclide diagnostics	3h
Practical № 14 Determination of irradiation duration and/or monitoring units in radiation therapy with high energy ionizing radiation	3h
Practical № 15 Seminar.	3h

BIBLIOGRAPHY

Lecture notes in medical physics, V. Turiyski, (electron format), 2021
 Biophysics Multiple Choice Questions Booklet, Edited by Prof. Atanas Krastev, DBSc, First Edition – 2018
 Notebook in medical physics – Edition 2017

SYLLABUS IN MEDICAL PHYSICS

Mechanics (acoustics and rheology)

1. Mechanical waves. Sound. Physical characteristics of sound: pressure, intensity, frequency, wavelength, propagation speed, acoustic impedance, spectrum.
2. Psychophysical characteristics of sound: intensity level, loudness, pitch, timber. Auditory area.
3. Sound diagnostics and therapy methods: auscultation, blood pressure measurement, audiometry, phonocardiography, extracorporeal lithotripsy.
4. Ultrasound (US). Physical properties. Production and detection of US for medical purposes.
5. US imaging. Ultrasonography modes.
6. US therapy. Sonophoresis. HIFU
7. Infrasound (IS). Physical properties. IS sources. Influence of IS on human body.
8. Gradients. Transfer processes: diffusion, internal friction, heat conduction. Medical methods based on transfer processes.
9. Structure of liquids. Molecule pressure and surface tension. Additional (Laplace) pressure. Embolism.

10. Movement of fluids. Laminar and turbulent flow. Steady flow. Poiseuille's law.
11. Blood flow in cardiovascular system. Pulse wave.
12. Mechanics of breathing. Surfactant.

Electricity and Magnetism

13. Electric currents. Electric conductivity. Conductors, semi-conductors and dielectrics.
14. Direct, pulsing and altering current. Ohm's law. Components of electric circuits and their properties. Impedance.
15. One-way and two-way current rectification.
16. Electrodiagnostics: passive and active diagnostics. Transducers. EIT (electric impedance tomography). EMG, EEG, EKG.
17. Electrotherapy. Medical procedures with direct and alternating currents. Therapy by electromagnetic fields.
18. Electro conductivity of electrolytes. Faraday's law. Medical electrophoresis.
19. Electric currents in gases. Aeroions. Biological influence of aeroions. Ozone therapy.
20. Magnetic properties of matter. Origin of magnetic field.
21. Magnetic resonance imaging (MRI). Image forming parameters ρ , T_1 , T_2 .

Non-ionizing electromagnetic radiation

22. Electromagnetic radiation – spectrum, parameters. Wave-particle duality.
23. Reflection, refraction, full inner reflection of light. Light absorption and scattering.
24. Ultraviolet (UV) radiation: parameters, bands, sources of UV radiation. Biological action. Protection.
25. Infrared (IR) radiation: parameters, bands, properties, sources. Biological action and application in image diagnosis (thermovision).
26. Luminescence. Atomic conversions in luminescent light emission. Characteristics and laws of luminescence. Diagnostic methods using luminescence.
27. Optical quantum generators - Lasers. Stimulated emission. Population inversion, three and four level scheme of generation. Laser components. Types of lasers.
28. Parameters of laser radiation Medical applications of laser radiation.
29. Observation of microobjects in medicine. Microscope – optic scheme, magnification. Optical resolution. Observation modes by microscope.

30. Human eye - optic system, refractive power, reduced schematic eye. Optic disorders, correction. Spectral sensitivity of the eye. Color vision.

Ionizing radiation

Ionizing radiation. Directly and indirectly ionizing radiations. Interactions between photon radiation and matter: photoelectric absorption, incoherent scattering (Compton effect), couple (e^-e^+) production. Attenuation of the radiation.

31. X-rays (Roentgen radiation): nature, properties. Production of X-rays – roentgen tube. Characteristic and braking radiation.
32. Medical applications of X-rays. X-ray imaging: radiography and radioscopy, conventional angiography, DSA, DEXA. Computed tomography. Hounsfield scale.
33. Radioactivity. Radioactive decays, parameters, law. Radio-pharmaceutics.
34. Nuclear medicine imaging. Gamma-camera, SPECT- and PET- systems.
35. Dosimetry of the ionizing radiations. Dosimetric quantities and units: exposure, absorbed equivalent and effective dosage dose. Radiation and tissue weighting factor.
36. Basics of radio-therapy. LINAC, cyber knife, brachytherapy.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

Chemistry

Approved by the Department Council on 17/05/2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			I st year	
Chemistry	1								
		90	45	45	3.0	3.0	6.0	3/3	

DISCIPLINE: CHEMISTRY

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: Mandatory

LEVEL OF QUALIFICATION: Master's degree /MS/

FORMS OF TRAINING: Lecture course, laboratory classes, and self-study

YEAR OF TRAINING: First year

DURATION OF TRAINING: One semester

ACADEMIC HOURS: 90

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, work with common laboratory equipment and glassware, UV-VIS spectrophotometers, HPLC system, GC system, other tools and technical devices for demonstration of the application of modern methods of quantitative chemical analysis in medicine, text book for the practical course, lecture handouts.

FORMS OF EVALUATION:

Ongoing evaluation – oral examination during practical lessons, writing colloquiums based on the studied topics written paper on certain topic (individual task). The current average grade for the semester is formed based on the colloquiums and individual tasks.

Final evaluation – written and oral examination at the end of the first semester. The final exam is cumulative, covering all of the same material tested previously.

EVALUATION CRITERIA:

Participation in discussions, and evaluation of the written papers from the colloquiums and individual tasks. The final mark is determined on the basis of the written exam on the subject, the oral exam and the current average grade.

ASPECTS OF EVALUATION CRITERIA:

The final grade formation includes an assessment of the colloquiums and individual tasks and the final written and oral exam. The final grade is calculated with the formula:

$$Q(\text{ final mark}) = 0.2 \times Q(\text{ average mark from the colloquiums and individual tasks}) + 0.5 \times Q(\text{ mark from the final written exam}) + 0.3 \times Q(\text{ mark from the oral exam})$$

SEMESTER EXAM:

Yes (written and oral examination)

STATE EXAM:

NO

LECTURER: ASSOCIATE PROFESSOR FROM THE DEPARTMENT OF BIOORGANIC CHEMISTRY

DEPARTMENT: BIOORGANIC CHEMISTRY

ANNOTATION

The course takes place in the first year and lasts one semester. The major objective of the course is the formation of systemic knowledge about the relationship between the structure, chemical properties and functions of biologically important classes of natural and synthetic organic compounds and to prepare the students for subjects studied in the following years of tuition such as biochemistry, pharmacology, clinical medicine and physiology. During the course of training modern means of equipment are used.

BASIC AIMS OF THE DISCIPLINE

Master the basic concepts related to the chemical characteristics of metabolic processes in the body including: buffers, enzymes, biological oxidation, chemical aspects of carbohydrate, amino acid and lipid metabolism; basic types of heterocyclic compounds and biologically active derivatives. Introduction to instruments for the analysis of biological objects.

EXPECTED RESULTS

At the end of course students must have the following knowledge and skills:

- To understand the meaning and content of such concepts as: concentration of solutions, pH and its definition, and the meaning and effect of buffer systems in the human body.
- To be acquainted with the classification of enzymes, their structure and action.
- To know the nature of redox processes in the body (biological oxidation) and the basic principles of biological metabolism
- To have a basic knowledge of high energy compounds and their place in the metabolism of substances in the human body
- To have a basic knowledge of main classes of organic compounds
- To have a basic knowledge of carbohydrate, amino acid and lipid metabolism
- To have an understanding of basic types of heterocyclic compounds and mostly their biologically active derivatives: coenzymes, vitamins, medicines and hormones.
- To be acquainted with the analytical equipment used during the practical classes and the possibilities it provides for studying biological objects.

LECTURES

LECTURE 1

CHEMISTRY – INTRODUCTION IN THE COURSE. COORDINATION COMPOUNDS. CHELATES

1. Chemistry – introduction in the course.
2. Coordination compounds – definition, structure and classification. Stability constant of coordination compounds. Biologically active coordination compounds.
3. Chelates – structure. Chelates formed by polyhydroxy alcohols, phenols, hydroxycarboxylic acids, amino acids, peptides, protoporphyrins (hemoglobin, cytochrome, vitamin B₁₂).

LECTURE 2

ACIDS AND BASIS

1. Brønsted-Lowry theory of acids and bases. Acid ionization constant. Base ionization constant. Self-ionization of water. Ionic product constant of water. The pH scale. Buffers. Calculation of the pH of the buffers. Buffers in the human body
2. Lewis theory of acids and bases.

LECTURE 3

CHEMICAL KINETICS. ACTIVATION ENERGY DIAGRAM. ARRHENIUS EQUATION. CATALYSIS. CHEMICAL EQUILIBRIUM

1. Chemical kinetics – rate law, factors affecting the rate of reaction. Order and molecularity of reaction. Activation energy diagram. Arrhenius Equation.
2. Catalysis – principals of homogeneous and heterogeneous catalysis.
3. Chemical equilibrium - basic conceptions, principle of Le Chatelier's. Factors, influencing on the chemical equilibrium.

LECTURE 4

OXIDATION-REDUCTION REACTIONS, BIOLOGICAL OXIDATION. CHEMICAL THERMODYNAMICS. BIOENERGETICS

1. Oxidation-reduction reactions, biological oxidation and reduction, redox potentials. Redox pair in biological oxidation and reduction. Respiratory chain.
2. Chemical thermodynamics. The first and second laws of thermodynamics.
3. Bioenergetics – principals. Energy, enthalpy, entropy, free energy.
4. Endergonic and exergonic reactions. Compounds with high-energy bonds – ATP, creatine phosphate, phosphoenolpyruvate etc.

LECTURE 5

ORGANIC COMPOUNDS – MAIN CLASSES. REACTIONS OF ORGANIC COMPOUNDS. ISOMERISM

1. Classification of organic compounds. Substitution reactions, addition reactions, elimination reactions, oxidation. Reactions between different functional groups.
2. Isomerism – structural and stereoisomerism.

LECTURE 6

HYDROXYL DERIVATIVES OF HYDROCARBONS – ALCOHOLS AND PHENOLS

1. Alcohols and phenols – classification; isomers; physical and chemical properties. – acid-base reactions, substitution reactions, dehydration, oxidation of alcohols to aldehydes, ketones and carboxylic acids; oxidation of phenols; foformation of chelates. Esters of phosphoric acid and esters of nitric acid. Biological oxidation of alcohols and phenols.
2. Thioalcohols, coenzyme A – biological functions.

LECTURE 7

CARBONYL COMPOUNDS – ALDEHYDES AND KETONES

1. Aldehydes and ketones – classification, isomerism, physical and chemical properties – addition reactions, substitution reactions, oxidation, Cannizzaro reaction, aldol reaction.
2. Biologically active carbonyl compounds – coenzyme Q, vitamin K, retinal, ketone bodies.

LECTURE 8

CARBOXYLIC ACIDS. ALIPHATIC AND AROMATIC MONO-CARBOXYLIC ACIDS.

1. Carboxylic acids-classification. Isomerism.
2. Physical and chemical properties of mono-carboxylic acids.
3. Biological oxidation of long chain carboxylic acids (β -oxidation).

LECTURE 9

DICARBOXYLIC ACIDS. HYDROXY- AND KETO ACIDS.

1. Carboxylic acids-classification. Isomerism.
2. Saturated and unsaturated dicarboxylic acids – oxalic, malonic, glutaric and adipic acids. Fumaric and maleic acid – chemical reactions and biological functions.
3. Hydroxy- and keto acids – chemical reactions and biological functions.

LECTURE 10

AMINES. BIOGENIC AMINES. ALPHA AMINO ACIDS: PHYSICAL AND CHEMICAL PROPERTIES. CHEMICAL ASPECTS OF AMINO ACID METABOLISM.

1. Amines – definition, structure and classification. Important chemical properties of amines. Biogenic amines. Sulfonamides.
2. Alpha amino acids – classification, isomerism. Important physical and chemical properties. Chemical aspects of amino acid metabolism.

LECTURE 11

PEPTIDES AND PROTEINS. BIOCATALYSIS

1. Peptides – structure, disulphide bridges. Biological activity of peptides.
2. Proteins – bonding in proteins; structural levels of proteins; functions; hydrolysis and denaturation. Basic principles of protein metabolism.
3. Biocatalysts: enzymes and co-enzymes; classification; mechanism of action; rate of enzymatic reaction – Michaelis-Menten constant. Specificity and regulation of enzyme activity. Medical significance of enzymes.

LECTURE 12

CARBOHYDRATES – CHEMICAL PROPERTIES. CARBOHYDRATE METABOLISM – CHEMICAL ASPECTS

1. Carbohydrates. Monosaccharides – classification, structure, configuration, isomerism;. Chemical reactions of monosaccharides.
2. Disaccharides and polysaccharides – functions, hydrolysis, medical significance.
3. Glycolysis – basic concept.

LECTURE 13

LIPIDS. BASIC PRINCIPLES OF LIPID METABOLISM

1. Lipids – classification. Fatty acids – saturated, unsaturated.
2. Triacylglycerols. Fats and oils. Chemical aspects of fat burning. Phospholipids. Waxes

3. Terpenes and steroids – structure; biosynthesis; biologically active derivatives - vitamins, hormones.

LECTURE 14

HETEROCYCLIC COMPOUNDS WITH FIVE-MEMBERED RINGS – FURAN, THIOPHENE, PYRROLE, PYRAZOLE, IMIDAZOLE, THIAZOLE AND THEIR BIOLOGICALLY ACTIVE DERIVATIVES.

1. Heterocyclic compounds – classification.
2. Five-membered ring heterocyclic compounds with one heteroatom (pyrrole, furan and thiophene) – structure (π -sextet) and chemical properties.
3. Important biological molecules containing pyrrole ring – heme, hemoglobin, bilirubin, cytochrome, proline, hydroxyproline
4. Heterocyclic compounds with five-membered ring and two heteroatoms (pyrazole, imidazole, and thiazole) – structure and important chemical properties.
5. Important biological molecules containing pyrazole, imidazole, and thiazole ring – histidine, antipyrin, pyrimidine, analgin, vitamins.

LECTURE 15

HETEROCYCLIC COMPOUNDS WITH SIX-MEMBERED RING AND FUSED RINGS.

1. Heterocyclic compounds with six-membered ring and one or two heteroatom-pyridine and pyrimidine, structure and major chemical properties.
2. Important biological molecules containing pyridine ring – nicotine, nicotinamide, medicines, vitamins, alkaloids. Biomolecules containing pyrimidine ring – nucleotides, vitamins, drugs.
3. Heterocyclic compounds with fused rings – indole, quinoline, isoquinoline and their derivatives. Purine and its derivatives. Uric acid. Nucleic acids.

PRACTICES

LABORATORY CLASS 1

CONCENTRATION OF SOLUTIONS. PREPARATION OF SOLUTIONS

1. Ways of expressing concentration
2. Solving problems concerning solution concentration
3. Preparation of solutions

LABORATORY CLASS 2

COORDINATION COMPOUNDS. COORDINATION CHEMISTRY OF SOME BIOLOGICAL METAL IONS

1. Structure of coordination compounds
2. Stability of coordination compounds
3. Chelates. Structure and functions of biologically significant chelates
4. Preparation of coordination compounds

LABORATORY CLASS 3

BRONSTED-LOWRY THEORY OF ACIDS AND BASES. IONIC PRODUCT OF WATER. PH AND METHODS FOR ITS MEASUREMENT. BUFFER SOLUTIONS

1. Discussion on the concepts “acid” and “base” according to existing theories. Buffers
2. Demonstrating different ways of measuring pH
3. Testing the action of a given buffer solution

LABORATORY CLASS 4

OXIDATION-REDUCTION REACTIONS. BIOLOGICAL OXIDATION AND REDUCTION. REDOX POTENTIALS

1. Discussion on principles of redox reactions, types of redox reactions
2. Biological oxidation
3. Experiments demonstrating redox processes with inorganic and organic compounds

LABORATORY CLASS 5

FUNDAMENTALS OF UV-visible spectrophotometry

1. Discussion on Fundamentals of UV-visible spectrophotometry
2. Determination of the concentration of salicylic acid in aspirin tablets.

LABORATORY CLASS 6

ISOMERISM IN ORGANIC CHEMISTRY. ALCOHOLS AND PHENOLS

1. Isomerism – definition, types, examples
2. Experiments demonstrating the essential chemical properties of alcohols and phenols
3. Qualitative reactions for testing alcohols and phenols.

LABORATORY CLASS 7

CARBONYL COMPOUNDS. KETONE BODIES IN HUMAN PATHOLOGY

1. Experiments demonstrating nucleophilic and redox properties of aldehydes and ketones.
2. Some tests for detection of aldehydes and ketones.
3. Tests for ketone bodies in biological samples

LABORATORY CLASS 8

CARBOXYLIC AND HYDROXY CARBOXYLIC ACIDS. KETOCARBOXYLIC ACIDS

1. Comparing the degree of ionization of carboxylic acids in water solution;
2. Demonstration of some chemical properties of carboxylic acids
3. Demonstration of keto-enol tautomerism

LABORATORY CLASS 9

AMINES. DERIVATIVES OF CARBONIC ACID: UREA, CREATINE

1. Some important chemical properties of amines and urea
2. Creatine function.

LABORATORY CLASS 10

AMINO ACIDS AND PROTEINS. DIALYSIS

1. Determination of pH of water solution of amino acids
2. Qualitative reactions for testing amino acids and proteins in a solution
3. Dialysis

LABORATORY CLASS 11

BIOCATALYSIS. ENZYMATIC HYDROLYSIS OF PROTEINS

1. Discussion on kinetics of enzyme reaction
2. Spectrophotometric determination of enzyme activity

LABORATORY CLASS 12

CARBOHYDRATES – STEREOCHEMISTRY AND PROPERTIES OF MONO-, DI-, AND POLYSACCHARIDES

1. Stereochemistry of carbohydrates
2. Chemical reactions of carbohydrates
3. Some tests for monosaccharides and polysaccharides

LABORATORY CLASS 13

HETEROSYCLIC COMPOUNDS. LOW MOLECULAR WEIGHT BIOREGULATORS: VITAMINS AND ALKALOIDS

1. Discussion on heterocyclic compounds – structure and biological significance
2. Reactions for testing some vitamins, alkaloids and medicines
3. Presentations on the individual tasks

LABORATORY CLASS 14

PRINCIPLE OF CHROMATOGRAPHY – COLUMN, PAPER, THIN-LAYER AND HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY. APPLICATION TO BIOMEDICAL SCIENCE

1. Principles of chromatography
2. Identification of medicines and alkaloids by means of TLC
3. Presentations on the individual tasks

LABORATORY CLASS 15

PRESENTATIONS ON THE INDIVIDUAL TASKS

BIBLIOGRAPHY

1. Ouellette R J, Introduction to General, Organic and Biological Chemistry, Prentice-Hall 1997 and new editions
2. Bruice P.Y., Organic Chemistry, 2003, Prentice Hall PTR eight and previous editions
Students can use any other textbook in chemistry covering above topics.

CONSPECTUS

1. Solutions – definition and types. Molecular and ionic solutions, solubility. Types of concentration (percent concentration, molarity, normality, osmolarity). Solutions in the human body.
2. Brønsted-Lowry theory of acids and bases. Acid ionization constant (K_a). Base ionization constant (K_b). Lewis' theory of acids and bases.
3. Self-ionization of water, ionic product of water. The pH scale, methods of measuring pH. Buffers – definition, buffer action. Calculation of the pH of buffers – Henderson-Hasselbalch's equations. Buffers in the human body.

4. Chemical kinetics – reaction rate, rate law. Order of chemical reactions. Activation energy. Arrhenius Equation. Mechanism and molecularity of the chemical reaction.
5. Catalysis. Homogeneous and heterogeneous catalysis. Autocatalysis. Chemical equilibrium - basic conceptions, principle of Le Chatelier's. Factors influencing on the chemical equilibrium.
6. Chemical thermodynamics. The first and second laws of thermodynamics. Energy, enthalpy, entropy, free energy. Endergonic and exergonic reactions. High energy bonds. High energy compounds and their significance in metabolism (ATP, creatine phosphate, phosphoenolpyruvate, thioesters, acylphosphates).
7. Oxidation-reduction reactions-definitions. Disproportionation and comproportionation reactions – definition and examples. Biological oxidation and reduction, redox potentials. Redox pair in biological oxidation and reduction. Catabolic and anabolic reactions. Respiratory chain.
8. Coordination compounds – definition, classification, structure, naming. Stability constant.
9. Chelates. Chelates formed with polyols, hydroxycarboxylic acids, amino acids, polypeptides and proteins. Chelates with protoporphyrins – hemoglobin, chlorophyll, cytochrome c, vitamin B₁₂.
10. Alcohols and phenols – classification, isomerism. Chemical properties – acid base properties, esterification, oxidation of alcohols and phenols. Reactions of the aromatic ring, dehydration, formation of chelates. Biological oxidation of alcohols (methanol, ethanol, 1,2-ethandiol, glycerol). Esters of phosphoric acid and esters of nitric acid – biological significance. Thioalcohols - definition and chemical properties. Coenzyme A, thioesters.
11. Carbonyl compounds – aldehydes and ketones. Chemical properties of aldehydes and ketones – nucleophile addition reactions, addition-elimination reactions, reactivity of α -carbon atom (tautomerism, aldol reaction). Cannizzaro reaction, oxidation of carbonyl compounds. Substitution reactions. Biologically active substances with quinone structure - coenzyme Q, K vitamins. Glycerolaldehyde, 11-cis retinal. Ketone bodies.
12. Carboxylic acids-classification. Chemical properties of aliphatic and aromatic monocarboxylic acids. Biological oxidation of long chain carboxylic acids (β -oxidation).
13. Saturated and unsaturated carboxylic acids – properties: oxalic acid, malonic acid, succinic acid, glutaric acid and adipic acid. Fumaric acid and maleic acid-isomerism and significance in metabolism.
14. Hydroxycarboxylic acids and ketocarboxylic acids – overview. Isomerism, chemical reactions. Important compounds of this group and their biological significance – lactic acid, salicylic acid, malic acid, tartaric acid, citric acid; pyruvic acid, acetoacetic acid, oxaloacetic acid, α -ketoglutaric acid.
15. Amines-definition, structure and chemical properties. Sulfonamides. Biogenic amines GABA, histamine, serotonin, catecholamines: dopamine, noradrenaline, adrenaline. Derivatives of carbonic acid-urea, guanidine, creatine.
16. α -Amino acids - classification. Chemical properties of α -amino acids. Chemical aspects of amino acid metabolism – deamination of α -amino acids; ketogenic and glucogenic amino acids.
17. Peptides and proteins – classification, structure, properties, functions. Peptide hormones – examples and functions.
18. Biocatalysts – definition and structure of enzymes. Classification of the enzymes. Factors affecting enzyme activity – temperature, pH; influence of substrate concentration on the rate of enzymatic reaction – Michaelis-Menten constant. Zymogenes and isoenzymes. Specificity and regulation of enzyme activity - competitive and irreversible inhibitors.
19. Carbohydrates. Monosaccharides – structure, isomerism and chemical properties. Examples of aldoses and ketoses. Cyclic forms of monosaccharides. Glycolysis – basic concept. Disaccharides and polysaccharides – examples and some functions.

20. Classification of lipids. Hydrolyzable lipids-examples. Chemical aspects of biological oxidation of fats and oils. Phospholipids – types and biological significance.
21. Classification of lipids. Non-hydrolyzable lipids. Terpenes and steroids. Examples of biologically significant compounds: β -carotene, retinol (vitamin A). Retinal – visual perception in humans. Cholesterol and D group vitamins. Sex hormones. Bile acids.
22. Heterocyclic compounds-classification. Five-membered heterocyclic compounds with one hetero atom– furan, thiophene, and pyrrole – structures, reactions. Biologically active substances containing pyrrole ring.
23. Five-membered heterocyclic compounds with two hetero atoms - pyrazole, imidazole and thiazole - structures. Biologically active derivatives of the above mentioned compounds.
24. Six-membered heterocyclic compounds with one hetero atom (pyridine, pyran, thiopyran): structure. Biologically active substances containing pyridine ring NAD^+ , vitamin B6, niacin, medicines and alkaloids; vitamin E.
25. Pyrimidine, piridazine, pirazine-structure. Biologically active substances with pyrimidine ring – pyrimidine bases, nucleotides, medicines, vitamins and enzymes.
26. Heterocyclic compounds with fused rings. Indole and some of its derivatives – structure and functions. Purine and its derivatives – purine bases, uric acid (tautomers), caffeine, theobromine -structure. Biological activity of purine and its derivatives. Nucleic acids – structure (nucleosides and nucleotides).

MEDICAL UNIVERSITY of PLOVDIV
FACULTY of MEDICINE

SYLLABUS
IN
LATIN LANGUAGE AND MEDICAL
TERMS

**Approved at the Foreign Languages Section meeting on 06 June,
2022/Proceedings № 93**

Confirmed by the Faculty Council - Protocol №6/15.06.2022

Latin language and medical terms

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								1 st year	
		Total	Lectures	Practices	ECTS			I	II
Latin language and medical terms	II	60	0	60	2.0	3.0	5.0	0/2	0/2

DISCIPLINE:

“Latin language and medical terms”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master degree /M/

FORM OF TRAINING:

Practical courses, self-training

YEAR OF TRAINING:

First

DURATION OF TRAINING:

1st and 2nd semesters

ACADEMIC HOURS:

60 academic hours of practical courses

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, discussions, multimedia interactive board, language laboratory, on-line platform provided by Medical University of Plovdiv

FORMS OF EVALUATION:

Continuous assessment, written tests /written examination in each of the two semesters, assessment of presentations and/ or individual assignments set by the lecturer, final written exam

EVALUATION CRITERIA:

- complex **annual final written exam** aiming to control the achieved self-training skills while using in practice the acquired knowledge during the course - **50%**;
- continuous assessment and term tests - **50%**.

Continuous assessment – complex assessment of knowledge and skills with the following components.

ASPECTS OF EVALUATION CRITERIA:

Active participation in the seminars, extracurricular tasks execution, written tests.

SEMESTER EXAM:

Yes (after the end of the second semester)

STATE EXAM:

No

LECTURER:

Master's and/or PhD degree

DEPARTMENT:

Section of Foreign Languages, Department of languages and specialized training

ANNOTATION

Each professional community needs a specialized language for the terminology used at the scientific level. For those, working in the field of medicine, that language is Latin *per se*, also acting as a mediator of Greek – basic for clinical practice, therapy and pathology. Study of Latin and medical terminology during the first year of medical education is *sine qua non* for every level of training and for the practice of every physician. The philosophy of medical science as a whole and of all its subspecialties is coded in Latin.

Teaching Latin for specialized training in the first year of medical training is the necessary prerequisite for the better acquisition of other disciplines that are part of the syllabus for each specialty studied at Medical University of Plovdiv in the course until completion of studies. According to tradition and methodology accepted and used in Bulgaria, all the diagnoses included in the textbooks and the additional sources for information and practice for the different subjects are written in Latin. That is the reason why the Latin course is of general educational nature, but it is also a supportive discipline for the understanding and utilization of medical concepts in anatomy and clinical practice. In the first year the Latin course meets the immediate needs of students regarding the course in anatomy, while giving them sufficient grammar knowledge and presenting the principles of word formation to meet the long-term needs in the upper courses of study and the medical field of future specialization.

BASIC AIMS

The syllabus offered aims to teach the students the grammatical and lexical minimum necessary for the proper understanding, reading and writing of diagnoses; the principles of word formation; Greek combining forms and their Latin equivalents.

Study contents according to the aims:

Ist semester: basic Latin grammar aimed at the medical profession: nouns and adjectives – morphological features; agreed and non-agreed attributes; study of a minimum quantity of terms necessary to understand subjects taught in the first course; reading and writing of diagnoses with elementary phraseological structure and syntax; basic information on prescription writing.

IInd semester: Greek declensions in Latin; compound terms word-formations – Greek and Latin terminological elements, prepositions and prepositions as prefixes in word formation; comparatives and superlatives of the adjectives; clinical and pathoanatomical diagnoses.

EXPECTED RESULTS

It is expected that by the end of the Latin course the students are going to be able to use the grammatical and lexical minimum that forms the basic microlanguage in the field of medicine as a science. The course gives the information about the medical terminology as a part of the general human knowledge achieved in its diachronic development.

When the Latin course is completed students should be able to:

- use the lexical minimum that serves the needs of other disciplines;
- use the minimum of grammar necessary for diagnoses understanding;
- use the acquired grammatical minimum for writing diagnoses in Latin with familiar and unfamiliar vocabulary;
- know the principles of compound terms word-formation used in clinical practice, for different types of treatment and kinds of pathology;
- know how to understand the compound clinical and pathological terms;
- be able to produce compound terms by their own.

LATIN LANGUAGE AND MEDICAL TERMS

PRACTICES

Ist year, Ist semester

№	Topic	Academic hours	date
1.	Alphabet and pronunciation. Accentuation	2 h	
2.	Grammatical categories of nouns and adjectives: gender, number, case. Declensions of the nouns. First Latin declension. First Greek declension. Syntax structure of a phrase	2 h	
3.	Greek terms in the Latin medical terminology. Word-formation patterns. Combining term-elements corresponding to first declension Latin nouns.	2 h	
4.	Second Latin declension. Second Greek declension.	2 h.	
5.	Combining term-elements corresponding to second declension Latin nouns.	2 h	
6.	Adjectives of the first and second declension. Past participle. Agreed and non-agreed attributes.	2 h	
7.	Drills on first and second declension and Greek term-elements corresponding to first and second declension Latin nouns.	2 h	
8.	Written examination	2 h	
9.	Third declension – consonant stems.	2 h	

10.	Terms of Greek origin (Third Greek declension). Locative Adjectives with the -ior/-ius-suffix. Combining term-elements corresponding to third consonant declension Latin nouns.	2 h	
11.	Drills on third declension – consonant stems.	2 h	
12.	Third vocal declension i-stem.	2 h	
13.	Terms of Greek origin (Third Greek declension). Combining term-elements corresponding to third vocal declension Latin nouns.	2 h	
14.	Third declension – mixed stems.	2 h	
15.	Combining term-elements corresponding to third mixed stem declension Latin terms.	2 h	

Total: 30 academic hours

Ist course, IInd semester

№	Topic	academic hours	date
1.	Revision of first and second declension – nouns and adjectives.	2 h	
2.	Adjectives of the third declension.	2 h	
3.	The present participle in Latin.	2 h	
4.	Comparative and superlative forms of the adjectives.	2 h	
5.	Revision of third declension – nouns (consonant, vocal, and mixed stems) and adjectives.	2 h	
6.	Greek declensions in Latin –revisional notes.	2 h	
7.	Written examination.	2 h	
8.	Fourth declension.	2 h	
9.	Combining term-elements corresponding to forth declension	2 h	
10.	Fifth declension.	2 h	

11.	Combining term-elements corresponding to fifth declension	2 h	
12.	Prepositions with Accusative and Ablative case.	2 h	
13.	Greek and Latin prepositions used as prefixes in the formation of medical terms.	2 h	
14.	Revision of combining forms.	2 h	
15.	Preparation for the final test	2 h	

TOTAL: 30 academic hours

Theses to seminars

Seminar № 1 – 2 hours

Alphabet and pronunciation

History and development of the Latin language.

Alphabet. Classification of sounds: vowels, consonants, diphthongs, digraphs.

Pronunciation of vowels, consonants, diphthongs, digraphs.

Accentuation

Quantity and syllabification

Rules of accentuation

Seminar № 2 – 2 hours

Nouns and adjectives – general information

Grammatical categories of nouns and adjectives: gender, number, case. Declensions of nouns. First declension. Vocabulary forms of nouns. Defining the practical stem. Case endings. First Greek declension. Syntax structure of a phrase. Initial information on the use of prepositions.

Seminar № 3 – 2 hours

Word-formation in medical terminology

Defining term components: prefix, root, suffix.

Greek combining term-elements corresponding to nouns of the first Latin declension.

Decoding clinical and pathoanatomical terms. Coining terms.

Seminar № 4 – 2 hours

Second Latin declension. Second Greek declension.

Seminar № 5 – 2 hours

Word-formation in medical terminology

Greek combining term-elements corresponding to nouns of the second Latin declension.

Decoding clinical and pathoanatomical terms. Coining terms

Seminar № 6 – 2 hours

Adjectives of the first and second declension. Past participle. Agreed and non-agreed attributes.

Suffixes in the formation of adjectives. Meaning of suffixes.

Agreement of adjectives and nouns.

Word-formation. Greek term-elements corresponding to adjectives of first and second declension.

Seminar № 7 – 2 hours

Drills on first and second declension – nouns and adjectives and Greek term-elements corresponding to nouns and adjectives of first and second declension.

Seminar № 8 – 2 hours

Written examination (nouns and adjectives of first and second declension and their corresponding Greek term-elements)

Seminar № 9 – 2 hours

Third declension

Third declension – consonant stems

Characteristic features.

Characteristic endings for nominative

Seminar № 10 – 2 hours

Terms of Greek origin (Third Greek declension).

Locative Adjectives with the -ior/-ius-suffix. Combining term-elements corresponding to third consonant declension Latin nouns.

Seminar № 11 – 2 hours

Drills on third declension consonant stems

Seminar № 12 – 2 hours

Third vocal declension – i-stems

Feminine nouns (Latin and Greek).

Neuter nouns

Seminar № 13 – 2 hours

Terms of Greek origin (Third Greek declension). Combining term-elements corresponding to third vocal declension Latin nouns.

Decoding clinical and pathoanatomical terms. Coining terms

Seminar № 14 – 2 hours

Third declension – mixed stems. Word-formation Parasyllabic names – how to differentiate them from third vocal declension nouns.

Imparasyllabic names - how to differentiate them from third consonant declension nouns.

Seminar № 15 – 2 hours

Greek term-elements corresponding to third mixed stem declension Latin nouns.

Decoding clinical and pathoanatomical terms. Coining terms.

Seminar № 16 – 2 hours

Revision of first and second declension – nouns and adjectives.

General rules.

Revisional drills.

Seminar № 17 – 2 hours

Adjectives of the third declension.

Adjectives of three nominative endings for the three genders.

Adjectives of two nominative endings for the three genders.

Adjectives of one nominative ending for the three genders.

Seminar № 18 – 2 hours

Present Participle – formation and usage

Seminar № 19 – 2 hours

Comparative and superlative forms of the adjectives – usage.

Comparative degree of adjectives.

Superlative degree of adjectives.

Comparatives in anatomy

Seminar № 20 – 2 hours

Revision of third declension – nouns (consonant, vocal, and mixed stems) and adjectives.

General rules.

Revisional drills.

Seminar № 21 – 2 hours

Greek declensions in Latin –revisional notes.

First Greek declension

Second Greek declension

Third Greek declension

Seminar № 22 – 2 hours

Written examination (first, second, third declension – nouns and adjectives and their corresponding Greek term-elements)

Seminar № 23 – 2 hours

Fourth declension. Word formation

Masculine nouns.

Neuter nouns.

Seminar № 24 – 2 hours

Greek combining forms, corresponding to nouns of the fourth declension

Decoding clinical and pathoanatomical terms. Coining terms and using them in diagnoses.

Seminar № 25 – 2 hours

Fifth declension

Agreed attributes and attributive genitive in the description of caries.

Seminar № 26 – 2 hours

Combining term-elements corresponding to fifth declension

Decoding clinical and pathoanatomical terms. Coining terms and using them in diagnoses.

Seminar № 27 – 2 hours

Prepositions with Accusative and Ablative case.

Latin declensions – revision.

Prepositions in diagnoses and prescriptions.

Seminar № 28 – 2 hours

Greek and Latin prepositions used as prefixes in the formation of medical terms.

Latin prepositions used as prefixes in the formation of medical terms.

Greek prepositions used as prefixes in the formation of medical terms

Seminar № 29 – 2 hours

Revision of combining forms

Classification of combining forms: combining forms for parts of the body

Combining forms for therapeutic, diagnostic and surgical procedures

Combining forms for colors and body liquids

Seminar № 30 – 2 hours

Preparation for the final exam

Revision and preparation for the exam test

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CONSPECTUS

1. *Nouns. First declension*
2. *Second declension*
3. *Agreement of nouns and adjectives. Genitive sg. and pl. used as modifier*
4. *Third consonant declension*
5. *Third vocal declension*
6. *Third mixed declension*
7. *Adjectives of the third declension*
8. *Fourth declension*
9. *Fifth declension*
10. *Comparatives and superlatives*
11. *Greek declensions*
12. *Prepositions*
13. *Prepositions as prefixes in word formation*

Sample Tests for self-training

Opus probationis - I and II declension

1. Which of the following can be ruptured or fractured? Make expressions meaning 'rupture of ...'; 'fracture of ...' with the nouns *ruptura* and *fractura* and a word or expression from the box:

aorta, ulna, musculus, clavicula, ligamentum latum, membrana interossea, trachea, digitus minimus, tibia, maxilla

Example: ruptura venae

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

2. Which case will you use so that you write in Latin ‘therapy of’?
 therapia (morbus acutus)
 therapia (pneumonia exacerbata)
 therapia (fractura complicata)
 therapia (cancer ventriculi)
 therapia (insufficiencia aortae)
3. Use the appropriate case after the prepositions:
 in (vitrum)
 propter (anaemia)
 post (morbus ventriculi)

Opus probationis – fourth and fifth declension

Name Fac. No. Group

1. Translate and write the plurals of:

	translation	Plural form
ductus hepaticus		
decubitus dorsalis		
morsus profundus		
arcus venosus		
infarctus recens		
caries media		
facies interna		

2. Translate into Latin:

a difficult delivery	stroke of the brain
internal use	frontal sinus
a critical day	itching with pains
caries of the bones	movement of the mandible

3. Write in one word:

lack of sense of taste
 implantation of a cornea
 excessive vomiting
 lack of sense of smell

Final test in Latin for students of medicine

Translate into English:

Obturatorius ductus hepatici
 Vulnere puncta in parte sinistra capitis
 Fractura septi nasi
 Carcinoma pulmonis sinistri
 Infarctus myocardi recens
 Radix dentis
 Max. 20p.

Translate into Latin:

Nucleus of the abducent nerve (5p.)
 Symptoms of incipient gonarthrosis (6p.)
 Operation of penetrating ulcer (5p.)
 Scars of the left ventricle after an operation (7p.)
 Lesion of the brain cortex (5p.)
 Thrombosis of the arteries (3p.)
 Carcinoma of paranasal sinuses (5p.)
 Max. 36p.

Explain the following clinical terms:^[L]_[SEP]

Hysterotomia^[L]_[SEP]
 Pneumothorax
^[L]_[SEP]Chondromalacia
^[L]_[SEP]Nephropexia
^[L]_[SEP]Syndactylia

Max. 10p.

Form a clinical term for the following using the Greek elements:^[L]_[SEP]

kidney disease
 paralysis of the half of the body
 tonsil inflammation
 surgical removal of the breast
 fungal disease of the skin

Max. 10p.

Put the phrases in brackets in the correct form:

^[L]_[SEP]Exemplum: remedia ad (usus proprius) – remedia ad usum proprium
 Febris cum (tussis acuta)
 Status post (operatio difficilis)

Vulnus in (regio sacralis)
Complicationes intra (partus)
Haemorrhagia ex (auris dextra)

Max. 15p.

Total amount of points: 91p.

Achieved points:
Assessor:

Mark:

**MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF MEDICINE**

**SYLLABUS
IN
ANATOMY AND HISTOLOGY**

Approved by the Department Council on 23.05.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

HUMAN ANATOMY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters			
								1 st year		2 nd year	
		Total	Lectures	Practices	ECTS			I	II	III	IV
Anatomy and Histology	II, IV	315	90	225	10.5	16.5	27.0	1/3	2/4	2/4	1/4

DISCIPLINE:

Anatomy and Histology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Obligatory

LEVEL OF QUALIFICATION:

Master of Science /M/

FORMS OF TRAINING:

Lectures, seminars, self – preparing

YEAR OF TRAINING:

I, II year

DURATION OF TRAINING:

four semesters

ACADEMIC HOURS:

90 hrs lectures, 225 hrs seminars

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Slides, software (ADAM, Anatomist, How the body works), light microscope, videos, anatomy tables, models, native preparations.

FORMS OF EVALUATION:

Current assessment, preliminary examination in Anatomy and Histology, tests during the semester, identifying practical preparations.

EVALUATION CRITERIA:

The grade from the preliminary examination in Anatomy and Histology and the current average grade for the semesters.

ASPECTS OF EVALUATION CRITERIA:

A preliminary exam attending, test solving, participation in discussions.

SEMESTER EXAM:

Yes /four stages/: 1. A. Practical examination 2. MCQ Test 3. Writing examination 4. Oral examination.

STATE EXAM:

No.

LECTURER:

A habilitated lecturer from the Department of Anatomy, Histology and Embryology.

DEPARTMENT:

Department of Anatomy, Histology and Embryology.

ANNOTATION***ANATOMY – GROSS, MICROSCOPIC AND REGIONAL ANATOMY***

Training plan: 1st and 2nd year; 1st, 2nd, 3rd and 4th semester, credit hours: 315 hours – 90 hours lectures and 225 hours practicals (6/15)

Lecturers: Prof. Sivkov, MD, Ph.D., Prof. Koeva, MD, Ph.D.

METHODS OF TEACHING: lectures, practical classes – self-made cadaver dissection, light microscopy, discussion, drawing.

TECHNICAL RESOURCES: slides, software (ADAM, Anatomist, How the body works), light microscope, videos, anatomy tables, models, native preparations.

CONTROL AND SCORING: midterm exams, final semester exam.

METHODS OF CONTROL: theoretical and practical discussions on specific subject every lesson, quizzes, presentation of self-made preparations, clinical case report. Final exams: after 2nd and 4th semester. Practical test and written exam including MCQ test and essay on a question from conspectus.

BASIC AIMS OF THE DISCIPLINE

Thorough knowledge of human anatomy by systems and organs at different levels of organization – from gross anatomy to ultramicroscopic structure.

OBJECTIVES OF THE SUBJECT:

1. Studying macroscopic structure of the organs and systems of human body
2. Studying microscopic structure of the organs of human body
3. Studying embryological development of the organs and systems of human body
4. Studying topography of the organs of human body

EXPECTED RESULTS

Thorough knowledge of gross and microscopic structure of human body as well as the topography of the organs and systems.

FIRST SEMESTER – LOCOMOTORY SYSTEM**SPECIFICATION:**

- a) credit hours: 4 hours weekly; 60 hours per semester
- b) lectures: 1 hour weekly; 15 hours per semester
- c) practical classes: 3 hours weekly; 45 hours per semester

- d) final exam after the 2nd semester

DESCRIPTION OF THE TRAINING COURSE

Lectures: Locomotory apparatus and circulatory system. Bone as an organ: structure, types of bone substance, growth and development of bones. Joints, Types of joints. Biomechanics. Muscles. General data. Structure of the muscle. Biomechanics.

Basic items from morphology of the circulatory system are included: heart, blood vessels, lymph vessels, lymph organs. Gross and microscopic structure as well as regional anatomy are discussed.

Practical classes: gross anatomy of bones, structure and biomechanics of joints, arrangement, attachments, innervation and function of the muscles are studied on cadaver preparations. The students make dissection of upper and lower limbs.

Control of knowledge: Theoretical and practical exams during the semester.

Lectures: 1 hour per week

1. Introduction to anatomy. Anatomy in the system of biological sciences. Development of anatomy. Relation to other medical sciences and medical practice.
2. Osteology. General data. Bone as an organ. Classification of bones. Growth of bone.
3. Joints. General data. Types of joints. Continuous joints. Synovial joints. Classification. Biomechanics.
4. Muscles. General data. Muscle as an organ. Structure of the muscle. Classification of the muscles. Supplementary structures of the muscle. Biomechanics.
5. Muscles, blood and nerve supply of the upper limb. Muscle groups. Main blood vessels. Innervation – brachial plexus.
6. Muscles, blood and nerve supply of the lower limb. Muscle groups. Main blood vessels. Innervation – lumbosacral plexus.
7. Topography of the upper limb. Regions. Boundaries. Content. In-depth anatomy
8. Topography of the lower limb. Regions. Boundaries. Content. In-depth anatomy.

Practicals: 3 hours weekly

1. Introduction to anatomy and osteology. Vertebrae and vertebral column.
2. Bones of the thorax and shoulder girdle. Ribs, sternum. Bones of the shoulder girdle - scapula, clavicle.
3. Bones of the upper limb. Humerus. Radius and ulna. Bones of the hand.
4. Bones of the pelvis. Sacrum and coccyx. Hip bone. Pelvis as a whole.
5. Bones of the lower limb. Femur. Tibia, fibula, patella. Bones of the foot.
6. **Midterm exam 1.**
7. Shoulder and pelvic regions. Main blood and nerve supply of upper and lower limbs. Nerve plexuses – brachial, lumbar and sacral. Muscles, blood and nerve supply of the shoulder region.
8. Shoulder and pelvic regions. Muscles, blood and nerve supply of the pelvic region.
9. Shoulder and pelvic regions. Topographic regions of shoulder and pelvis.
10. Shoulder region. Joints of the shoulder girdle. Sternoclavicular, acromioclavicular joints. Humero-scapular joint.
11. Pelvic region. Joints of the pelvis. Sacroiliac joint. Hip joint.
12. Arm and thigh. Muscles, blood and nerve supply.
13. Arm and thigh. Muscles, blood and nerve supply.
14. Arm and thigh. Muscles, blood and nerve supply.
15. Arm and thigh. Topographic regions.
16. Elbow and knee regions. Cubital fossa and popliteal fossa.
17. Elbow and knee regions. Elbow and knee joint.
18. **Midterm exam 2.**
19. Forearm and leg. Muscles, blood and nerve supply of the forearm and leg.

20. Forearm and leg. Muscles, blood and nerve supply of the forearm and leg.
21. Forearm and leg. Topographic regions.
22. Forearm and leg. Joints of the forearm and the leg.
23. Wrist. Joints of the wrist. Topographic regions.
24. Hand. Muscles, blood and nerve supply.
25. Hand. Joints of the hand. Topographic regions.
26. Foot. Muscles, blood and nerve supply of the foot.
27. Foot. Joints of the foot. Topographic regions.
28. Joints of the vertebral column. Joints between vertebrae. Joints between vertebral column and skull.
29. Joints of the thorax. Joints between ribs and vertebrae. Joints between ribs and sternum.
30. **Midterm exam 3.**

SECOND SEMESTER – NERVOUS SYSTEM, SENSORY ORGANS (2/4)

SPECIFICATION:

- a) credit hours: 6 hours weekly; 90 hours per semester
- b) lectures: 2 hours weekly; 30 hours per semester
- c) practical lessons: 4 hours weekly; 60 hours per semester
- d) the final exam is after the 2nd semester

DESCRIPTION OF THE TRAINING COURSE

Lectures: nervous system and sensory organs. Basic principles in the structural pattern of the nervous system: nervous tissue, synapsis, neural chains, reflex arch. Internal and external features of the different parts of CNS. Peripheral nervous system. Structure of the sensory organs: eye and ear.

Practical classes: In the first half of the semester they are on CNS. On native preparations from human brain the students study the morphology of spinal cord and the parts of the encephalon. Next are the sensory organs like eye and ear and also the cranial nerves – their origin, course, branches and area of supply.

Control of knowledge: Theoretical and practical quizzes are held during the semester.

Lectures: 2 hours per week

1. Introduction to morphology of nervous system. Development of nervous system.
2. Spinal cord. Spinal nerves.
3. Brain. General description. Medulla oblongata.
4. Pons. Rhomboid fossa. Cerebellum.
5. Cerebellum.
6. Diencephalon. Thalamus, epithalamus, metathalamus.
7. Diencephalon. Hypothalamus, subthalamus.
8. Forebrain – general description. Brain cortex.
9. Forebrain – white matter. Basal ganglia.
10. Rhinencephalon. Limbic system.
11. Pathways in CNS.
12. Eye.
13. Ear.
14. Cranial nerves.
15. Autonomic nervous system.

Practicals: 4 hours weekly (2x2)

1. Cranium. Frontal, parietal and occipital bones. Vault.
2. Skull – temporal and ethmoid bones.
3. Skull – sphenoid bone. Facial bones.
4. Skull. Nasal cavity. Paranasal sinuses. Orbit.

5. Skull – basis cranii externa and interna. Temporal, infratemporal and pterygopalatine fossae.
6. **Midterm exam 1. Practical and theoretical quiz.**
7. Spinal cord. External features.
8. Medulla oblongata.
9. Pons. Rhomboid fossa.
10. Midbrain.
11. Cerebellum. IVth ventricle.
12. Diencephalon. Thalamus, epithalamus, metathalamus.
13. Diencephalon. Hypothalamus, subthalamus. IIIrd ventricle.
14. Telencephalon. Gross brain. Brodmann's areas.
15. Telencephalon – white matter, basal ganglia. Lateral ventricles.
16. **Midterm exam 2. Practical and theoretical quiz.**
17. Rhinencephalon. Limbic system.
18. Meninges. Blood supply of CNS.
19. Eye. Visual system.
20. Ear. External and middle ear. Osseous labyrinth.
21. Inner ear. Auditory and vestibular systems.
22. CN – general remarks. III, IV, VI, XII.
23. CN – V.
24. CN – VII, X.
25. CN – X, XI.
26. Spinal cord, spinal ganglion, autonomic ganglion, peripheral nerve – *microscopic structure*.
27. Cerebral and cerebellar cortex – *microscopic structure*.
28. Sensory organs. Receptors of general sensation, eye and ear – *microscopic structure*.
29. **Midterm exam 3.**
30. Pathways in the brain.

III SEMESTER – ANATOMY AND HISTOLOGY OF THE INTERNAL ORGANS (2/4) SPECIFICATION:

- a) teaching hours: 6 h. weekly; 90 h. for semester
- b) lectures: 2 h. weekly; 30 h. for semester
- c) practical classes: 4 h. weekly; 60 h. for semester
- d) final examination: after the end of the IV semester

DESCRIPTION OF THE TEACHING COURSE:

Lectures: The main subject area of the lecture course is the macro- and microscopic structure and the embryonic development of the human internal organs. The purpose is to build up clear and logical notion about the normal morphology and development of the organs in systematic plan. The organs of the cardiovascular, immune, respiratory, digestive, endocrine, urinary, reproductive and integumental systems are examined in systematic aspect.

Practical classes: The basic teaching method in the practical course is the macro-and microscopic (study under light microscope) observation through which the students get a notion about the normal structure, function and development of the organs in the human body. During the semester there are examinations (tests) in the topic of each practical exercise and finally a total mark for the semester is summarized.

Control of the knowledge: Tests (3) and practical examinations (3).

Lectures: 2 hours weekly

1. Cardiovascular system. Heart–embryonic development, topography, macro-and microscopic anatomy.
2. Blood vessels - embryonic development, macro-and microscopic anatomy. Lymph system – principal structure. Lymph vessels and lymph.

3. Immune system–principal structure. Bone marrow, thymus, spleen and lymph nodes–embryonic development, macro-and microscopic anatomy.
4. Respiratory system- embryonic development and general structure of the organs of the respiratory system. Nasal cavity, larynx, trachea and lungs– macro-and microscopic anatomy.
5. Digestive system. Oral cavity-embryonic development, general structure. Tongue, salivary glands and teeth – embryonic development, macro-and microscopic anatomy.
6. Pharynx, oesophagus and stomach-embryonic development, macro-and microscopic anatomy.
7. Small, large intestines and appendix–embryonic development, macro-and microscopic anatomy.
8. Liver, gall bladder and pancreas–embryonic development, macro-and microscopic anatomy.
9. Urinary system-embryonic development and principal structure of the organs. Kidney, ureter and urinary bladder– macro-and microscopic anatomy.
10. Endocrine system- general characteristic and classification. Hypophysis and epiphysis. Peripheral endocrine organs-adrenal gland, thyroid and parathyroid glands- embryonic development, macro-and microscopic anatomy.
11. Male reproductive system-embryonic development and general characteristic. Testis– macro-and microscopic anatomy.
12. Male reproductive system–epididymis, prostate, seminal vesicles, penis and male urethra– macro- and microscopic anatomy.
13. Female reproductive system. Ovary–embryonic development, macro-and microscopic anatomy.
14. Female reproductive system – uterus, oviduct and vagina–embryonic development, macro-and microscopic anatomy.
15. Integumental system. The skin and its appendages- embryonic development, macro-and microscopic anatomy.

Practicals: 4 hours weekly (2x2)

1. Principal structure of a tube and parenchymatous organs- 2 h.
 2. Cardiovascular system- macro- and microscopic anatomy– 2 h.
- Histological sections:
1. artery and vein- muscular type
 2. aorta-orcein, H-E
 3. arteriola, venula and capillaries
 4. EM of capillaries
 3. Heart- macro-and microscopic anatomy. - 2 h.
- Histological sections:
1. heart wall
 2. Impulse-conducting system
 4. Immune system- bone marrow, thymus and lymph nodes-macro-and microscopic anatomy.2h.
- Histological sections:
1. bone marrow
 2. thymus
 3. lymph node
 5. Immune system–spleen and tonsils – macro-and microscopic anatomy– 2 h.
- Histological sections:
1. spleen
 2. tonsilla palatina
 6. Nasal cavity and the paranasal air sinuses - macro-and microscopic anatomy. – 2 h
- Histological sections:
1. nasal mucosa
 7. Larynx- macro-and microscopic anatomy. – 2 h

Histological sections:

1. epiglottis

2. larynx

8. Trachea, bronchi and the lungs—macro-and microscopic anatomy. – 2 h

Histological sections:

1. trachea

9. The lungs and bronchi – macro-and microscopic anatomy. – 2 h

Histological sections:

1. lungs

2. small and middle-sized bronchi

3. embryonic lung

4. EM of alveocytes and blood-air barrier

10. Digestive system. Oral cavity—macro-and microscopic anatomy- 2h.

Histological sections:

1. lips

2. cheeks

3. uvula

11. Teeth- – macro-and microscopic anatomy- 2 h.

Histological sections:

1. embryonic tooth

2. adult tooth- H-E

3. adult tooth– schliff

12. Test in cardiovascular, respiratory and immune systems

13. Tongue and salivary glands – macro-and microscopic anatomy- 2h.

Histological sections:

1. tongue, papillae filiformes

2. tongue, papillae vallatae

3. parotid gland

4. submandibular gland

5. sublingual gland

14. Pharynx and oesophagus –macro-and microscopic anatomy– 2 h.

Histological sections:

1. oesophagus

15. Stomach -macro-and microscopic anatomy. - 2h.

Histological sections:

1. stomach – fundus

2. stomach –pylorus

3. EM of parietal and chief cells

16. Small and large intestine (caecum, colon, rectum)- macro-and microscopic anatomy 2h.

Histological sections:

1. small intestine

2. duodenum

3. large intestine

4. appendix

5. EM of goblet cell

17. Liver and pancreas—macro-and microscopic anatomy- 2 h.

Histological sections:

1. liver

2. gall bladder

3. pancreas

4. EM of hepatocytes

18. Urinary system—kidney-macro-and microscopic anatomy. – 2 h

Histological sections:

1. kidney-H-E
2. kidney– kongorot
3. EM of blood-urinary barrier
19. Ureter and urinary bladder – macro-and microscopic anatomy – 2h.

Histological sections:

1. ureter
2. urinary bladder
3. urethra (male)
20. Test in digestive and urinary systems
21. Endocrine system-hypophysis, epiphysis and the islets of Langerhans - macro-and microscopic anatomy - 2h.

Histological sections:

1. hypophysis
2. epiphysis
3. islets of Langerhans
- 3.1 staining by H-E
- 3.2 by impregnation
22. Endocrine system–thyroid, parathyroid and adrenal glands - macro-and microscopic anatomy - 2h.

Histological sections:

1. thyroid gland
2. parathyroid glands
3. adrenal gland
4. EM of adrenocorticocytes
23. Male reproductive system –testis, epididymis- macro-and microscopic anatomy - 2 h.

Histological sections:

1. testis
2. epididymis
3. EM of Leydig cell
24. Prostate, seminal vesicles, penis and male urethra– macro-and microscopic anatomy. The external male genitalia - 2 h.

Histological sections:

1. prostate
2. ductus deferens
25. The external male genitalia - 2 h.

Histological sections:

1. penis
26. Female reproductive system. Ovary–macro-and microscopic anatomy - 2 h.

Histological sections:

1. ovary
27. Uterus, oviduct and vagina–macro-and microscopic anatomy. - 2 h.

Histological sections:

1. uterus
2. oviduct
3. vagina
28. The external female genitalia- 2 h.

Histological sections:

1. mammary gland (lactating)
2. mammary gland (non-lactating)
29. Test in endocrine, male and female reproductive systems
30. The skin and its appendages- 2 h.

Histological sections:

1. skin
2. hair
3. nail

FOURTH SEMESTER – REGIONAL ANATOMY OF BACK, NECK, THORAX, ABDOMEN AND PELVIS (1/4)

SPECIFICATION:

- a) credit hours: 5 hours weekly; 75 hours per semester
- b) lectures: 1 hour weekly; 15 hours per semester
- c) practical lessons: 4 hours weekly; 60 hours per semester
- d) the final exam is after the 4th semester
- e) how the exam is organized: practical and theoretical exam: quiz, written exam, oral exam.

DESCRIPTION OF THE TRAINING COURSE

Lectures: Topography of the internal organs. The discussion of the internal organs is continued. Regional anatomy of back, neck, thorax, abdomen and pelvis.

Practical classes: Cadaver dissection. During dissection the students examine the superficial landmarks and underlying structures of the back, head, neck, thoracic and abdominal wall. Topography of the organs in the neck, thorax, abdomen and pelvis is also studied.

Control of knowledge: Theoretical and practical quizzes are held during the semester.

Lectures: 1 hour weekly

1. Neck topography. Subcutaneous elements. Lateral neck region. Infrahyoid region.
2. Neck topography. Carotid and submandibular region; root of the neck.
3. Topography of thorax. Thoracic cavity. Pleural cavity. Mediastinum.
4. Abdominal wall. Inguinal canal. Abdominal and peritoneal canal. Upper peritoneal region – organs, bursae, peritoneal structures.
5. Topography of the abdomen. Lower peritoneal region. organs, bursae, peritoneal structures. Retroperitoneum.
6. Topography of the pelvis. Peritoneal, subperitoneal and subcutaneous region. Organs, spaces, muscles, fasciae.
7. Topography of the head. Regions. Blood and nerve supply, lymph drainage. Epicranial and parotid regions.
8. Topography of the head. Temporal, infratemporal regions. Peripharyngeal space.

Practicals: 4 hours weekly (2x2)

1. Introduction to cadaver dissections. Body regions. Back – subcutaneous elements superficial muscles.
2. Back – deep muscles.
3. Neck – regions and subcutaneous elements.
4. Cervical fascia. Lateral cervical region.
5. Carotid triangle and sternocleidomastoid region.
6. Submandibular triangle. Infrahyoid region.
7. Root of the neck.
8. Fossa axillaris.
9. Thoracic region – mapping and subcutaneous elements. Thoracic cavity.
10. Superior mediastinum. Root of the lung.
11. ***Midterm exam 1.***
12. Anterior and middle mediastinum.
13. Posterior mediastinum. Intercostal spaces and thoracic diaphragm.

14. Abdomen - regions and subcutaneous elements.
15. Anterolateral abdominal wall. Inguinal canal. M. rectus abdominis and its vagina.
16. Abdominal cavity. Peritoneum. Peritoneal cavity – subdivisions.
17. Upper region of abdominal cavity. Omental bursa.
18. Lower region of the abdominal cavity.
19. Vessels and nerves in the region of the truncus celiacus. V. Portae.
20. **Midterm exam 2.**
21. Vessels and nerves in the region of superior and inferior mesenteric artery.
22. Retroperitoneum – primary and secondary retroperitoneal organs - topography.
23. Retroperitoneum – vessels and nerves.
24. Pelvis - peritoneal region.
25. Pelvis – subperitoneal and subcutaneous regions. Vessels and nerves of the pelvis.
26. Muscles of facial expression. Vessels and nerves of the face. Temporomandibular joint – structure, biomechanics. Muscles of mastication. Regio parotidomasseterica.
27. Epicranial, temporal and infratemporal regions.
28. **Discussion on the dissection preparations.**
29. **Midterm exam 3.**
30. Peripharyngeal space.

FIRST YEAR FINAL EXAM QUESTIONS

I. Locomotory system

1. Bone as an organ. Structure of mature bone: osseous (bone) tissue, compact and spongy bone tissue. Types of bones. The skeleton - definition, function.
2. Development and growth of the bones. Histogenesis - types of bone formation. Factors, influencing bone formation. Increase of the bones in length and thickness - the growth cartilage, periosteum - structure.
3. Joints between bones. Solid joints.
4. Synovial joints (diarthroses) - the structure of the synovial joints: basic and additional elements. The classification of the synovial joints.
5. Vertebral column. Joints of the vertebral column. The vertebral column as a whole. Biomechanics.
6. Skeleton of the thorax. Joints of the thorax. The thorax as a whole. Biomechanics.
7. Joints between the vertebral column and the skull. Biomechanics.
8. Joints between the skull bones. Temporomandibular joint.
9. Joints of the shoulder girdle. Shoulder joint.
10. Elbow joint. Joints between the bones of the forearm.
11. Joints of the hand. Carpometacarpal joints. Metacarpophalangeal joints. Interphalangeal joints.
12. Joints of the pelvic girdle. The pelvic girdle as a whole. Biomechanics.
13. Hip joint.
14. Knee joint.
15. Joints between the leg bones. Ankle joint.
16. Joints of the foot - subtalar joint and talo-calcaneo-navicular joint. Joints of the foot with limited movement. Interphalangeal joints. Arches of the foot. Biomechanics.
17. Structure of skeletal muscle: auxiliary structures, classification of muscles, biomechanics.
18. Muscles of the shoulder girdle - groups, attachments, action, and nerve supply.
19. Muscles of the upper arm - groups, attachments, action, and nerve supply.
20. Muscles of the forearm - groups, attachments, action, and nerve supply.
21. Muscles of the hand - groups, attachments, action, and nerve supply.
22. Synovial sheaths of the hand. Flexor and extensor retinacula.
23. Muscles around the hip joint - groups, attachments, action, and nerve supply.

24. Muscles of the femoral region - groups, attachments, action and nerve supply.
25. Muscles of the leg - groups, attachments, action and nerve supply.
26. Muscles of the foot - groups, attachments, action and nerve supply.
27. Topography of the upper limb – lateral (quadrangular) and medial (triangular) axillary space, cubital fossa.
28. Topography of the lower limb - suprapiriform foramen, infrapiriform foramen, vascular and muscular lacuna, obturator and femoral canal.
29. Topography of the lower limb – Femoral triangle, adductor canal, popliteal fossa, cruropopliteus canal.
30. The superficial veins of the upper and lower limbs.
31. The axillary artery. Position, parts, branches. Anastomoses around the shoulder joint.
32. The arteries of the upper limb - the brachial artery, the radial artery and the ulnar artery. Their position and branches.
33. The external and internal iliac arteries. Position, branches. Anastomoses around the hip joint.
34. The arteries of the lower limb - the femoral artery, the popliteal artery, the anterior and posterior tibial arteries. Position and branches.
35. Brachial plexus. The formation, position. Branches of the supraclavicular branches.
36. Median and ulnar nerve. Origin, position, branches. Areas of sensory and motor innervation.
37. Radial, axillary and musculocutaneous nerve.
38. Lumbar plexus. Formation, position, branches.
39. Sacral and coccygeal plexus. Formation, position, branches.
40. Sciatic nerve. Origin, position, branches. Branches supplying skin and muscles.

II. Nervous system and sensory organs

1. Skull (cranium) - facial cranium and neurocranium (cranial skull). Calvaria (calva, vault). The skull of the newborn.
2. External surface of the base of the skull - elements, passing through the openings and canals.
3. Internal surface of the base of the skull - elements, passing through the openings and canals.
4. Lateral aspect of the skull: temporal, infratemporal, and pterygopalatine fossae. Walls, boundaries, communications and elements passing through them.
5. Orbit. Walls, communications, and elements passing through them.
6. Skeleton of the nasal cavity. Walls, communications and elements passing through them.
7. Spinal cord - position, shape, size, segments. Meninges and blood supply.
8. Spinal cord. Grey matter - arrangement and structure.
9. Spinal cord. The white matter - ascending (sensory) and descending (motor) tracts. Intersegmental tracts.
10. Brain - development, shape, size. Anatomical and ontogenetic division. Brainstem - new and old parts. The reticular formation.
11. Medulla oblongata - position, size, the external view (aspect), the internal structure.
12. Pons - position, parts, external view, internal structure.
13. Cerebellum - position, shape, size, parts. General arrangement - grey and white matter. Archi-, paleo-, and neo-cerebellum. Nuclei. Cerebellar peduncles.
14. Cerebellar cortex - structure. Afferent and efferent tracts.
15. The fourth ventricle. Rhomboid fossa. Cerebrospinal fluid - formation, circulation, and drainage.
16. Midbrain - position, parts. External view and internal structure.
17. Diencephalon - thalamus, epithalamus, metathalamus. Position, parts, external view, internal structure.
18. Diencephalon - hypothalamus, subthalamic area. Position, external view, internal structure.
19. Cerebrum (forebrain) - position, shape, lobes. Exterior of the cerebral hemispheres - sulci and gyri. Important functional areas of the cerebral cortex.

20. Cerebral cortex - structure. Variations in the structure.
21. Basal nuclei of the cerebrum.
22. White matter. Internal capsule.
23. Olfactory apparatus (rhinencephalon). Olfactory pathway.
24. Limbic system.
25. The third ventricle. The lateral ventricle. Cerebrospinal fluid - formation and circulation, and drainage.
26. The meninges of the brain. Blood supply of the brain.
27. Ascending pathways for general sensation.
28. Ascending pathways for proprioception.
29. Efferent pathways from the cerebral cortex (the pyramid system).
30. The extrapyramidal system.
31. Cranial nerves - number, names, groups. General principles of formation. Nuclei (motor, sensory, parasympathetic), ganglia.
32. Third, fourth, and sixth cranial nerves - nuclei, position, characteristics. Course of the nerve, branches, area of distribution.
33. Trigeminal nerve. Nuclei - position, characteristic. The ganglion of the nerve. The first branch of the nerve - course, branches, area of distribution.
34. Trigeminal nerve. Nuclei - position, characteristic. The ganglion of the nerve. The second branch of the nerve - course, branches, area of distribution.
35. Trigeminal nerve. Nuclei - position, characteristic. The ganglion of the nerve. The third branch of the nerve - course, branches, area of distribution.
36. Facial nerve. Nuclei - position, characteristic. The course, branches, area of distribution.
37. Glossopharyngeal nerve. Nuclei - position, characteristic. The course, branches, area of distribution.
38. Vagus nerve. Nuclei - position, characteristic. The course, branches, area of distribution.
39. Accessory nerve, hypoglossal nerve. Nuclei - position, characteristic. The course of the nerves, branches, area of distribution.
40. Spinal nerves - number, groups, formation. Functional analysis of the spinal nerves. The spinal ganglion.
41. Autonomic nervous system - definition, criteria for division into sympathetic and parasympathetic divisions. Reflex arch. Analysis of its neurons. Autonomic ganglia. Differences between the autonomic and somatic nervous system.
42. Sympathetic division of the autonomic nervous system - nuclei, sympathetic trunk, prevertebral ganglia, nerves.
43. Parasympathetic division of the autonomic nervous system. Cranial and sacral parasympathetic outflow - nuclei, ganglia, nerves.
44. Plexuses of the autonomic nervous system in the thorax, abdominal and pelvic cavities - formation, position, organs receive their fibers.
45. Organ of vision - general remarks. The eyeball - shape, position, size. Outer (fibrous) coat.
46. The eyeball - middle (vascular) coat - parts, description.
47. Retina. Visual pathway.
48. Refracting media of the eye - cornea, lens, vitreous body, aqueous humour.
49. Extraocular muscles. Eyelids. Lacrimal apparatus. Conjunctiva. Orbital fat.
50. External ear.
51. Middle ear.
52. Internal ear. The bony labyrinth.
53. Internal ear. The membranous labyrinth - cochlear part. Organ of Corti. Pathway of hearing.
54. Internal ear. The membranous labyrinth - vestibular part. Organ of equilibrium. Pathway of equilibrium.

Recommend Resources for study:

Textbooks

1. *Gray's Anatomy for Students: With Student Consult Online Access*, Richard Drake, A. Wayne Vogl, Adam W. M. Mitchell, Churchill Livingstone; 3rd edition (3 April 2014).
2. *Sobotta Anatomy Textbook 1st ed*, eds. Friedrich Paulsen Tobias M. Böckers Jens Waschke, Urban & Fischer, 2018.
3. *Krishna Garg. B D Chaurasia's Human Anatomy: Regional and Applied Dissection and Clinical Head Neck and Brain (Volume - 3) 4th edition*. CBS Publisher, 2010.
4. *William DeMyer. NMS Neuroanatomy*. 2nd edition. Williams & Wilkins, 1998.
5. *Central Nervous System. Vankov's Anatomy*, M. Vankova. STENO publ.house, Varna, 2015.
6. *High-Yield Neuroanatomy (High-Yield Series)* by James D. Fix (Sep 2, 2008)
7. *Functional Neuroanatomy: Text and Atlas, 2nd Edition (LANGE Basic Science)* by Adel Affi and Ronald Bergman (Jan 28, 2005)

Atlases

8. *Delchev S., Novakov S., Ivanova R. Photographic atlas of human anatomy*, ed. S. Sivkov, Lax book, Plovdiv 2016.
9. *Sobotta. Atlas of Human Anatomy*, 13th edition, Urban & Fischer, 2001

SECOND YEAR FINAL EXAM QUESTIONS

I. Splanchnology

1. The circulatory system. Definition. Constituting elements. Major (or systematic) circulation. Lesser (or pulmonary) circulation. Fetal circulation.
2. Heart - position, surface projection on the chest wall. Cardiac size, shape and external features. Pericardium.
3. Cardiac chambers and internal features. The valves of the heart.
4. Cardiac wall (endocardium, myocardium, epicardium) - structure. Fibrous skeleton.
5. Cardiac nerve supply. Coordination of cardiac activities - the conducting system. Blood supply of the heart.
6. Arteries - definition, position in the body, structure of arterial wall. Types of arteries.
7. Veins - definition, position in the body, structure of arterial wall. Types of veins.
8. Microcirculatory blood system. Arterioles, capillaries and sinusoids. Venules. Arteriovenous anastomoses.
9. The lymphoid system. Definition, constituting Blood supply. Lymph capillaries - microstructure. The thoracic duct and its tributaries. The right lymphatic duct - formation. Movements of the lymph.
10. The spleen. Position, structure, blood supply and nerve supply.
11. The lymph nodes - position, groups, structure. The tonsils. The thymus.
12. Digestive system- the major organs of the digestive system. The vestibule of the mouth. Lips. Cheeks. Blood supply and nerve supply.
13. Oral cavity proper - walls. The hard and soft palate. The oropharyngeal isthmus. The mucous membrane. Blood supply and nerves.
14. Teeth. Deciduous and permanent dentition. Structure of the tooth.
15. Tongue - parts, surfaces. The mucous membrane - papillae. The lingual tonsil. The lingual muscles. Blood supply, nerves, and lymph drainage.
16. The major salivary glands. Position, structure. Blood supply, lymph drainage, and nerves.
17. Pharynx - position, shape, parts, description. Structure of the pharyngeal wall. Blood supply, lymph drainage, and nerves.
18. Esophagus - position, parts, description. Structure of the pharyngeal wall. Blood supply, lymph drainage, and nerves.
19. Stomach - position, shape, size. Peritoneal relation of the stomach. Blood supply, lymph drainage, and nerves.
20. Stomach - parts. Structure of the wall. Glands of the stomach.

21. Small intestine. Duodenum - position, parts, description, peritoneal relation of the duodenum. Structure of the wall. Blood supply, lymph drainage, and nerves.
22. Small intestine - jejunum and ileum. Position, peritoneal relation. Structure of the wall. Blood supply, lymph drainage, and nerves.
23. Large intestine - parts, position. External features of the large intestine. Peritoneal relation. Blood supply, lymph drainage, and nerves.
24. Large intestine - the colon. Parts, position, peritoneal relation. Structure of the wall. Blood supply, lymph drainage, and nerves.
25. Caecum. The vermiform appendix - position, shape, size. Structure of the wall. Peritoneal relation. Blood supply, lymph drainage, and nerves.
26. Rectum - position, shape, size. Peritoneal relation. Structure of the wall. Blood supply, lymph drainage, and nerves.
27. Liver - position, shape, size, lobes. Peritoneal connection of the liver.
28. Structure of the liver - the liver lobule, the portal lobule, the liver acinus, microcirculation. Blood supply, lymph drainage, and nerves of the liver.
29. The biliary system. The gall bladder. Structure, description, peritoneal connection of the gall bladder. Blood supply, lymph drainage, and nerve supply.
30. Pancreas - shape, position, description, peritoneal relation. Structure. Blood supply, lymph drainage, and nerves.
31. Respiratory system. The major organs of the respiratory system - principle structure. The nose.
32. Nasal cavity - division, description, mucous membrane. Paranasal air sinuses. Blood supply, lymph drainage, and nerve supply.
33. Larynx - position, shape. Laryngeal cartilages, vocal folds, laryngeal muscles - nerve supply.
34. Larynx - the cavity of the larynx, mucous membrane. Blood supply, lymph drainage, and nerve supply.
35. Trachea - position, parts, size. The principal bronchi. The tracheobronchial tree. Structure of the wall.
36. Lungs - shape, position, description, surface marking. Lobes, segments, lobules.
37. Respiratory spaces of the lungs. Structure of a lung lobule - acinus, blood-air barrier.
38. Urinary system. Components. Kidneys - position, shape, and size. Topography of the kidneys. Capsules of the kidney.
39. Kidneys. Internal structure. Blood supply and microcirculation.
40. Excretory structures - minor and major calyces, pelvis, ureter.
41. Urinary bladder. Position, shape, and size. Peritoneal relations. Structure of the wall. Blood and nerve supply. Female urethra.
42. Endocrine system. Organs. Classification. General characteristics. Thyroid, parathyroid, and suprarenal glands - position and structure. Blood and nerve supply.
43. Male reproductive system. Organs. Testis - position, structure, and coats. Accessory ducts. Epididymis. Blood and nerve supply.
44. Accessory ducts - ductus deferens, ejaculatory duct. Seminal vesicles. Prostate gland - position, size and shape. Internal structure. Blood and nerve supply.
45. Penis. Male urethra. Blood and nerve supply.
46. Female reproductive system. Organs. Ovary - position, shape, size, peritoneal relations, suspensory ligaments. Internal structure. Blood and nerve supply, lymph drainage.
47. Uterus - position, shape, size, peritoneal relations. Suspensory ligaments.
48. Uterus. Uterine cavity. Structure. Blood and nerve supply, lymph drainage.
49. Uterine tubes - position, parts, peritoneal relations. Structure. Blood and nerve supply, lymph drainage.
50. External genital organs. Vagina - position, shape, size, peritoneal relations. Structure. Blood and nerve supply, lymph drainage.

II. Regional anatomy

51. Scalp.
52. Muscles of facial expression - groups, blood and nerve supply.
53. Blood and nerve supply of the face.
54. Muscles of mastication - action, nerve supply.
55. Joints between the skull bones. Temporomandibular joint.
56. Parotid region.
57. Temporal region.
58. Infratemporal region.
59. Lateropharyngeal and retropharyngeal spaces.
60. Digastric triangle.
61. Carotid triangle.
62. The carotid system of arteries. The common carotid artery - beginning, position and branches.
External and internal carotid arteries - position and branches.
63. Infrahyoid region.
64. Posterior cervical triangle.
65. Antescalenus, interscalenus, and scalenovertebral spaces.
66. The subclavian artery. Position and branches. Anastomoses around the shoulder joint.
67. Cervical plexus. The formation, position, branches. Subcutaneous structures in the cervical, thoracic, and abdominal regions.
68. Cervical fascia.
69. Muscles of the neck - groups, attachments, action, and nerve supply.
70. Muscles of the back - groups, action, nerve supply.
71. Chest wall. Muscles and intercostal spaces. Topography of the chest wall.
72. Axilla. Shape, walls, and contents.
73. Thoracic cavity. Pleura. Pleural cavity.
74. Diaphragm.
75. Superior mediastinum.
76. Posterior mediastinum.
77. Anterior and middle mediastinum.
78. The aorta. Position and division in parts. The ascending aorta, the arch of the aorta, the thoracic aorta - branches.
79. Anterior abdominal wall. regions, muscles, fasciae. Topography of the abdominal wall. Sheath of the rectus abdominis muscle.
80. Inguinal canal. Linea alba.
81. Abdominal cavity. Walls, regions. Peritoneum - gross anatomy, blood and nerve supply.
82. Peritoneal cavity. Upper region - organs, peritoneal structures, and recesses.
83. Peritoneal cavity. Lower region - organs, peritoneal structures, and recesses.
84. Omental bursa. Greater omentum.
85. The unpaired visceral branches of the abdominal aorta - the coeliac trunk, the superior and inferior mesenteric arteries. Position and branches.
86. The hepatic portal system - constituting veins. Position of the portal vein. Anastomoses between the portal and systematic circulation.
87. Retroperitoneal space.
88. The abdominal aorta. Parietal (lateral) and paired visceral branches.
89. The superior and inferior vena cava. Position. Main tributaries. Anastomoses between the two caval veins.
90. Peritoneal cavity. Pelvic region - organs, peritoneal structures, and recesses.
91. Subperitoneal space - organs, and spaces.
92. Subcutaneous pelvic region. Perineum. Ischioanal fossa.

Recommend Resources for study:

Textbooks

1. *Gray's Anatomy for Students: With Student Consult Online Access*, Richard Drake, A. Wayne Vogl, Adam W. M. Mitchell, Churchill Livingstone; 3rd edition (3 April 2014).
2. *Sobotta Anatomy Textbook 1st ed*, eds. Friedrich Paulsen Tobias M. Böckers Jens Waschke, Urban & Fischer, 2018.
3. *Chaurasia BD. Human anatomy. Regional and applied. Third edition. CBS Publishers & distributors. New Delhi, India, 1998.*
4. *Romanes GJ. Cunningham's manual of practical anatomy. Thorax and abdomen. Oxford University Press. New York, 1996.*
5. *Patrick W. Tank. Grant's Dissector (Tank, Grant's Dissector). 14th Edition. Lippincott Williams & Wilkins, 2008.*
6. *S.T.Sivkov, P.K. Atanasova, S.S. Novakov. MCQ's in Anatomy. A self-testing supplement to human anatomy. Internal organs and topographic anatomy. Medical Publishing House "VAP", Plovdiv, Publishing House "Makros", Plovdiv. 2013.*

Atlases

7. *Sobotta. Atlas of Human Anatomy, 15th edition, Urban & Fischer, 2011.*
8. *Drake R, Wayne Vogl A., Mitchell A, Gray's Atlas of Anatomy, 2e, 2015, Churchill Livingstone*
9. *Delchev S., Novakov S., Ivanova R. Photographic atlas of human anatomy, ed. S.Sivkov, Lax book, Plovdiv 2016.*
10. *Junqueira, Carneiro. Histology, 4 edition, Springer, 1997.*
11. *Stevens, Lowe, Human Histology, 2 edition, Chapman and Hall, 1997.*
12. *Rohen, Yokochi, Luten-Drecoll. Human Anatomy, 4 edition, Springer, 1998*
13. *Krstic, Human Microscopic Anatomy, Springer, 1997*

www.anatomy.plcnet.org

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MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

CYTOLOGY, HISTOLOGY AND EMBRYOLOGY

Approved by the Department Council on 23.05.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

MEDICAL UNIVERSITY – PLOVDIV

FACULTY OF MEDICINE

Cytology, Histology and Embryology

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								1 st year	
		Total	Lectures	Practices	ECTS			I	II
Cytology, Histology and Embryology	II	90	30	60	3.0	3.0	6.0	-	2/4

DISCIPLINE:

“Cytology, histology and embryology”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Obligatory

LEVEL OF QUALIFICATION:

Master of Science /M/

FORMS OF TRAINING:

Lectures, seminars, self – preparing

YEAR OF TRAINING:

I year

DURATION OF TRAINING:

one semester

ACADEMIC HOURS:

30 hrs lectures, 60 hrs seminars

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Light microscopes, sets of microscopical preparations, electron microphotographs, videofilms, multimedia presentations, atlases, native specimens of placenta and fetuses,

discussion, Practicum of Cytology, Histology and Embryology, Handbook in Cytology, Histology and Embryology, CD interactive atlas of Cytology, Histology and Embryology.

FORMS OF EVALUATION:

Current assessment, preliminary examination in Cytology (Cytology Colloquium), tests during the semester, identifying microscopical preparations and electron microphotographs.

EVALUATION CRITERIA:

The grade from the preliminary examination in Cytology (Cytology Colloquium) and the current average grade for the semester.

ASPECTS OF EVALUATION CRITERIA:

A preliminary exam attending, test solving, participation in discussions.

SEMESTER EXAM:

Yes /four stages/: 1. A. Practical examination (identifying microscopical preparations and electron microphotographs in Cytology), B. Practical examination (identifying microscopical preparations and electron microphotographs in Histology and Embryology); 2. MCQ Test in Cytology, Histology and Embryology; 3. Writing examination on two topics on Histology and Embryology; 4. Oral examination.

Term tests:

1. Cytology Colloquium – 60 points
2. Test on epithelial and connective tissues – 40 points
3. Test on blood, muscle and nerve tissues – 50 points

Total score points for the semester – 150

Evaluation

143 – 150 p. – 6,00
135 – 142 p. – 5,50
127 – 134 p. – 5,00
120 – 126 p. – 4,50
113 – 119 p. – 4,00
105 – 112 p. – 3,50
90 – 104 p. – 3,00
< 90 p. – 2,00

EXEMPTION

Cytology Colloquium:

Students with **90% from practical part (18 points) and 90% from MCQ test (36 points)** exempt the Cytology section (practical and MCQ) from the final Cytology, Histology and Embryology exam.

Total score points (Cytology + Histology points):

Students with **90% of the maximum semester score (135 points or more)** exempt both practical and MCQ test on Cytology, Histology and Embryology from the final exam. They sit only for essay and oral part of the final exam.

Students with **less than 90% (< 135 p.)** of the maximum semester score sit for the entrance test (practical and MCQ test) of the final exam. If they pass the practical and MCQ test, they sit for the essay and oral part.

STATE EXAM:

No

LECTURER:

A habilitated lecturer from the Department of Anatomy, Histology and Embryology.

DEPARTMENT:

Department of Anatomy, Histology and Embryology.

ANNOTATION

The course in "Cytology, Histology and Embryology" is a mandatory propaedeutic step in teaching the fundamental discipline Human Anatomy. Students acquire knowledge on the basic structural elements in the human body: cells, tissues. The material is studied in three sections. The Cytology provides knowledge on the structure of the eukaryotic cells - cell membrane, cell organelles, inclusions, nucleus, cytophysiology. General Histology - provides knowledge on the main structural, ultrastructural, histochemical and functional characteristics of the tissues and their histogenesis. Embryology – provides knowledge on the human embryonal and fetal development (fertilization, early and late gastrulation), primitive organs, extra-embryonic layers, twins, anomalies in the human embryonal development).

BASIC AIMS OF THE DISCIPLINE

The main objective is to gain knowledge of the main morphological structures of the human body: cells, tissues, stages of the embryonal development (fertilization, early and late gastrulation, histogenesis, differentiation).

Cytology – studying the structure of the eukaryotic cells:

- Plasma membrane (plasmalemma) - structural, ultrastructural and chemical organization, cell contacts, specialization the cell surface - cilia, flagella, microvilli, basolateral folds, transport of the substances through the cell membrane.
- Cell organelles – types, structural, ultrastructural and functional characteristics.

- Specialized cell organelles - structural, ultrastructural and functional characteristics.
- Nucleus in interphase – structural, ultrastructural and functional characteristics.
- Cell division. Mitosis – phases.

General Histology – studying the main tissues of the human body – histogenesis, lightmicroscopical, electronmicroscopical, histochemical and functional characteristics:

- Epithelial tissue
- Connective tissue
- Blood tissue
- Muscle tissue
- Nervous tissue
- Reproductive tissue

General Embryology – studying the embryonal development and the initial stages of the fetal period, twins, anomalies in the human embryonal development.

EXPECTED RESULTS

After completing the Cytology, Histology and Embryology course, students should have the following knowledge and practical skills:

- deep knowledge of the structure of the eukaryotic cells - cell membrane, structural, ultrastructural and chemical organization, cell contacts, specialization the cell surface - cilia, flagella, microvilli, transport of the substances through the cell membrane - endocytosis and exocytosis
- deep knowledge of the cell organelles and metabolic inclusions in the cell
- deep knowledge of the tissues - structural, ultrastructural and functional characteristics - epithelial tissue, connective tissue, blood tissue, muscle tissue, nervous tissue, reproductive tissue.
- deep knowledge on General Embryology – the embryonal development and the initial stages of the fetal period, formation and structure of placenta, twins, anomalies in the human embryonal development.

LECTURES

I course, II semester

№	TOPIC	HOURS	DATE
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1.	Introduction to Cytology, Histology and Embryology. The cell.	2 hrs.	
2.	Cell organelles.	2 hrs.	
3.	Cytoplasm.	2 hrs.	
4.	Nucleus in interphase. Mitosis.	2 hrs.	
5.	Cytophysiology.	2 hrs.	
6.	Tissues – classification, properties. Epithelia.	2 hrs.	
7.	Connective tissue. Fibrous connective tissue.	2 hrs.	
8.	Connective tissue with solid intercellular substance. Blood tissue.	2 hrs.	
9.	Blood tissue.	2 hrs.	
10.	Muscle tissue.	2 hrs.	
11.	Nerve tissue.	2 hrs.	
12.	Reproductive tissue. Early human embryonal development.	2 hrs.	
13.	Early human embryonal development.	2 hrs.	
14.	Extra-embryonic layers.	2 hrs.	
15.	Twins. Anomalies in the human embryonal development.	2 hrs.	

Total: 30 hrs.

PRACTICES

I course, II semester

№	TOPIC	HOURS	DATE
1.	General Methods of Investigation in Histology. The cell – morphology.	4 hrs.	
2.	Cytoplasm. Cell organelles.	4 hrs.	
3.	Nucleus in interphase. Mitosis.	4 hrs.	
4.	Cytoplasm. Cell inclusions. Cytophysiology.	4 hrs.	
5.	Epithelia. Unilayered epithelia.	4 hrs.	
6.	Colloquium in Cytology.	4 hrs.	
7.	Epithelia. Multistratified epithelia. Secretory epithelia.	4 hrs.	
8.	Fibrous connective tissue.	4 hrs.	
9.	Connective tissue with solid intercellular substance.	4 hrs.	
10.	Blood tissue.	4 hrs.	
11.	Muscle tissue.	4 hrs.	
12.	Nerve tissue.	4 hrs.	
13.	Reproductive tissue.	4 hrs.	
14.	General embryology. Gastrulation.	4 hrs.	

15.	Extra-embryonic layers.	4 hrs.	
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Total: 60 hrs.

LECTURES - TOPICS

LECTURE № 1 – 2 hrs

Introduction in Cytology, Histology and Embryology. Relationship with other medical and biological sciences.

1. Introduction in Cytology, Histology and Embryology..
 - Subject
 - Development
 - Relationship with other medical and biological sciences.
 - General methods of investigation in Histology.
2. The cell
 - Cell membrane (plasmalema)
 - Biomembranes – transport of substances through the cell membrane
 - Specializations of the cell surface, cell contacts
 - Compartmentalization of cytoplasm
 - Cell organelles - endoplasmatic reticulum, ribosomes

LECTURE № 2 – 2 hrs

Cell organelles.

1. General organelles - structural, ultrastructural and functional characteristics.
 - 1.1. Endoplasmatic reticulum
 - 1.1. Mitochondria
 - 1.2. Goigi apparatus (complex)
 - 1.3. Lysosomes

LECTURE № 3 – 2 hrs

Cytoplasm.

1. Cytoskeleton - structural, ultrastructural and functional characteristics.
2. Specialized organelles – structural, ultrastructural and functional characteristics.
3. Cell inclusions.

LECTURE № 4 – 2 hrs

Nucleus in interphase and mitosis.

1. Nucleus in interphase and mitosis - structural, ultrastructural and functional characteristics.

- nuclear components
 - nuclear membrane
 - chromatin, nucleolus
2. Nucleus in mitosis - phases

LECTURE № 5 – 2 hrs

Cytophysiology.

Metabolism. Phagocytosis, Synthesis, secretion, moving, aging.

LECTURE № 6 – 2 hrs

Tissues. Epithelial tissue.

1. Definition
2. Histogenesis
3. Classification.
4. Unistratified epithelia. Structural, ultrastructural and functional characteristics.
5. Multistratified epithelia. Structural, ultrastructural and functional characteristics.
6. Gland epithelia. Structural, ultrastructural and functional characteristics.

LECTURE № 7 – 2 hrs

Connective tissue. Fibrous connective tissue.

1. Definition
2. Histogenesis
3. Classification
4. Structural, ultrastructural and functional characteristics.
 - connective tissue cells
 - intercellular substance

LECTURE № 8 – 2 hrs

Connective tissue with solid intercellular substance.

1. Connective tissue with solid intercellular substance.
 - 1.1. Cartilage
 - 1.2. Bone

LECTURE № 9 – 2 hrs

Blood tissue.

1. Definition.
2. General characteristics
3. Classification.
4. Structural, ultrastructural and functional characteristics
 - Erythrocytes
 - Granulocytes
 - Blood platelets (thrombocytes)

LECTURE № 10 – 2 hrs

Muscle tissue.

1. Definition
2. Histogenesis
3. General characteristics
4. Classification.
5. Structural, ultrastructural and functional characteristics.

LECTURE № 11 – 2 hrs

Nervous tissue.

1. Definition
2. Histogenesis
3. General characteristics
4. Classification.
5. Structural, ultrastructural and functional characteristics – neurons, neuroglia, nerve fibers, myoneural synapse.

LECTURE № 12 – 2 hrs

Reproductive tissue.

1. Reproductive tissue.
 - 1.1. Definition
 - 1.2. Histogenesis
 - 1.3. General characteristics
 - 1.4. Structural, ultrastructural and functional characteristics.
 - Oocytes
 - Spermatozoa.

LECTURE № 13 – 2 hrs

Early human embryonal development

1. Fertilization, cleavage
2. Segmentation
3. Blastocysts, implantation
4. Gastrulation
5. Primitive organs.

LECTURE № 14 – 2 hrs

Extra-embryonic layers

1. Chorion, amnion, yolk sack, allantoic diverticulum
2. Umbilical cord
3. Fetal sack
4. Placenta

LECTURE № 15 – 2 hrs

Twins. Anomalies in the human embryonal development.

1. Multiple pregnancy.
 - fraternal twins and identical twins
2. Anomalies in the human embryonal development – embryotoxic factors

PRACTICES – TOPICS

SEMINAR № 1 – 4 hrs

General Methods of Investigation in Histology. The cell – morphology.

1. Discussion
2. Light microscopic observation
3. Video film

Microscopical preparations:

1. Squamous epithelial cells
2. Pyramidal neurons
3. Spherical cells

SEMINAR № 2 – 4 hrs

Cytoplasm. Cell organelles.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Nissl substance (granules)
2. Mitochondria
3. Golgi complex
4. SDH activity

Electron microphotographs:

1. Rough endoplasmatic reticulum
2. Smooth endoplasmatic reticulum
3. Ribosomes
4. Mitochondria
5. Golgi complex
6. Centrosome

SEMINAR № 3 – 4 hrs

Nucleus in interphase. Mitosis.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Nucleus in interphase
 - 1.1. H-E staining
 - 1.2. Feulgen staining

2. DNA synthesis (histoautoradiography)
3. Mitosis in cells of pea radix

Electron microphotographs:

1. Interphase nucleus

SEMINAR № 4 – 4 hrs

Plasmalemma. Cell inclusions. Cytophysiology.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Lipid drops
2. Glycogen granules in hepatic cells
3. Pigment inclusions
4. Acid phosphatase activity
5. Phagocytosis
6. Secretion (secretory granules)
7. Mooving of cillia – demonstration

Electron microphotographs:

1. Cell membrane
2. Microvilli
3. Basal foldings
4. Desmosomes
5. Interdigitations
6. Protein granules
7. Glycogen granules
8. Lipid droplets
9. Lysosomes
10. Secretory granules
11. Cilia
 - 11.1 Longitudinal section
 - 11.2. Transverse section

SEMINAR № 5 – 4 hrs

Epithelia. Unilayered epithelia.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Simple squamous epithelium
2. Cuboidal epithelium
3. Columnar epithelium
4. Unilayered (pseudostratified) ciliated columnar epithelium
5. Henle's epithelium

SEMINAR № 6 – 4 hrs

Colloquium

(preliminary examination)

1. Practical part – 7 microscopical preparations, 6 - electron microphotographs
2. Theoretical part – test

SEMINAR № 7 – 4 hrs

Epithelia.

Multistratified epithelia. Secretory epithelia.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Stratified squamous epithelium
2. Stratified squamous keratinizing epithelium
3. Secretory epithelia
 - 3.1. Simple tubular glands
 - 3.2. Serous, mucous and compound alveolar (acinar) glands

SEMINAR № 8 – 4 hrs

Fibrous connective tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Loose connective tissue
2. Collagenous fibrous tissue
3. Elastic tissue
4. Pigment connective tissue
5. White adipose tissue
 - 5.1. Sudan III staining
 - 5.2. H-E staining
6. Brown adipose tissue

Electron microphotographs:

1. Multilocular adipocyte
2. Macrophage
3. Fibroblast
4. Mast cell
5. Plasma cell
6. Collagen fibers

SEMINAR № 9 – 4 hrs

Connective tissue with solid intercellular substance.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Hyaline cartilage
2. Elastic cartilage
3. Compact bone – decalcinated
4. Compact bone – Shliff

5. Osteogenesis

Electron microphotographs:

1. Osteocyte
2. Osteoclast

SEMINAR № 10 – 4 hrs

Blood tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations
4. Test and preparations on Epithelial and Connective tissues.

Microscopical preparations:

1. Blood smear - examination

Electron microphotographs:

1. Neutrophil granulocyte
2. Eosinophil granulocyte
3. Lymphocyte
4. Plateles

SEMINAR № 11 – 4 hrs

Muscle tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Smooth (visceral) muscle tissue
2. Striated skeletal muscle tissue
3. Striated cardiac muscle tissue
4. Impulse conductive cardiac muscle tissue

Electron microphotographs:

1. Smooth muscle cell
2. Myofibril – skeletal
3. Cardiomyocyte – myofibril
4. Intercalated disc

SEMINAR № 12 – 4 hrs

Nerve tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Multipolar neurons
2. Pear-like neurons
3. Pyramidal neurons
4. Myelinated nerve fibers
5. Fibrous astrocytes
6. Protoplasmic astrocytes

Electron microphotographs:

1. Myelinated nerve fibers

2. Myoneural synapse

SEMINAR № 13 – 4 hrs

Reproductive tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations
4. Video film

Microscopical preparations:

1. Oocyte
2. Spermatozoa

Electron microphotographs:

1. Oocyte
2. Spermatozoon

SEMINAR № 14 – 4 hrs

General embryology. Gastrulation.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations
4. Test and preparations on blood, muscle and nerve tissues.

Microscopical preparations:

1. Early gastrulation
2. Late gastrulation

SEMINAR № 15 – 4 hrs

Extra-embryonic layers

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Umbilical cord of 2-3 month old human embryo
2. Umbilical cord of newborn baby
3. Placenta
4. Fetal sack

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2. Human embryology, I. Singh, 6th edition
3. Clinical and Functional Histology for Medical Students, Richard S. Snell
4. Histology, R. Henrikson
5. Histology – A Text and Atlas, M. Ross, Sixth edition
7. Practicum of Cytology, Histology and Embryology with CD, P. Atanassova, I. Koeva, E. Petrova, N. Penkova, V. Trichkova
7. Handbook in Cytology, Histology and Embryology, I. Koeva, ИК-БАП, ISBN 978-954-8326-33-9.

CONSPECTUS

in Cytology, General Histology and Embryology

CYTOLOGY

1. Cell. Microscopic and ultrastructural components of the cell.
2. Biomembranes - structural, ultrastructural and chemical organization.
3. Plasma membrane (plasmalemma) - structural, ultrastructural and chemical organization.
4. Cell contacts - ultrastructure and function.
5. Specialization the cell surface - cilia, flagella, microvilli, basolateral folds.
6. Transport of the substances through the cell membrane. Endocytosis and exocytosis.
7. Endoplasmic reticulum – types, structural, ultrastructural and functional characteristics. Ribosomes.
8. Golgi apparatus (complex) - structural, ultrastructural and functional characteristics.
9. Mitochondria - structural, ultrastructural and functional characteristics.
10. Membrane bound vesicles. Lysosomes. Peroxisomes.
11. Cytoskeleton - microtubules. Centrioles. Cytocenter.
12. Cytoskeleton - microfilaments, intermediate filaments.
13. Specialized cell organelles. Structural, ultrastructural and functional characteristics.
14. Metabolic inclusions in the cell. Types, structural, ultrastructural and functional characteristics.
15. Nucleus in interphase.
16. Cell division. Mitosis.
17. Synthesis and secretion in the cell.
18. Movement in the cell- role of the cilia, flagella and miofibrils.

GENERAL HISTOLOGY

1. Tissues- general characteristics. Histogenesis and classification.
2. Epithelial tissue. Histogenesis. General characteristics. Classification.
3. Unistratified epithelia. Structural, ultrastructural and functional characteristics. Examples.
4. Multistratified epithelia .Structural, ultrastructural and functional characteristics. Examples.
5. Gland epithelia. Structural, ultrastructural and functional characteristics. Examples.
6. Connective tissue. Histogenesis. General characteristics. Classification.
7. Intercellular substance of the connective tissue. Fibres - structural, ultrastructural, chemical and functional characteristics.
8. Ground substance of connective tissue. Structural, chemical and functional characteristics.
9. Histogenesis of the intercellular substance of the connective tissue – biosynthesis of collagen.
10. Connective tissue cells. Types, structural, ultrastructural and functional characteristics.
11. Fibrous connective tissue. Types, structural, ultrastructural and functional characteristics.
12. Cartilage. Types, structural, ultrastructural and functional characteristics.
13. Bone. Structural, ultrastructural and functional characteristics.
14. Osteogenesis (ossification). Types and structural characteristic.

15. Specialized connective tissue: adipose tissue, reticular tissue, pigmentous tissue.
16. Blood tissue. General characteristics. Classification.
17. Histogenesis of blood tissue. Scheme of the histogenesis.
18. Erythrocytes – structural, ultrastructural and functional characteristics. Erythropoiesis.
19. Granulocytes – types, structural, ultrastructural and functional characteristics. Granulocytopoiesis.
20. Agranulocytes – types, structural, ultrastructural and functional characteristics. Lymphocyto- and monocytopenesis.
21. Blood platelets (thrombocytes) - structural, ultrastructural and functional characteristics. Thrombocytopoiesis.
22. Interstitial (reactive blood) cells. Types, histogenesis. Structural, ultrastructural and functional characteristics.
23. Muscle tissue. Histogenesis. General characteristics. Classification.
24. Smooth muscle tissue. Structural, ultrastructural, chemical and functional characteristics.
25. Cardiac striated muscle tissue. Structural, ultrastructural, chemical and functional characteristics.
26. Skeletal striated muscle tissue. Structural, ultrastructural, chemical and functional characteristics.
27. Nervous tissue. Histogenesis. General characteristics. Classification.
28. Nervous fibres. Types, structural, ultrastructural, chemical and functional characteristics.
29. Neuroglia. Types, structural, ultrastructural, and functional characteristics. Histogenesis.
30. Reproductive tissue. Spermatogenesis. Spermatozoa.
31. Reproductive tissue. Oogenesis. Oocytes.

GENERAL EMBRYOLOGY

32. Insemination. Fertilization. Factors that influence the processes.
33. Initial development of human embryo. Segmentation. Blastocysts. Morulla. Embryoblast. Trophoblast.
34. Implantation. Structural, ultrastructural and functional characteristics of the uterine endometrium during proliferative phase.
35. Early development (gastrulation) of human embryo. Formation of the germ layers. Embryonic disc. Chorion.
36. Late development (gastrulation) of human embryo. Formation of the mesoderm and the mesenchyme. Primitive organs.
37. Germ layers and their derivatives.
38. Yolk sac. Chorion. Allantoic diverticulum. Vitelline haemopoiesis. Vitelline circulation.
39. Umbilical cord. Formation. Fetal circulation.
40. Placenta. Formation, structure, functions and blood circulation. Blood - placental barrier (placental membrane).
41. Amnion. Amniotic cavity. Amnio-chorionic membrane.
42. Twinning. Monozygotic. Dizygotic.
43. Abnormalities in the embryonic development. Teratogenic factors.

SELF STUDY GUIDE

POINT THE RIGHT ANSWER

1. The umbilical cord of the newborn baby contains two arteries and one vein.
YES NO
2. The cells that are formed after cleavage are called blastomers.
YES NO
3. Lisosomes can be observed with light microscope.
YES NO
4. The decreased number of erythrocytes in the blood sample is called erythrocytosis.
YES NO
5. Exocytosis is a transport through the cell membrane.
YES NO

CHOOSE ONE CORRECT ANSWER

6. Goblet cells are:
a/ absorbing (resorbing) cells
b/ secreting cells
c/ covering cells
d/ stem cells
7. Somites are derivates of:
a/ ectoblast
b/ endoblast
c/ mesoblast
d/ mesenchyme
8. The cells that possess microvilli are:
a/ resorbing cells
b/ secreting cells
c/ covering cells
d/ stem cells
9. The nerve tissue originates from:
a/ ectoblast
b/ endoblast
c/ mesoblast
d/ mesenchyme
10. The time of implantation is:
a/ 1st day after fertilization
b/ 6-7 days after fertilization
c/ 10 days after fertilization
d/ 1st month after fertilization
11. Unilocular adipocytes are typical for:
a/ white adipose tissue
b/ blood tissue
c/ brown adipose tissue
d/ long bones

WRITE “RIGHT” (R) OR “WRONG” (W)

12. Typical for Golgi complex is:

- a/ synthesis of proteins
- b/ synthesis of lipids
- c/ cis and trans zone
- d/ made of cisternae, vacuoles and vesicles
- d/ can be seen with the light microscope

13. Typical for the lymphocytes is:

- a/ small nucleus
- b/ large nucleus
- c/ beam-shaped nucleus
- d/ basophilic cytoplasm
- e/ granules in the cytoplasm

DEFINE AND FILL IN THE CORRECT ANSWERS

14. Count the layers of the multistratified keratinizing epithelium:

- a.....
- b.....
- c.....
- d.....
- e.....

15. The phases of the mitosis are:

- a.....
- b.....
- c.....
- d.....

WRITE THE CORRECT ANSWER

16. With the light microscope, H-E staining, an epithelium with several rows of nuclei and cilia at the cell's surface is seen.

Which is this epithelium?

Prepared by: Prof. P. Atanassova, MD, PhD

Assistant Professor A. Fusova, MD

Approved by: Assoc. prof. S. Novakov, MD, PhD

/Head of the Department of Anatomy, Histology and Embryology/

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
BIOPHYSICS

Approved by the Department Council – Protocol №93/09.06.2022

Confirmed by the Faculty Council – Protocol №6/15.06.2022

BIOPHYSICS

Syllabus

COURSE	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								1 st year	
		Total	Lectures	Practices	ECTS			I	II
Biophysics	II	60	30	30	2.0	5.0	7.0	-	2/2

COURSE NAME:

Biophysics

TYPE OF COURSE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master's /M/

FORMS OF TRAINING:

Lectures, laboratory practices, seminars, research involvement for talented students.

YEAR OF TRAINING:

1st year

DURATION OF TRAINING:

2 semesters

ACADEMIC HOURS:

30h of lectures and 30h of laboratory practices

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Microscopes, Models for simulations of biophysical processes, Electrophoresis, Digital oscilloscopes, Apparatus of electro muscle and neuronal stimulations.

FORMS OF EVALUATION:

Practical tests, oral exam and final exam.

EVALUATION CRITERIA:

Final grade is calculated according to the formula: Final Grade = $0.3 \cdot X + 0.7 \cdot Y$, where X is the accumulated grade from practical tests, and Y is the grade from the final exam.

ASPECTS OF EVALUATION CRITERIA:

1. Running evaluation – (criteria for the grade) – demonstration of knowledge during classes, participation in the laboratory exercises, the ability to collect, analyses, and present data during laboratory practices.
2. Midterm evaluation (average grade from the running evaluation).
3. Final grade (after final exam – entry test, written and oral exam).

SEMESTER EXAM:

Written exam based on multiple choice and open questions.

STATE EXAM:

No

LECTURER:

Professor from the department of Medical Physics and Biophysics.

DEPARTMENT:

Medical Physics and Biophysics

ANNOTATION

Biophysics is considered a fundamental biological course studied by medical students at MU-Plovdiv. The course is mostly theoretical. It discusses the physical nature of the organization and function of bio-objects at the molecular, sub-cellular, cellular and tissue levels.

Medical students gain knowledge on common principles upon which are based fundamental phenomena and processes in living tissue, as well as the occurring mechanisms.

This course clarifies the molecular relationships responsible for: cell membrane structure, mechanisms of membrane transport, nerve conduction, muscle contraction, conjugation between mechanical, electrical and energy processes in cells.

The theoretical part also describes the processes of intercellular realization and signaling pathways, as well as the effects and mechanisms of influence of external factors like electric current, light, ultraviolet and infrared rays, and ionizing radiation on biological objects.

MAIN TASKS OF THE COURSE

The first task is to acquire knowledge regarding the general principles on which the basic phenomena and processes in living tissues occur. Moreover, they will get a profound understanding of the mechanisms by which these processes are realized. Even more, this course provides clarification, via a specific interdisciplinary approach, of physical and physico-chemical reactions and processes occurring in biological systems with different degrees of organization. This will stand as a basis for the development of physiological and pathophysiological processes.

EXPECTED RESULTS

After completing the biophysics training program and passing the exam, students must have acquired knowledge on:

- main components, principles of construction and organization of biomembranes;
- energy prerequisites for passive and active transmembrane transport, processes and membrane structures involved in the transport;
- bioelectrogenesis - membrane potential, action potential in cells of excitable tissues, tissue specificity of the processes, mechanisms of propagation of the action potential;
- types of muscle contractions and the types of thermal processes during the muscle contraction;
- the specifics of the mechanisms in skeletal, cardiac and smooth muscles contraction;
- ways of exchange of intercellular information communication;
- receptors as cellular information inputs and their influence on the activation of basic intracellular signaling pathways;
- electrokinetic phenomena in bio-objects - surface electric charge, mechanism of existence, dependence on pH and ionic strength of the medium, influence on the electrophoretic characteristics of biomolecules and cells;
- quantum biophysics;
- influence of external factors - electric current, visible light, ultraviolet, infrared rays and ionizing radiation on biological objects - physical interactions, specifics of biological effects and hypotheses that explain them.

FROM THE PRACTICAL EDUCATION IN BIOPHYSICS

Mastering the technical skills and the experimental methods for:

1. Measurement and calculation of the dimensions of a lipid monolayer in laboratory setup. Work with micropipettes. Calculation of the amount of substance in a solution and unit conversions.
2. Analysis of the changes in the spontaneous mechanical activity of smooth muscle tissue after the treatment with different pharmaceutical substances.
3. Attachment of electrodes to human skin. Measurement of the impedance of human skin for different frequencies of the stimulus. Plotting impedance vs. frequency. Determination of the resistance of human skin.

4. Basic techniques for transcutaneous neuromuscular stimulation: preparation of the skin, attachment of electrodes, choosing the frequency and the duration of the electrical pulses.
5. Conduction of rheographic test. Attachment of the electrodes to the selected area with a rubber band. Analysis of the amplitude and time parameters of the rheographic recording. Manipulation of the speed of the recording equipment.
6. Work with “Voltage Clamp - computer simulation”: manipulating and analyzing the parameters of the trans-membrane current in axon of a squid. Application of specific channel blockers for Na^+ and K^+ ion channels. Determination of the threshold depolarization.
7. Measuring the parameters of pulses generated by a cardiac pacemaker. Work with oscilloscope. Determination of the amplitude, duration, and the period of the stimulation pulse.
8. Work with micro electrophoresis equipment. Measurement of the speed of dispersed- phase particles.
9. Preparation of the equipment for paper electrophoresis. Conduction of paper electrophoresis and spectrometric identification the fractions.

PROGRAM OF BIOPHYSICS LECTURES

№	LECTURE COURSES	HOURS
1.	1. Thermodynamic systems and processes. First principle of thermodynamic. Application in biological systems. 2. Secondary principle of thermodynamic. Entropy. Free energy.	2
2.	3. Application of the secondary thermodynamic principle in biological objects. Equation of Prigogine. 4. Biological membranes. Common features. Construction of the lipid molecules. Organization of the membrane.	2
3.	5. Membrane proteins and glycoproteins. Localization of the membrane carbohydrates. 6. Mobility of the membrane components.	2

4.	7. Phase transitions in the biological membranes. 8. Gradients. Chemical, concentrational and electrical potential. Electrochemical potential. Equations potentials.	2
5.	9. Diffusion, trans-diffusion, osmosis and filtration. 10. Passive transport. Eased and exchanged diffusion.	2
6.	11. Ionophores. Ion channels. 12. Active transport. Model of sodium — potassium pump. Calcium pump.	2
7.	13. Diffusion potential. Bernstein's and Goldman's equation. Permeability and conductivity. Potential of a rest condition. 14. Action potential of nerve cells	2
8.	15. Membrane current at the time of the excitation. 16. Ion theory of the excitation. Theory of Hodgkin and Huxley.	2
9.	17. Refractory period. Following potentials. Accommodation. 18. Propagation of the action potential. Electrotonic potential. Mechanism of conduction. Speed of spreading.	2
10.	19. Bioelectrical activity of the excitable tissues. 20. Structure and mechanical characteristics of striated muscles.	2
11.	21. Types of muscle contraction. Temporary characteristics of single muscle contraction. 22. Contracting mechanisms by striated muscles. The role of the Ca^{2+} .	2
12.	23. Propagation of the excited process. Electromechanical connection. 24. Smooth muscles structure. Mechanism of smooth muscles contraction. The role of the Ca^{2+} . Phasic and tonic contractions.	2

13.	25. Comparative characteristic between smooth muscle and striated muscle contractions. 26. Double electrical layer. Electrokinetic potential, dependence on the pH of the medium.	2
14.	27. Electrical permeability of the tissue for constant current. Polarization. Types. 28. Impedance. Dispersion of the dielectric permittivity. Application of the method in the biology and in the medicine.	2
15.	29. Application of the constant current and low frequencies pulses in clinical practice. 30. Application of the alternating current and electromagnetic fields in biological objects.	2

PRACTICAL COURSE SYLLABUS

Practical № 1

Monolayer of surface-active substance – a study model of the specific features of lipid aggregates in aqueous medium. Spatial characteristics and density of the monolayer molecules in different conditions resembling membrane phase transitions.

Practical № 2

Membrane transport of H₂O molecules. Role of osmosis in the increase of the water content in tissue.

Practical № 3

Membrane ion channels. Ion channel blockers. Effects of blocking Ca²⁺ - channels.

Practical № 4

Diffusion and membrane potentials: experimental models.

Practical № 5

Hodgkin and Huxley model - Ion theory of excitation. Method of the fixed voltage. Changes of the ion currents across the cell membrane of the squid axon on blocking Na⁺ -and K⁺ - channels.

Practical № 6

Analysis of the action potential of cardiac muscle, illustrated by an implantable cardiac stimulator.

Practical № 7

Mechanical activity and reactivity of smooth muscle tissue. The role of Ca^{2+} .

Practical № 8

Experimental determination of the electrokinetic potential.

Practical № 9

Electrical conductivity of biological tissues in the presence of electric current. Neuromuscular synapses. Electro-muscular stimulation. Dependence of current threshold on pulse duration.

Practical № 10

Electrophoresis. Separation and study of fractions by means of preparatory electrophoresis.

Practical № 11

In vivo determination of the dependence of skin resistance on the frequency of alternating current.

Practical № 12

Determination of the dependence of force of muscular contraction on the extracellular concentration of Ca^{2+} – ions and *in vivo* experiments.

Practical № 13

Investigation of the changes in the Atlantic squid axon's membrane potential provoked by means of stimulation with pulsed electric current with different density, direction and duration.

Practical № 14

Biophysical basis of the rheography. Determination of temporal and amplitude rheographic parameters, characterizing the functioning of the heart and of the pulsatile blood influx.

Practical № 15

Determination of the half-life of $^{99\text{m}}\text{Tc}$ – radionuclide applied in the medical practice for the investigation of the thyroid gland.

Practical № 16

Receptors: information gates of the cell. Activation and inhibition of M-cholinoreceptors.

BIBLIOGRAPHY

1. Emilia Milieva, Franco Milano, Iordan Kostourkov, Martianna Yaneva, Lubka Mihova – “Physics and Biophysics of Clinical Radiation Therapy” – 2017
2. Notebook in Biophysics – 2017
3. Biophysics Multiple Choice Questions Booklet, Edited by Prof. Atanas Krastev, DBSc, First Edition – 2018
4. Tom A. Waigh – “Applied Biophysics”, John Wiley and Sons, Ltd, Manchester, UK – <https://epdf.pub/biophysics.html>
5. Rodney M. J. Cotterill, “Biophysics”- An introduction, John Wiley and Sons, Ltd – 2002 – <https://epdf.pub>
6. Patrick F. Dillon, Biophysics – A Physiological Approach, Published by Cambridge University Press, 2012

SYLLABUS IN BIOPHYSICS

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**MEDICAL UNIVERSITY –
PLOVDIV
FACULTY OF MEDICINE**

SYLLABUS

IN

Physical education and sport

Specialty Medicine

**Approved by the Department Council on 31
May 2022**

**Confirmed by the Faculty Council – Protocol
№6/15.06.2022**

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non- auditorium classes	ECTS total	Academic hours in years and semesters	
								1 st year	
Physical education and sport	II	Total	Lectures	Practices	ECTS	2.0	4.0	I	II
		60	0	60	2.0			0/2	0/2

DISCIPLINE:

„Sport “

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master /M/

FORMS OF TRAINING:

Practices

YEAR OF TRAINING:

One year

DURATION OF TRAINING:

Two semesters

ACADEMIC HOURS:

60 practices

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, discussions, demonstrations of methods and tools, solving practical tasks.

FORMS OF EVALUATION:

Yes. Exam.

EVALUATION CRITERIA:

Active participation in practical exercises, theoretical knowledge and practical skills for the sport chosen by the students.

SEMESTER EXAM:

Yes. It is formed at the end of the second semester.

STATE EXAM:

No

LECTURER:

Habilitated lecturer from the section “Physical education and sport”

DEPARTMENT:

Physiology

SECTION:

“Physical education and sport”

ANNOTATION

Classes are held in a sport chosen by the students and include:

- initial study
- in-depth study
- consolidation and sports improvement

BASIC AIMS OF THE DISCIPLINE

Acquisition of knowledge, acquisition and improvement of motor skills and increasing the physical capacity of students

A)To establish the level of technical and physical training of new students.

B)To acquire the necessary theoretical knowledge and motor skills of the chosen kind of sport

C)To develop the basic physical qualities with the means of the chosen species sport.

EXPECTED RESULTS

Upon completion of the training, students must have the following knowledge and skills:

- to know the basic principles of the theory and methodology of conducting sports activities
- to know the basic means and methods of physical education
- to be able to use the “small forms” of physical education and sport in the school regime
- to know the role of physical education and sports for maintaining and improving mental performance during the semester and session
- to know the competition rules in the chosen sport
- to acquire knowledge and skills for independent physical exercises and sports
- to know the forms of independent activities
- to know the methods for load regulation during independent activities
- to know the signs of fatigue and overfatigue in independent activities

PROGRAM FOR FITNESS CLASSES

I year, I semester

№	THEME	HOURS	DATE
1	Organizationally Class. Safety rules.	2	
2	Program for beginners. Method of progressive load. 10 exercises for muscle antagonists	4	
3	Circle training. Aerobic.	4	
4	Basic exercises for chest muscles. Bench press. Pool over with a bar. Flv with dumbbells. Incline Dumbbell Press.	2	
5	Basic exercises for back muscles. Bent Over Barbell Row. Seated Cable Row. V-Bar Pulldown. Barbell Shrug. Hyperextensions (Back Extensions)	2	
6	Basic exercises for legs Barbell Squat. Dumbbell Lunges. Leg Press. Lying Leg Curls. Leg Extensions. Standing Calf Raises	2	
7	Basic exercises for arms Close-Grip Barbell Bench Press Cable Rope Overhead Triceps	4	
	Extension Triceps Pushdown Barbell Curl Dumbbell Alternate Bicep Curl Standing Biceps Cable Curl Palms-Down Wrist Curl Over A Bench		
8	Core exercises Crunches Reverse Crunches Barbell Side Bend Cable Crunch	2	
9	Other sports Table tennis Tennis Badminton	4	
10	Other sports Basketball Volleyball	4	
	Football		
		30	

I year, II semester

№	THEME	HOURS	DATE
1	Organizational Class. Safety rules.	2	
2	Circle training. Aerobic	4	
3	Outdoor training. Aerobic.	4	
4	Exercises for chest muscles Incline Dumbbell Press Decline Dumbbell Bench Press Decline Barbell Bench Press Dips - Chest Version	2	
5	Exercises for back muscles Bent Over Two-Dumbbell Row Reverse Grip Bent-Over Rows Close-Grip Front Lat Pulldown Dumbbell Shrug Stiff Leg Barbell Good Morning	2	
6	Exercises for legs Barbell Deadlift Dumbbell Rear Lunge Hack Squat Seated Leg Curl Leg Extensions Seated Calf Raise	2	
7	Exercises for arms Bench Dips Lying Triceps Press Standing One-Arm Dumbbell Triceps Extension Alternate Incline Dumbbell Curl Barbell Curls Lying Against An Incline Lying Cable Curl Cable Wrist Curl	4	
8	Core exercises Seated Barbell Twist Air Bike Crunch - Hands Overhead	2	
	Flat Bench Lying Leg Raise		
9	Other sports Table tennis Tennis Badminton	4	
10	Other sports Basketball Volleyball Football	4	
		30	

PROGRAM FOR SWIMMING CLASSES

I year, I semester

	THEME	HOURS	DATE
1.	Organizationally class	2h.	
2.	Preparation exercises	6h.	
3.	Learning freestyle swimming technique - legs	6h.	
4.	Learning freestyle swimming technique - arms	6h.	
5.	Learning freestyle swimming technique - coordination	6h.	
6.	Free swimming and development of the freestyle stroke	4h.	

TOTAL: 30h.

	THEME	HOURS	DATE
1.	Breaststroke swimming technique - legs	8h.	
2.	Breaststroke swimming technique - arms	8h.	
3.	Breaststroke swimming technique - coordination	8h.	
4.	Free swimming and development of the breaststroke	6h.	

TOTAL: 30h.

EXERCISES - THESES I year, I semester

EXERCISE 1 -2 hours

Organizationally exercise

1. Familiarizing the students with the facilities and the requirements of the Department concerning the trainings of physical education
2. Introduction of the students with the basic objectives of teaching physical education

EXERCISE 2 -2 hours

Preparation exercises

1. Exercises for getting used with the water conditions
2. Beginners breathing exercises

EXERCISE 3 - 2 hours

Preparation exercises

1. How to stay over the water
2. Basic beginners swimming exercises

EXERCISER 4 - 2 hours

Preparation exercises

1. Basic breathing exercises outside the swimming pool
2. Basic breathing exercise inside the water

EXERCISE 5 - 2 hours

Freestyle swimming technique - legs

1. Beginners exercises for freestyle - legs
2. Beginners freestyle breathing techniques

EXERCISE 6 - 2 hours

Freestyle swimming technique - legs

1. Basic freestyle exercises - legs
2. Breathing development in the water

EXERCISE 7 - 2 hours

Freestyle swimming technique - legs

1. Development the coordination and technique of freestyle
2. Water games

EXERCISE 8 - 2 hours

Freestyle swimming technique - arms

1. Beginners exercises for freestyle - arms
2. Deeper development of freestyle - legs

EXERCISE 9 - 2 hours

Freestyle swimming technique - arms

1. Basic freestyle exercises - arms
2. Water games

EXERCISE 10 - 2 hours

Freestyle swimming technique - arms

1. Technique development of freestyle - arms
2. Breathing development for freestyle

EXERCISE 11 - 2 hours

Freestyle swimming technique - coordination

1. Coordinating freestyle exercises - beginners
2. Water games

EXERCISE 12- 2 hours

Freestyle swimming technique - coordination

- 1. Development the freestyle technique
- 2. Freestyle exercises

EXERCISE 13- 2 hours

Freestyle swimming technique - coordination

- 1. Deeper analysis and development of freestyle
- 2. Water games

EXERCISE 14- 2 hours

Freestyle swimming technique - coordination

- 1. Free swimming
- 2. Water games

EXERCISE 15 - 2 hours

Freestyle swimming technique - coordination

- 1. Free swimming
- 2. Water games

PROGRAM FOR TENNIS CLASSES

I year, I semester

	THEME	HOURS	DATE
1.	Organizationally class	2h.	
2.	Learning the basic rules. Grips, ready position, movement, ways of holding the racket	4h.	
3.	Waiting position - differences Preparing for the shot	4h.	
4.	Learning of the basic Forehand shot	4h.	
5.	Learning of the basic Backhand shot	4h.	
6.	Rules. Dictionary of the tennis player	4h.	
7.	The Serve - learning the basic technique	4h.	
8.	Learning games and matches with the coach	4h.	

TOTAL: 30h.

PROGRAM FOR TENNIS CLASSES

I year, II semester

	THEME	HOURS	DATE
1.	Development of the baseline shots (forehand and backhand)	4h	
2.	Hitting the running Forehand shot, moving towards the ball, forehand drills	2h.	
3.	Hitting the running Backhand shot, moving towards the ball, backhand drills	2h.	
4.	Learning the Volleys and the Smash (overhead shot)	4h.	
5.	Mixed drills, running towards the ball, controlling the ball, recovery from the shot, changing the directions	4h.	
6.	Learning of playing points and games. Learning the tennis scoring system	4h.	
7.	Tactics	2h.	
8.	Learning games with a partner between the students Doubles games and Single games	4h.	
9.	Competition between the students, Tournament	4h	

TOTAL: 30h

EXERCISES - THESES

I year, I semester

EXERCISE #1 -2 hours

Organizationally exercise

1. Familiarizing the students with the facilities and the requirements of the Department concerning the trainings of physical education
2. Introduction of the students with the basic objectives of teaching physical education

EXERCISE #2 -2 hours

Learning the basic rules. Grips, ready position, movement

1. Teaching the rules and regulations
2. How to hold a tennis racket
3. Learning the basic grips
4. Learning the basic positions on the court

EXERCISE #3 - 2 hours

Waiting position - differences

1. Waiting positions
2. Execution of the shot
3. Preparing for the shot

EXERCISE #4 - 2 hours

Learning of the basic Forehand shot

1. Learning the basic technique of the forehand shot
2. Showing the right grip
3. Drills

EXERCISE #5 - 2 hours

Forehand shot

1. Tennis dictionary and terminology
2. Forehand from a single position (single shots)

EXERCISE #6 - 2 hours

Forehand shot

1. Forehand shot on a steady position
2. Phases of the forehand shot

EXERCISE #7 - 2 hours

Forehand shot

1. Preparation for the shot
2. Backswing and follow-through
3. Learning the different phases of the shot from steady position

EXERCISE #8 - 2 hours

Backhand shot

1. Showing the proper backhand grip
2. Variation of the grips
3. Ready backhand positions

EXERCISE #9- 2 hours

Backhand shot

1. Showing the types of backhand
2. How to hold the racket with the proper backhand grip
3. Drills
4. Learning the basic rules

EXERCISE #10 - 2 hours

Backhand shot

1. Learning the two handed backhand
2. Hitting the ball from a steady position
3. Learning game

EXERCISE #11 - 2 hours

Backhand shot

1. Learning the one handed backhand shot
2. Hitting the ball from a steady position
3. Learning game
4. Tennis Rules

EXERCISE #12- 2 hours

The Serve

1. Showing the right grip
2. Types of serve

EXERCISE #13 - 2 hours

The Serve

1. Learning the basic technique
2. Serve stances
3. Serving drills

EXERCISE #14 - 2 hours

Development of the baseline game

1. How to move around the ball
2. Learning to adjust for the shot with small steps
3. How to recover position after hitting the shot
4. Drills

EXERCISE #15 - 2 hours

Learning the Volleys and the Smash

1. When and where to hit a volley shot
2. Forehand volley technique
3. How to hit a smash
4. Drills

EXERCISE #16 - 2 hours

Learning the Volleys and the Smash

1. Backhand volley basics
2. Hitting a smash
3. Volley drills

EXERCISE #17- 2 hours

Mixed drills, running towards the ball

1. Controlling the ball
2. How to position for the shot
3. Moving towards the ball and shot recovery
4. Drills with the coach

EXERCISE #18 - 2 hours

Mixed drills, running towards the ball

1. How to attack
2. How to defend
3. Going to the net
4. Drills with the coach

EXERCISE #19 - 2 hours

Development of the baseline game

1. How to move around the ball
2. Learning to adjust for the shot with small steps
3. How to recover position after hitting the shot
4. Drills

EXERCISE #20 - 2 hours

Learning the Volleys and the Smash

1. When and where to hit a volley shot
2. Forehand volley technique
3. How to hit a smash
4. Drills

EXERCISE #21 - 2 hours

Learning the Volleys and the Smash

1. Backhand volley basics
2. Hitting a smash
3. Volley drills

EXERCISE #22 - 2 hours

Mixed drills, running towards the ball

1. Controlling the ball
2. How to position for the shot
3. Moving towards the ball and shot recovery
4. Drills with the coach

EXERCISE #23 - 2 hours

Mixed drills, running towards the ball

1. How to attack
2. How to defend
3. Going to the net
4. Drills with the coach

EXERCISE #24 - 2 hours

Learning of playing points and games

1. How to play points
2. How to start a rally
3. Learning to count the score
4. Paying points and games

EXERCISE #25 - 2 hours

Learning of playing points and games

1. How to play a game, set or match
2. Simulating games
3. Rules and scoring

EXERCISE #26 - 2 hours

Tactics

1. Learning the importance of tactics
2. How to move the opponent
3. How to win a point

EXERCISE #27 - 2 hours

Learning games

1. Playing a singles match with the coach
2. Playing different games with a partner
3. Playing a doubles match with the coach

EXERCISE #28 - 2 hours

Learning games

1. Playing a match between the students
2. Mixed doubles between the students
3. Different game variations between the students

EXERCISE #29 - 2 hours

Competitions

1. How to create and organize a tennis tournament
2. Playing a variety of competitive games and matches
3. Tactics

EXERCISE #30 - 2 hours

Competitions

1. Singles tournament
2. Doubles tournament
3. Mixed doubles tournament

PROGRAM FOR FOOTBALL CLASSES

I year, I semester

№	THEME	HOURS	DATE
1.	Organizationally class.	2h.	
2.	Technique of movements without ball.	4h.	
3.	Running of the player,changing the direction of running.	4h.	
4.	Techniques with the ball.	4h.	
5.	Hitting the ball, control the ballkeeping the ball.	4h.	
6.	Straight shofstraight inside shofinside shot,outside shot.	4h.	
7.	Stopping the ball,control the ball.	4h.	
8.	Learning game.	4h.	

TOTAL: 30 h.

PROGRAM FOR FOOTBALL CLASSES

I year, II semester

№	THEME	HOURS	DATE
1.	Tactics in defense.	4 h .	
2.	Individual tactic in defense	4 h .	
3.	Taking the ball.	2 h .	
4.	Group tactic actions in defense.	4 h .	
5.	Tactic in attack.	4 h .	
6.	Individual tactic in attack.	2 h .	
7.	Group tactic in attack.	2 h .	
8.	Simple tactical combinations in team attack.	4 h .	
9.	Learning game.	4 h .	

TOTAL: 30 h

EXERCISES-THESES

I year, I semester

EXERCISEM 1 - 2 hours

Organizationally exercise

1. Familiarizing students with the facilities and requirements of the Department-related training in physical education.

2. Acquaint students with the basic objectives of teaching physical education.

EXERCISE № 2 - 2 hours

Technique of movements without ballk

1. Running.
2. Stopping.
3. Changing the direction of movement.

EXERCISE № 3 - 2 hours

Technique with the ball.

1. Shooting.
2. Learning game.

EXERCISE № 4 - 2 hours

Technique with the ball.

1. Straight shot.
2. Straight inside shot.

EXERCISE № 5 - 2 hours

Technique with the ball.

1. Inside shot
2. Outside shot.

EXERCISE № 6 - 2 hours

Technique with the ball.

1. Stopping the ball.
2. Control the ball.

EXERCISE №27- 2 hours

Technique with the ball.

1. Outside part of the foot.
2. Inside part of the foot.

EXERCISE №28- 2 hours

Technique with the ball.

1. Dribble.
2. Game.

EXERCISE №29- 2 hours

Technique with the ball.

1. Control the ball.
2. Game.

EXERCISE №10 - 2 hours

Technique with the ball.

1. Shooting the ball.
2. Game.

EXERCISE №111 - 2 hours

Technique with the ball.

1. Straight shot.
2. Game.

EXERCISE №12 - 2 hours

Technique with the ball.

1. Straight shot, advanced technique.
2. Game.

EXERCISE № 1 3 - 2 hours

Technique with the ball.

1. Straight shot, shot with outside part of the foot.
2. Game.

EXERCISE № 1 4 - 2 hours

Technique with the ball.

1. Advanced shooting on goal.
2. Game.

EXERCISE № 1 5 - 2 hours

Learning game.

1. Tournament.

I year, II semester

EXERCISE № 1- 2 hours

Tactic in defense.

1. Passing the ball.
2. Game.

EXERCISE № 2- 2 hours

Individual tactic in defense.

1. Taking the ball.
2. Game.

EXERCISE № 3 - 2 hours

Team tactic in defense.

1. Team tactic in defense.

2. Game.

EXERCISE № 4 - 2 hours

Tactic in attack

1. Passing in attack.

2. Game.

EXERCISE № 5 - 2 hours

Individual game in attack.

1. Taking the ball.

2. Dribble.

EXERCISE No 6 - 2 hours

Team tactic in attack.

1. Forward right play.

2. Game.

EXERCISE № 7 - 2 hours

Simple tactic combinations between the strikers.

1. 1-2 passing.

2. Attack with men forward.

EXERCISE № 8 - 2 hours

Individual tactic moves in defense.

1. Zone defense.

2. Game.

EXERCISE № 9 - 2 hours

Individual tactic moves in defense.

1. Cover defense.
2. Game.

EXERCISE № 1 0 - 2 hours

Individual tactic in defense.

1. Goalkeeper tactic.
2. Game.

EXERCISE № 1 1 - 2 hours

Individual tactic in attack.

- 1 .Getting behind opposition defense.
2. Game.

EXERCISE № 1 2 - 2 hours

Individual tactic in attack.

- 1 .Tactic in shooting.
3. Game.

EXERCISE № 1 3 - 2 hours

Team tactic in attack.

- 1 .Right way to attack the opposition goal.
2. Game.

EXERCISE № 1 4 - 2 hours

Individual tactic in attack.

1. Keeping the ball.

EXERCISE № 1 5 - 2 hours

Learning game.

1. Tournament.

PROGRAM FOR VOLLEYBALL CLASSES

2.

I year, I semester

№	THEME	HOURS	DATE
1.	Organizationally class.	2h.	
2.	General and special physical preparation.	4h.	
3.	Improvement in elements of the game.	4h.	
4.	Improvement in serve and reception.	4h.	
5.	Advanced studying of elements-set,serve,reception and defense.	4h.	
6.	Group tactical actions at reception of serve.	4h.	
7.	Improvement of serve-reception and direction.	4h.	
8.	Learning game with task.	4h.	

TOTAL: 30 h.

PROGRAM FOR VOLLEYBALL CLASSES

I year, II semester

№	THEME	HOURS	DATE
1.	Improvement of basic technical elements.	4 h.	
2.	Group tactical action at reception and serve.	4 h.	
3.	Improvement of elements in attack.	2 h.	
4.	Group tactical actions in attack.	4 h.	
5.	Learning of element block.	2 h.	
6.	Improvement of element attack and block.	2 h.	
7.	Group tactical action in building block.	2 h.	
8.	Technical and tactical action in attack and defense.	4 h.	
9.	Learning game with task.	4 h.	

TOTAL: 30 h.

EXERCISE-THESES

I year, I semester

EXERCISE № 1 - 2 hours

Organizationally exercise

1. Familiarizing students with the facilities and requirements of the Department-related training in physical education.
2. Acquaint students with the basic objectives of teaching physical education.

EXERCISE № 2- 2 hours

General and special physical training

1. Exercises for development of speed, bouncing and endurance.
2. Sport game.

EXERCISE № 3 - 2 hours

Improvement of elements

1. Pass with two hands up and down.
2. Serve.
3. Learning game with task.

EXERCISE № 4 - 2 hours

Improvement of serve and reception.

1. Direction of serve.
2. Reception.
3. Learning game.

EXERCISE № 5 - 2 hours

Advanced studying of element set, serve and reception.

1. Group tactical and technical actions.
2. Learning game.

EXERCISE № 6 - 2 hours

Group tactical actions in reception of serve.

1. Improvement of elements set, serve, reception.
2. Learning game.

EXERCISE № 7 - 2 hours

Improvement of serve-reception and direction.

1. Serving in different zone.
2. Reception.

EXERCISE № 8 - 2 hours

Improvement of elements.

1. Improvement in defense.
2. Learning game.

EXERCISE № 9 - 2 hours

Advanced learning of elements-set, serve, reception and defense.

1. Tactical actions in defense.
2. Learning game.

Exercise № 10 - 2 hours

Advanced learning of elements-set, serve, reception and defense.

1. Tactic in defense.
2. Learning game.

EXERCISE № 11 - 2 hours

Advanced learning of elements- set, serve, reception and defense.

1. Tactic in defense (third meter).
2. Learning game.

EXERCISE № 13 - 2hours

Group tactical actions at reception of serve.

- 1.Learning for the position in every zone.
- 2.Learning game.

EXERCISE № 13 - 2hours

Group tactical action at reception of serve.

1. Improvement of the position in different zone.
2. Learning game.

EXERCISE № 14 - 2 hours

Improvement of serve and reception.

- 1 .Technical and tactical actions.
3. Learning game.

EXERCISE № 1 5 - 2 hours

Learning game.

1. Tournament.

I year, II semester

EXERCISE № 1 - 2 hours

Improvement of basic technical elements.

- 1 .Pass with two hands up and down. 2.Learning game.

EXERCISE № 2- 2 hours

Improvement of basic technical elements.

- 1 .Improvement in defense. 2.Learning game.

EXERCISE № 3 - 2 hours

Improvement of basic technical elements.

1. Set, serve, reception
2. Learning game.

EXERCISE № 4 - 2 hours

Improvement of elements in attack.

- 1.Improvement of serve.
- 2.Learning game

EXERCISE № 5 - 2 hours

Improvement of elements in attack.

- 1 .Tactic in first and second pass.
- 2.Learning game.

EXERCISE № 6 - 2 hours

Improvement of elements in attack.

- 1.Learning of attack in zone 4-3-2.
- 2.Learning game.

EXERCISE № 7 - 2 hours

Improvement of elements in attack

1. Learning of attack in zone 4-3-2.
- 2.Learning game.

EXERCISE №8 - 2 hours

Improvement of elements in attack.

1. Improvement in attack from second line.
- 2.Learning game.

EXERCISE № 9 - 2 hours

Group tactical actions in attack.

1. Group tactical actions from zone 4-3-2.
- 2.Learning game.

EXERCISE № 10 - 2 hours

Group tactical actions in attack.

1. Tactical actions from zone 1-6.

2.Learning game.

EXERCISE № 1 0 - 2 hours

Block.

1. Learning block.

2.Learning game.

EXERCISE No 12- 2 hours

Improvement of elements attack and block.

1.Technical and tactical actions of attack and block.

2.Learning game.

EXERCISE № 1 3 - 2 hours

Group tactical actions when building block.

1 .Block from zone 3-4-2.

2.Learning game.

EXERCISE № 1 4 - 2 hours

Technical and tactical action in attack and defense.

1.Group tactical and technical action in attack from zone 4-3-2 and defense in zone 5-6-1.

2.Learning game.

EXERCISE № 1 5 - 2 hours

Learning game with task.

1. Tournament.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

BIOCHEMISTRY

For students in medicine

Approved by the Department Council on №02/09.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

BIOCHEMISTRY

EDUCATIONAL PLAN

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								2 nd year	
		Total	Lectures	Practices	ECTS			III sem.	IV sem.
Biochemistry	IV	180	90	90	6.0	8.0	14.0	3/3	3/3

DISCIPLINE:

„Biochemistry”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS

Compulsory

LEVEL OF QUALIFICATION:

Master

FORMS OF TRAINING:

Lectures, exercises, self-training

YEAR OF TRAINING:

Second course

YEAR OF TRAINING:

6 years

DURATION OF TRAINING:

Two semesters

ACADEMIC HOURS:

90 hours lectures, 90 hours exercises

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

- Multimedia form of lectures presentation, that are given to the students in electronic version
- discussions
- continuous process of update of the teaching material with new information from textbooks published by leading universities
- providing of facts, confirmed by fundamental scientific researches, published in reputable journals
- individual work with students showing specific interests in different fields of medical biochemistry, closely related with the disciplines that they study alongside or in future

FORMS OF EVALUATION:

Current assessment, tests, preparation of paper.

EVALUATION CRITERIA:

An average current mark is formed for every semester.

ASPECTS OF EVALUATION CRITERIA:

Participation in discussions, tests solving, preparation of paper

SEMESTER EXAM:

Yes /placement test, written and oral exam/

STATE EXAM:

No

LECTURER:

Prof. Tatyana Vlaykova, PhD

DEPARTMENT:

Department of Medical Biochemistry

ANNOTATION

The aim of medical biochemistry for students in medicine is to investigate at molecular level the processes that occur in human organism in normal and pathological conditions, in order to provide a modern scientific base for understanding of the pathobiochemical mechanisms and to assist for effective treatment of the diseases.

BASIC AIMS OF THE DISCIPLINE

To introduce the students with the basic parts of medical biochemistry which include:

1. Structural aspects- biopolymers structure (proteins and nucleic acids), lipids, carbohydrates, nucleotides and porphyrins
2. Cell bioenergetics- characteristics of formation and use of energy in human organism
3. Enzymes as biocatalysts
4. Metabolism of carbohydrates, lipids, nucleotides and porphyrins in normal and pathological conditions
5. Regulation of gene expression at the level of replication, transcription and translation
6. Mechanism of intercellular interactions- signal transduction and cell adhesion
7. Change in the metabolism and in the mechanisms of cell regulation in the most common and socially significant diseases- diabetes, obesity, atherosclerosis and oncogenesis.
8. Functional biochemistry- specificity of the metabolism and biological functions of the organs and tissues in human organism.

EXPECTED RESULTS

After finishing their education the students must have the following knowledge and skills:

- to know the chemical structure of the main molecules- biopolymers (proteins and nucleic acids), lipids, aminoacids and nucleotides, participating in metabolism and tissue formation
- to understand the significance of the enzymes as catalysts of the enzyme reactions
- to learn the ways for energy supply of the organism and the role of biologic oxidation processes in energy metabolism
- to learn the main metabolic pathways in carbohydrates, lipids, aminoacids, nucleotides and porphyrins metabolism
- to know the main principles of cell organization and compartmentation of the metabolic processes in it
- coming to know the main metabolic processes to get a notion about the molecular diseases as a target of therapeutic intervention
- to get knowledge for metabolic processes integration at molecular, cellular and tissue level
- to get a notion about the stages of gene expression regulation at the level of replication, transcription, translation and posttranslational repair of important regulatory proteins
- to know how the intercellular communication occurs by introducing with the mechanism of signal transduction and cell adhesion
- to make associations between the processes occurring normally in the cell and the changes in disease processes by introducing with the biochemical disorders in the most common and socially significant diseases- diabetes, obesity, atherosclerosis and oncogenesis
- to learn the specific features of the metabolism in some main organs- liver, adipose tissue, muscles, kidney, intestines, blood cells, connective tissue
- to know and apply the modern methods in biochemistry

LECTURES

Winter semester

LECTURE №1 – 3 hours

1. Characteristics of enzymes as biological catalysts. Structure, names and classification of enzymes. Mechanisms of enzyme catalysis. Enzyme–substrate complex. Active site. Specificity of the enzyme action.
2. Water-soluble vitamins – structure, biological role. Vitamin and vitamin derivatives as cofactors. Avitaminoses.
3. Lipid-soluble vitamins – structure, biological role. Hyper- and avitaminoses.

LECTURE №2 – 3 hours

1. Enzyme kinetics. Enzyme units. Factors affecting the enzyme reaction rate: time, temperature, pH, concentration of the enzyme and of the substrate. Michaelis constant. Michaelis – Menten equation and Lineweaver – Burk plot (equation).
2. Reversible and irreversible inhibition. Competitive and noncompetitive inhibitors. Enzyme activators.

LECTURE №3 – 3 hours

1. Enzyme activity regulation. Regulation of the absolute enzyme amount – constitutive and inducible enzymes; control of the half-life of enzymes. Regulation of the catalytic activity – compartmentalization, shuttle mechanisms, multienzyme complexes, covalent modification (phosphorylation – dephosphorylation) and allosteric control. Retroinhibition.
2. Clinical significance of enzymes: functional and non-functional plasma enzymes. Role in the diagnosis of myocardial infarction and hepatitis. Diagnostic significance of isoenzymes (creatine phosphokinase and lactate dehydrogenase). Hereditary enzyme diseases (Gout, Lesch-Nyhan syndrome). Enzyme therapy. Enzymes and enzyme inhibitors in the treatment of cancer.

LECTURE №4 – 3 hours

1. Bioenergetics. Features of organisms as open chemical systems. General laws of thermodynamics and their application in living organisms. Coupling of endergonic and exergonic processes. Macroergic compounds. Role of the system ATP/ADP. Characteristics of biological oxidation. Substrates of biological oxidation and final hydrogen acceptors. Oxidoreductases. Redox systems.
2. Oxidative phosphorylation at substrate level: oxidative phosphorylation of glyceraldehyde-3-phosphate, enolase reaction. Oxidative decarboxylation of the α -keto acids pyruvate and α -ketoglutarate; regulation.
3. Respiratory chain – localization, function and molecular structure. Oxidative phosphorylation coefficient (P/O). Respiratory control, phosphate potential. Inhibitors of the electron transport. Chemiosmotic theory for the mechanism of oxidative phosphorylation in the respiratory chain. ATP synthase. Effect of uncoupling agents and inhibitors of the oxidative phosphorylation.

LECTURE №5 – 3 hours

1. Free oxidation. Heat production. Brown adipose tissue. Role of thermogenin. Short electron transport chains. Reactive oxygen and nitrogen species (ROS and RNS) -generation and neutralization. Antioxidant enzymes and non-enzymatic antioxidants.

2. Citric acid cycle – importance for catabolism and anabolism. Chemical reactions, metabolic and energetic balance. Connection of the TCA cycle with the respiratory chain and with the other metabolic pathways. Regulation mechanisms. Pyruvate dehydrogenase deficiency.

LECTURE №6 – 3 hours

1. Digestion and absorption of carbohydrates in the gastrointestinal tract. Glycolysis – importance, chemical reactions, energy production under anaerobic and aerobic conditions, tissue specificity. Metabolic fate of NADH and pyruvate – shuttle systems (malate and glycerophosphate shuttles). Pasteur effect and Warburg effect (in cancer). Clinical aspects - lactic acidosis, enzymopathies, hemolytic anemia.

2. Gluconeogenesis. Cellular compartmentalization and tissue localization, substrates. Importance. Overcoming the irreversible steps of glycolysis. Regulation. Role of gluconeogenesis in the kidney and in the small intestine.

LECTURE №7 – 3 hours

1. Pentose phosphate pathway and NADPH – role in metabolism. Oxidative, isomerase and transferase reactions. Importance of the pentose phosphate pathway for erythrocytes. Glucose-6-phosphate dehydrogenase deficiency.

2. Fructose metabolism – resorption, organ specificity of degradation and relation with other metabolic pathways. Defects in the metabolism of fructose – essential fructosuria and fructose intolerance. Galactose metabolism – resorption; degradation; synthesis of lactose in lactating mammary glands. Defects in the metabolism of galactose – lactase deficiency, galactosemia type I and II.

3. Glycogen metabolism – structure, degradation and synthesis. Regulation of glycogenolysis and glycogenogenesis. Glycogenoses.

LECTURE №8 – 3 hours

1. Regulation of carbohydrate metabolism and blood sugar level. Role of insulin, glucagon and other hormones. Hypoglycemia, hyperglycemia and glucosuria.

2. Features of carbohydrate metabolism in the different tissues and organs: gastrointestinal tract, liver, nervous tissue, muscles, kidneys, adipose tissue, erythrocytes.

LECTURE №9 – 3 hours

1. Lipids – classification. Lipid digestion – enzymes. Composition, origin and functions of the lipoprotein complexes. Receptors, apolipoproteins, enzymes of the lipoprotein metabolism. Familial hypercholesterolemia.

2. Degradation and biosynthesis of triacylglycerols. Metabolism of glycerol. Fate of the fatty acids. Regulation of the degradation of triacylglycerols in the adipose tissue - hormone-sensitive lipase.

LECTURE №10 – 3 hours

1. Oxidation of fatty acids. β -oxidation of fatty acids with an even and an odd number of carbon atoms and of polyunsaturated fatty acids. Carnitine shuttle. Regulation. Energetic balance. Peroxisomal β -oxidation. α -oxidation of branched fatty acids. Peroxide oxidation of unsaturated fatty acids. Enzyme defects in the oxidation of fatty acids.

2. Ketone bodies metabolism. Ketogenesis and ketolysis. Regulation of the ketogenesis. Ketosis and ketoacidosis.

LECTURE №11 – 3 hours

1. Biosynthesis of fatty acids. Citrate shuttle. Acylsintase complex. Regulation of the lipogenesis. Fatty acids chain elongation and synthesis of unsaturated fatty acids.
2. Synthesis and degradation of phospholipids. Biological role of phospholipases A₁, A₂, C and D. Sphingolipids – types, structure and importance. Sphingolipidoses.

LECTURE №12 – 3 hours

1. Essential fatty acids and their derivatives – eicosanoids (prostaglandins, tromboxanes, prostacyclins and leucotrienes). Cyclic and linear pathways of formation. Steroidal and non-steroidal anti-inflammatory drugs – mechanism of action. Essential fatty acids deficiency.
2. Structure and biological role of cholesterol. Cholesterol pathways in the organism. Cholesterol synthesis. Regulation – control by covalent modification and at the transcription level. Removal from the body.

LECTURE №13 – 3 hours

1. Cholesterol derivatives. Synthesis of bile acids, regulation, cholelithiasis (gallstone disease). Steroid hormones – structure, synthesis and functions. Synthesis and biological functions of vitamin D₃.
2. Lipid metabolism disorders. Atherosclerosis. Obesity and fatty liver disease. Adipokines (leptin, adiponectin, etc.) – synthesis, secretion and their role in obesity and in the development of insulin resistance.

LECTURE №14 – 3 hours

1. Digestion and absorption of proteins in the gastro-intestinal tract. Mechanisms for intracellular degradation of proteins. Nitrogen balance and the end products of nitrogen metabolism. General reactions in amino acid metabolism – transamination, oxidative deamination, transdeamination and decarboxylation. Amines of biological significance. Clinical significance of the enzymes called aminotransferases.
2. Ammonia toxicity. Detoxification of ammonia. Reductive amination of α -ketoglutarate. Synthesis of glutamine. Amoniogenesis in the kidneys (renal amoniogenesis). Urea cycle – interrelationships with the citric acid cycle, regulation and metabolic disorders. Glucose-alanine cycle.

LECTURE №15 – 3 hours

1. Catabolism of amino acids. General pathways for degradation of the C-skeletons of amino acids. Pathways for degradation of glucogenic and ketogenic amino acids. Single carbon atom units – types, sources, importance. Vitamin B₁₂, folic acid and S-adenosyl methionine. Therapeutic application of folate analogues. Catabolism of phenylalanine and tyrosine. Catabolism of tryptophan. Catabolism of branched amino acids.
2. Essential and nonessential amino acids. Common reactions in the synthesis of nonessential amino acids. Selenocysteine. Conversion of amino acids to specialized products – arginine (synthesis of creatine phosphate, citrulline, nitric oxide and polyamines) and serine (synthesis of ethanolamine, choline and phospholipids).

LECTURES

Summer semester

LECTURE №1 – 3 hours

1. Conversion of amino acids to specialized products – tryptophan (NAD^+ , serotonin, melatonin), tyrosine (thyroid hormones, catecholamines, dopamine, melanin). Products of glutamine and glutamate metabolism. The γ -glutamyl cycle. Glutathione as a reducing agent, antioxidant and as a participant in the metabolism of xenobiotics. Tissue specificities in amino acid metabolism.
2. Impairments of amino acids metabolism. Enzymopathies associated with metabolism of tyrosine (phenylketonuria, tyrosinosis, alkaptonuria, albinism), tryptophan (pellagra) and aliphatic amino acids (methylmalonic acidemia). Parkinson's disease and L-DOPA.

LECTURE №2 – 3 hours

1. Synthesis and degradation of purine nucleotides. Regulation of the pathway. Tissue specificities. Hyperuricemia and gout. Inhibition of the enzyme activity of xanthine oxidase. Enzyme defects – Lesch-Nyhan syndrome and immunodeficiencies. Purine analogues used as anticancer and antiviral drugs.
2. Synthesis and degradation of pyrimidine nucleotides. Regulation of the pathway. Synthesis of CTP and TMP from UMP. Ribonucleotide reductase reaction. Thymidylate synthase reaction. Orotaturia.

LECTURE №3 – 3 hours

1. Iron metabolism. Absorption of haem-bound iron and nonhaem iron. Transferrin receptors. Iron-binding and iron storage proteins. Hepcidin. Post-transcriptional control over iron homeostasis. Disorders of iron homeostasis.
2. Synthesis of porphyrins. Organ and intracellular localization of the pathway. Regulation and regulatory enzymes. ALA-synthase and its control – enzyme inducers and repressors. Types of porphyrias. Application of exogenous porphyrins in the treatment of certain cancer diseases.
3. Hemoglobin degradation. Haptoglobin, hemopexin and scavenger receptors. Haem oxygenase. Direct and indirect bilirubin. Bile pigments. Enterohepatic circulation of the bile pigments. Jaundice.

LECTURE №4 – 3 hours

1. Metabolism integrity. Integration at the level of a single protein molecule and multienzyme complexes. Compartmentalization and selective permeability – transport mechanisms and shuttle mechanisms. Role of the key enzymes, metabolites and cofactors. Regulation through limiting metabolites and cofactors. Control at the level of the slowest steps of a metabolic pathway.
2. Metabolism integrity. Tissue and organ specificities – brain, liver, muscles, heart and adipose tissue. Adaptation in starvation.

LECTURE №5 – 3 hours

1. Molecular diseases. Mutations as a reason for the development of molecular diseases. Consequences from the existence of point mutations that affect enzymes of the pathway for synthesis of hemoglobin. Defects that affect enzyme activities. Molecular diseases due to defects in the DNA repair mechanisms.
2. Regulation at the post-translational level. Proteolytic cleavage of proteins. Post-translational modifications – methylation, acetylation, myristoylation and prenylation. Phosphorylation and

sulfation. Vitamin C and vitamin K-dependent modifications. Selenoproteins. Ubiquitin, ubiquitination and targeted degradation of proteins.

LECTURE №6 – 3 hours

1. Principles of the intercellular communication and signal transduction. Types of intercellular interactions: endocrine, paracrine, autocrine mechanisms and intercellular junctions. Principles in cell signaling: signaling molecules and receptors. Intracellular participants in cell signaling: a signal cascade. Adaptor proteins and effector molecules: G-proteins, protein kinases and phosphatases. General features of the signal cascades: convergence, divergence and cross-talk.
2. Types of plasma membrane receptors. Receptors associated with ion channels. G-protein coupled receptors. Receptors with intrinsic enzyme activity. Receptors, associated with enzyme activity molecules (tyrosine kinase activity).

LECTURE №7 – 3 hours

1. Secondary messengers in signal transduction. Types of secondary messenger. The adenylyl cyclase system, cyclic AMP (cAMP), cyclic GMP (cGMP), G-proteins and nitric oxide (NO).
2. Secondary messenger in signal transduction. Calcium and calmoduline. Lipid mediators: inositol-3-phosphate, diacylglycerols (DAG), eicosanoids, ceramides and sphingosine-1-phosphate.
3. Pituitary and hypothalamic hormones. Hypothalamo-pituitary axis: releasing hormones. Hormones of the anterior pituitary. The hypothalamo-pituitary-thyroid (HPT) axis. Synthesis, secretion and biological effects of the thyrotropin-releasing hormone (TRH) and thyroid-stimulating hormone (TSH). Synthesis, secretion and effects on metabolism of the thyroid hormones. Deiodinases. Thyroid gland diseases.

LECTURE №8 – 3 hours

1. The hypothalamo-pituitary-adrenal (HPA) axis. General characteristics of the steroid hormones. Synthesis of mineralocorticoids and glucocorticoids. Hormonal control over synthesis of steroid hormones: corticotropin-releasing hormone (CRH), proopiomelanocortin (POMC) and adrenocorticotrophic hormone (ACTH). Regulatory mechanisms that control synthesis of glucocorticoids and mineralocorticoids in the adrenal cortex. Biological and metabolic effects of cortisol. Clinical cases with increased or decreased secretion of cortisol.
2. The hypothalamo-pituitary-gonadal (HPG) axis. Gonadotropin-releasing hormone (GnRH). Folicle stimulating hormone (FSH) and luteinizing hormone (LH). Synthesis of sex hormones. The hypothalamic–pituitary–somatotrophic (HPS) axis. Defects in synthesis and the signaling pathways of growth hormone. Insulin-like growth factors (IGF-1, 2). Hormones of the posterior pituitary.

LECTURE №9 – 3 hours

1. Hormones that regulate water and salt balance. Renin-angiotensin-aldosterone system. Natriuretic peptides. Antidiuretic hormone (ADH or vasopressin). Calcitonin and parathyroid hormone (PTH). Synthesis, secretion and signaling.
2. Hormones of the pancreas – insulin, glucagon and somatostatin. Synthesis, secretion, signaling pathways and biological effects.
3. Catecholamines. Hormones of the gastrointestinal tract. Synthesis, secretion, signaling pathways and biological effects.

LECTURE №10 – 3 hours

1. Hormones that bind intracellular receptors. General characteristics of nuclear receptors. Different types of intracellular receptors. Retinoic acid receptors (RAR). Receptors that bind thyroid

hormones. Receptors that bind steroid hormones. Anti-inflammatory effects of the glucocorticoids through inhibition the NF- κ B-signaling pathway. Antiestrogens. The intracellular signaling pathways of vitamin D₃. Other families of intracellular receptors: retinoid X receptors (RXR's), liver X receptors (LXR's), peroxisome proliferator-activated receptors (PPAR's), farnesoid X receptor (FXR) and pregnane X receptor (PXR).

2. Apoptosis – molecular mechanisms and biological role. Internal and external pathways of apoptosis. The role of mitochondria in apoptosis. Signals from death-receptors. The role of caspases in apoptosis. TNFR and Fas signal pathways. Anti-apoptotic signals for cell survival – the role of PI3K and PKB/Akt. p53 signal pathway. Regulation and clinical significance of programmed cell death.

LECTURE №11 – 3 hours

1. Molecular mechanisms of oncogenesis. Tumor cells features. Tumor markers. Factors that cause cancer. Direct carcinogens and pro-carcinogens. Pro-carcinogen metabolic activation. Stages of chemical carcinogenesis. Oncogenes and proto-oncogenes. Mechanisms of transformation of oncogenes into proto-oncogenes. Oncogenes and growth factors. Oncogenic viruses. Oncogenes and signal transduction. Tumor-suppressor genes. Mechanisms of tumor cell progression and metastasis. Telomerase and cancer. Anticancer therapy drugs – mechanism of action. P-glycoproteins.

2. Pathobiochemical mechanisms of *Diabetes mellitus (DM)*. Classification. Genetic and environmental factors as a predisposition for the development of DM. Type I diabetes (T1DM) and Type II diabetes (T2DM). Metabolic disorders and complications of T1DM and T2DM. Glucose as a regulator of gene transcription – the role of carbohydrate-responsive element-binding protein (ChREBP) protein. T2DM and hyperglycemia: oxidative stress, the sorbitol pathway, advanced glycation end-products and their receptors (AGE's and RAGE's), activation of the DAG/PKC cascade. Diabetes and obesity. Biochemical indicators in the diagnosis of diabetes.

LECTURE №12 – 3hours

1. Blood. Biochemical features and biomedical importance. Blood cells. Erythrocytes: erythropoiesis, erythropoietin, hematocrit. Bioenergetics and specificities in metabolism of erythrocytes – enzymopathies and anemias. Metabolism of leucocytes – bioenergetics and phagocytosis. Regulation of metabolism in T-lymphocytes. T-cell receptor complex (TCR).

2. Biochemistry of the blood. Blood serum and plasma. Biological role of the plasma proteins. Albumin. Acute-phase proteins: C-reactive protein (CRP), serum amyloid-A (SAA) haptoglobin and hemopexin. Complement system. Matrix metalloproteinases. Immunoglobulins. Plasma proteins and inflammation.

LECTURE №13 – 3 hours

1. Hemostasis and thrombosis. Blood coagulation cascade: intrinsic and extrinsic pathways. Conversion of fibrinogen to active fibrin. Proteins, involved in hemostasis. Vitamin K-dependent post-translational modifications. Fibrinolysis. Regulation of hemostasis.

2. Mechanisms of cellular adhesion. Types of adhesion molecules – structure and biological role – integrins, cadherins, immunoglobulin-like cell adhesion molecules (IgSF CAM's). Cytoskeleton and cell adhesion. Types of cell contacts. Actin and actin filaments – assembly and regulation of actin filaments. Clinical significance.

LECTURE №14 – 3 hours

1. Extracellular matrix (connective tissue). Types and functions of the structural proteins. Types and functions of the proteoglycans and glycosaminoglycans. Diseases due to mutations in genes that encode for structural proteins. Mucopolysaccharidoses.
2. Bones as a mineralized connective tissue. Chemical composition of the bones. Osteoblasts, osteocytes and osteoclasts – role in the formation and remodeling of bones. Biochemistry of the ossification and bone resorption. Regulation of the bone metabolism. Metabolic and genetic disorders that affect the bones. Biochemistry of cartilage. Calcium homeostasis and factors that affect calcium homeostasis.

LECTURE №15 – 3 hours

1. Nutrition and digestion. Food and its biological meaning and value. Some clinical aspects of feeding. Digestion and absorption of carbohydrates, lipids, proteins, vitamins and minerals. Processes in the colon. Secretion of molecules, involved in digestion, in the lumen of the gastrointestinal tract. Disorders of digestion and absorption.
2. Biochemistry of the liver. Metabolic functions. Synthesis of specific products. Metabolism of xenobiotics.

PRACTICES

Winter semester

EXERCISE №1 – 3 hours

Structure and functions of proteins

1. Protein functions. Molecular forms of proteins (hetero-, iso- and alloproteins). Oligopeptides, polypeptides and proteins. Amino acids – types and classification. Levels of organization of the protein molecule. Primary structure of proteins. Types of bonds in protein molecules - properties of the peptide bond, weak bonds, disulfide bridges.
2. Conformation. Secondary structure - α -helix and β -sheet, random coil characterization. Supersecondary structures – motifs and domains. Tertiary structure. Fibrous and globular proteins.
3. Quaternary structure. Mechanisms maintaining the conformation of proteins. Relation between the structure and the function of proteins - medical importance: defects in receptors (familial hypercholesterolemia, diabetes insipidus); diseases due to impaired conformation (prion disease, Alzheimer's disease); molecular diseases (sickle cell anemia); defects in the post-translational modification of proteins (scurvy and glycated hemoglobin).

Practice:

Colour reactions for proof of amino acids:

1. Xanthoproteic reaction- for amino acids carrying aromatic groups.
- Test, questions for self-study.

EXERCISE №2 – 3 hours

Proteins as polyelectrolytes. Structure of nucleic acids.

1. Proteins as polyelectrolytes: isoelectric point, precipitation of proteins. Denaturation. Electrophoresis. Methods for protein analysis – electrophoresis, chromatography, etc. Serum proteins electrophoresis – serum proteins fraction profile.

2. Nucleic acids – types and biological role. Chemical composition – structure of nucleotides, chemical bonds. Free nucleotides of biological importance. Features of the polynucleotide chains. Watson and Crick model. Purine and pyrimidine analogues as anticancer and antiviral agents.
3. Primary structure of the nucleic acids. Conformation of DNA. Conformation and structural specificities of the different types of RNA. Nucleosomes. Importance of histone and nonhistone proteins. Denaturation and renaturation of DNA. Ribozymes, RNA maturation, microRNAs – role in the regulation of gene expression.

Practice:

1. Proof of purine bases and nucleotide content in yeast hydrolyzate.
- Test, questions for self-study.

EXERCISE №3 – 3 hours

Chemical nature of enzymes and characteristics of enzyme catalysis. Enzyme kinetics

1. Characteristics of enzymes as biological catalysts. Structure, names and classification of enzymes. Mechanisms of enzyme catalysis. Enzyme-substrate complex. Active site. Specificity of the enzyme action.
2. Water-soluble vitamins – structure, biological role. Vitamins and vitamin derivatives as cofactors. Avitaminoses.
3. Lipid-soluble vitamins – structure, biological role. Hyper- and avitaminoses.
4. Enzyme kinetics. Enzyme units. Factors affecting the rate of enzyme reaction: time, temperature, pH, concentration of the enzyme and concentration of the substrate. Michaelis constant. Michaelis-Menten equation and Lineweaver-Burk plot (equation).

Practice:

1. Proof of the enzyme substrate specificity- hydrolysis of starch and sucrose under the action of α -amylase and β - fructofuranosidase.
 2. Qualitative determination of thiamine (vitamin B1) by thiochrome reaction.
 3. Qualitative determination of thiamine (vitamin B1) by diazo reaction.
 4. Qualitative colour reaction of vitamin B6.
- Test, questions for self-study.

EXERCISE №4 – 3 hours

Regulation of the enzyme activity. Clinical significance of the enzymes

1. Reversible and irreversible inhibition. Competitive and non-competitive inhibitors. Enzyme activators.
2. Enzyme activity regulation. Regulation of the absolute enzyme amount – constitutive and inducible enzymes; control of the half-life of enzymes. Regulation of the catalytic activity – compartmentalization, shuttle mechanisms, multienzyme complexes, covalent modification (phosphorylation/dephosphorylation) and allosteric control. Retroinhibition.
3. Clinical significance of enzymes: functional and non-functional plasma enzymes. Role in the diagnosis of myocardial infarction and hepatitis. Diagnostic significance of isoenzymes (creatine phosphokinase and lactate dehydrogenase). Hereditary enzyme diseases (Gout, Lesch-Nyhan syndrome). Enzyme therapy. Enzymes and enzyme inhibitors in the treatment of cancer.

Practice:

1. Investigation of the effect of activators and inhibitors over the activity of salivary α -amylase.

Test, questions for self-study.

EXERCISE №5 – 3 hours

Colloquium: Biopolymers and Enzymes

EXERCISE №6 – 3 hours

Bioenergetics – part 1

1. Bioenergetics. Features of the living organisms as open chemical systems. General laws of thermodynamics and their application in the living organisms. Coupling of endergonic and exergonic processes. Macroergic compounds. Role of the ATP/ADP system. Characteristics of biologic oxidation. Substrates of biologic oxidation and final hydrogen acceptors. Oxidoreductases. Redox systems.

Practice:

1. Quantitative determination of vitamin C in blood serum.

Test, questions for self-study.

EXERCISE №7 – 3 hours

Bioenergetics – part 2

1. Oxidative phosphorylation at substrate level: oxidative phosphorylation of glyceraldehyde-3-phosphate, enolase reaction. Oxidative decarboxylation of the α -keto acids pyruvate and α -ketoglutarate; regulation.

2. Respiratory chain – localization, function and molecular structure. Oxidative phosphorylation coefficient (P/O). Respiratory control, phosphate potential. Inhibitors of the electron transport. Chemiosmotic theory of the mechanism of oxidative phosphorylation in the respiratory chain. ATP synthase. Effect of uncoupling agents and inhibitors of the oxidative phosphorylation.

Practice:

1. Use of inorganic phosphate in glycolysis and alcoholic fermentation.

Test, questions for self-study.

EXERCISE №8 – 3 hours

Bioenergetics – part 3

1. Free oxidation. Heat production. Brown adipose tissue. Role of thermogenin. Short electron transport chains. Reactive oxygen and nitrogen species (ROS and RNS) -generation and neutralization. Antioxidant enzymes and non-enzymatic antioxidants.

2. Citric acid cycle – importance for catabolism and anabolism. Chemical reactions, metabolic and energetic balance. Connection of the TCA cycle with the respiratory chain and with the other metabolic pathways. Regulation mechanisms. Pyruvate dehydrogenase deficiency.

Practice:

1. Qualitative reaction for succinate dehydrogenase (SDH).

Test, questions for self-study.

EXERCISE №9 – 3 hours

Colloquium: Bioenergetics

EXERCISE №10 – 3 hours

Carbohydrate metabolism – part 1

1. Digestion and absorption of carbohydrates in the gastrointestinal tract. Glycolysis – importance, chemical reactions, energy production under anaerobic and aerobic conditions, tissue specificity. Metabolic fate of NADH and pyruvate – shuttle systems (malate and glycerophosphate shuttles). Clinical aspects – lactic acidosis, enzymopathies, hemolytic anemia.
2. Gluconeogenesis. Cellular compartmentalization and tissue localization, substrates. Importance. Overcoming the irreversible steps of glycolysis. Regulation. Role of gluconeogenesis in the kidney and in the small intestine.

Practice:

1. Quantitative determination of pyruvate in blood serum.
- Test, questions for self-study.

EXERCISE №11 – 3 hours

Carbohydrate metabolism – part 2

1. Pentose phosphate pathway and NADPH – role in metabolism. Oxidative, isomerase and transferase reactions. Importance of the pentose phosphate pathway for erythrocytes. Glucose-6-phosphate dehydrogenase deficiency.
2. Fructose metabolism – absorption, organ specificity of degradation and association with other metabolic pathways. Defects in fructose metabolism – essential fructosuria and fructose intolerance. Galactose metabolism – absorption; degradation; synthesis of lactose in lactating mammary glands. Defects in the metabolism of galactose – lactase deficiency, galactosemia type I and II.

Practice:

1. Qualitative determination of fructose by Seliwanoff's test.
- Test, questions for self-study.

EXERCISE №12 – 3 hours

Carbohydrate metabolism – part 3

1. Glycogen metabolism – structure, degradation and synthesis. Regulation of glycogenolysis and glycogenogenesis. Glycogenoses.
2. Regulation of carbohydrate metabolism and blood sugar level. Role of insulin, glucagon and other hormones. Hypoglycemia, hyperglycemia and glucosuria.
3. Features of carbohydrate metabolism in the different tissues and organs: gastrointestinal tract, liver, nervous tissue, muscles, kidneys, adipose tissue, erythrocytes.

Practice:

1. Quantitative determination of glucose in blood serum (glucose oxidase assay).
- Test, questions for self-study.

EXERCISE №13 – 3 hours

Colloquium: Carbohydrate metabolism.

EXERCISE №14 – 3 hours

Lipid metabolism – part 1

1. Lipids – classification. Lipids digestion – enzymes. Composition, origin and functions of the lipoprotein complexes. Receptors, apolipoproteins, enzymes of the lipoprotein metabolism. Familial hypercholesterolemia.
2. Degradation and biosynthesis of triacylglycerols. Metabolism of glycerol. Metabolic fate of the fatty acids. Regulation of triacylglycerols degradation in the adipose tissue – hormone-sensitive lipase.

Practice:

1. Method for determination of triglycerides.
- Test, questions for self-study.

EXERCISE №15 – 3 hours

Lipid metabolism – part 2

1. Synthesis and degradation of phospholipids. Biological role of phospholipases A₁, A₂, C and D. Sphingolipids – types, structure and importance. Sphingolipidoses.
2. Essential fatty acids and their derivatives – eicosanoids (prostaglandins, thromboxanes, prostacyclins and leucotrienes). Cyclic and linear pathways of formation. Steroidal and non-steroidal anti-inflammatory drugs – mechanism of action. Essential fatty acids deficiency.
3. Lipid metabolism disorders. Atherosclerosis. Obesity and fatty liver disease. Adipokines (leptin, adiponectin, etc.) – role in obesity and in the development of insulin resistance.

The students should prepare written essays on the topics listed above.

PRACTICES

Summer semester

EXERCISE №1 – 3 hours

Lipid metabolism – part 3

1. Oxidation of fatty acids. β -oxidation of fatty acids with an even and an odd number of carbon atoms and of polyunsaturated fatty acids. Carnitine shuttle. Regulation. Energetic balance. Peroxisomal β -oxidation. α -oxidation of branched fatty acids. Peroxide oxidation of unsaturated fatty acids. Enzyme defects in the oxidation of fatty acids.
2. Ketone bodies metabolism. Ketogenesis and ketolysis. Regulation of the ketogenesis. Ketosis and ketoacidosis.
3. Biosynthesis of fatty acids. Citrate shuttle. Acylsintase complex. Regulation of the lipogenesis. Fatty acids chain elongation and synthesis of unsaturated fatty acids.

Practice:

1. Determination of acetone in urine (Liben's test).
 - 2 Lange's test for determination of acetone and acetoacetate.
- Test, questions for self-study.

EXERCISE №2 – 3 hours

Lipid metabolism – part 4

1. Structure and biological role of cholesterol. Cholesterol metabolism pathways. Pathways of cholesterol metabolism in the organism. Regulation – control by covalent modification and at the level of transcription. Excretion from the body.
2. Cholesterol derivatives. Synthesis of bile acids, regulation, cholelithiasis (gallstone disease). Steroid hormones – structure, synthesis and functions. Synthesis and biological functions of vitamin D3.

Practice:

1. Quantitative determination of cholesterol in blood serum.
 2. Proof of cholesterol in gallstones.
- Test, questions for self-study.

EXERCISE №3 – 3 hours

Colloquium: Lipid metabolism

EXERCISE №4 – 3 hours

Common reactions of amino acids degradation. Detoxification of ammonia

1. Digestion and absorption of proteins in the gastrointestinal tract. Mechanisms of intracellular degradation of proteins. Nitrogen balance and end products of nitrogen metabolism. General reactions of amino acid metabolism – transamination, oxidative deamination, transdeamination and decarboxylation (biogenic amines). Clinical significance of aminotransferases.
2. Detoxification of ammonia. Ammonia toxicity. Reductive amination of α -ketoglutarate. Synthesis of glutamine. Role of ammoniogenesis in the kidneys. Urea cycle – associations with the citric acid cycle, regulation, metabolic disorders. Glucose-alanine cycle.
3. Catabolism of amino acids. General pathways for degradation of the C-skeleton of amino acids. Pathways for degradation of glucogenic and ketogenic amino acids. One-carbon units – types, sources, importance. Vitamin B12, folic acid and S-adenosylmethionine. Therapeutic use of folate analogues. Catabolism of phenylalanine and tyrosine. Catabolism of tryptophan. Catabolism of branched-chain amino acids.

Practice:

1. Quantitative determination of aspartate aminotransferase (ASAT/AST) in serum.
 2. Quantitative determination of alanine aminotransferase (ALAT/ALT) in serum.
 3. Quantitative determination of urea in serum.
- Test, questions for self-study.

EXERCISE №5 – 3 hours

Products of the amino acids metabolism. Disorders of the amino acids metabolism

1. Essential and nonessential amino acids. Common reactions in the synthesis of nonessential amino acids. Selenocysteine. Conversion of amino acids to specialized products – arginine (synthesis of creatine phosphate, citrulline, nitric oxide and polyamines) and serine (synthesis of ethanolamine, choline and phospholipids).
2. Conversion of amino acids to specialized products – tryptophan (NAD^+ , serotonin, melatonin), tyrosine (thyroid hormones, catecholamines, dopamine, melanin). Products of glutamine and glutamate metabolism. The γ -glutamyl cycle. Glutathione as a reducing agent, antioxidant and participant in the metabolism of xenobiotics. Tissue specificities in the amino acids metabolism.

3. Disorders of the amino acids metabolism. Enzymopathies associated with the metabolism of tyrosine (phenylketonuria, tyrosinosis, alkaptonuria, albinism), tryptophan (pellagra) and aliphatic amino acids (methylmalonic acidemia). Parkinson's disease and L-DOPA.

Practice:

1. Determination of creatinine by a photometric colorimetric test (Jaffé reaction) in serum or plasma.

Test, questions for self-study.

EXERCISE №6 – 3 hours

Biosynthesis and degradation of purine and pyrimidine nucleotides. Regulation

1. Biosynthesis and degradation of purine nucleotides. Regulation of purine nucleotides biosynthesis. Tissue specificity. Hyperuricemia and gout. Inhibition of xanthine oxidase. Enzyme defects in the metabolism of purine nucleotides (immune deficiencies and Lesch-Nyhan syndrome). Purine analogues used as anticancer and antiviral drugs.

2. Biosynthesis and degradation of pyrimidine nucleotides. Regulation of pyrimidine nucleotides biosynthesis. Synthesis of CTP and TMP from UMP. Ribonucleotide reductase reaction. Thymidylate synthase. Orotic aciduria.

Practice:

1. Determination of uric acid in serum.

Test, questions for self-study.

EXERCISE №7 – 3 hours

Iron metabolism. Biosynthesis and degradation of porphyrins

1. Iron metabolism. Absorption of haem and non-haem iron in the small intestines. Transferrin receptors. Iron-binding and iron-storage proteins. Heparin. Post-transcriptional control of iron homeostasis. Disorders of iron homeostasis.

2. Synthesis of porphyrins. Organ and intracellular localization of the pathway. Regulation. ALA-synthase – enzyme inducers and repressors. Types of porphyrias. Use of exogenous porphyrins in the treatment of some types of cancer.

3. Hemoglobin degradation. Haem oxygenase. Direct and indirect bilirubin. Bile pigments. Enterohepatic circulation of the bile pigments. Jaundice.

Practice:

1. Quantitative determination of total bilirubin in serum.

2. Erlich's test for identification of urobilinogen in urine.

Test, questions for self-study.

EXERCISE №8 – 3 hours

Colloquium: Metabolism of amino acids, nucleotides and porphyrins

EXERCISE №9 – 3 hours

Signal transduction – part 1

1. Intercellular communication and signal transduction. Types of intercellular interactions: endocrine, paracrine, autocrine signaling and gap junctions. Principles in cell signaling: types of signaling molecules and cell receptors. Intracellular participants in signal cascades. Molecular

intracellular switches – protein kinases/protein phosphatases and G-proteins. Characteristic features of the signal pathways – integration, convergence, divergence and cross-talk.

2. Types of plasma membrane receptors. Receptors, associated with ion channels. G-protein coupled receptors. Receptors with intrinsic enzyme activity. Receptors, associated with other proteins with enzyme activity (tyrosine kinases).

3. Second messengers in signal transduction. Types of second messengers. Cyclic AMP (cAMP), the adenylyl cyclase system and G-proteins. Nitric oxide (NO) and cyclic GMP.

4. Second messengers in signal transduction. Calcium and calmodulin. Lipid mediators: inositol 1,4,5-triphosphate (IP3), diacylglycerols (DAG), phosphatidylinositol 3,4,5-triphosphate (PIP3), ceramide and sphingosine-1-phosphate.

Practice:

Test, questions for self-study.

EXERCISE №10 – 3 hours

Signal transduction – part 2 (hormones)

1. Hormones of the pituitary gland. Hypothalamic-pituitary system – releasing hormones. Hypothalamus-pituitary axis. Hormones from the anterior pituitary. The hypothalamic-pituitary-thyroid (HPT) axis. Synthesis, secretion and biological effects of the thyrotropin-releasing hormone (TRH) and thyroid-stimulating hormone (TSH). Synthesis, degradation and effects on metabolism of the thyroid hormones. Deiodinases. Thyroid gland disorders.

2. The hypothalamic-pituitary-adrenal (HPA) axis. Hormonal control over synthesis and general characteristics of steroid hormones. Synthesis of mineralo- and glucocorticoids. Releasing hormones: corticotropin-releasing hormone (CRH), proopiomelanocortin (POMC) and adrenocorticotrophic hormone (ACTH). Regulatory mechanisms that control synthesis of glucocorticoids and mineralocorticoids in the adrenal cortex. Biological and metabolic effects of cortisol. Clinical cases with increased or decreased secretion of cortisol.

3. The hypothalamic-pituitary-gonadal (HPG) axis. Gonadotropin-releasing hormone (GnRH). Follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Synthesis of sex hormones. The growth hormone axis. Insulin-like growth factors (IGF-1 and 2). Defects in synthesis and the signaling pathways of growth hormone. Hormones of the neurohypophysis.

4. Hormones that regulate the water and salt balance. Renin-angiotensin system. Natriuretic peptides. Antidiuretic hormone (ADH). Calcitonin and parathyroid hormone (PTH). Synthesis, secretion and signaling.

Practice:

1. Qualitative reactions for determination of 17-ketosteroids in urine

Test, questions for self-study.

EXERCISE №11 – 3 hours

Signal transduction – part 3. Molecular mechanisms of oncogenesis

1. Hormones of the pancreas – insulin, glucagon and somatostatin. Synthesis, secretion, signaling pathways and biological effects.

2. Catecholamines. Hormones of the gastrointestinal tract. Synthesis, signaling pathways, biological and metabolic effects.

3. Hormones that bind intracellular receptors. General characteristics of nuclear receptors. Different types of intracellular receptors. Retinoic acid receptors (RAR). Thyroid hormone receptors. Steroid hormone receptors. Anti-inflammatory effects of glucocorticoids through inhibition the NF- κ B-

signaling pathway. Antiestrogens. Intracellular signaling pathways of vitamin D₃. Other families of intracellular receptors: retinoid X receptors (RXRs), liver X receptors (LXRs), peroxisome proliferator-activated receptors (PPARs), farnesoid X receptor (FXRs) and pregnane X receptor (PXR).

4. Molecular mechanisms of oncogenesis. Tumor cells features. Tumor markers. Factors that cause cancer. Direct carcinogens and pro-carcinogens. Pro-carcinogen metabolic activation. Stages of chemical carcinogenesis. Oncogenes and proto-oncogenes. Mechanisms of transformation of oncogenes into proto-oncogenes. Oncogenes and growth factors. Oncogenic viruses. Oncogenes and signal transduction. Mechanisms of tumor cell progression and metastasis. P-glycoproteins. Tumor-suppressor genes. Mechanism of action of anticancer drugs.

Practice:

1. Qualitative determination of adrenaline (epinephrine).

Test, questions for self-study.

EXERCISE №12 – 3 hours

Colloquium: Signal transduction

EXERCISE №13 – 3 hours

Molecular mechanisms of type 1 and type 2 diabetes mellitus

1. Pathobiochemical mechanisms of Diabetes mellitus (DM). Classification. Genetic and environmental factors as a predisposition for the development of DM. Type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM). Metabolic disorders and complications of T1DM and T2DM. T2DM and hyperglycemia: oxidative stress, the sorbitol pathway, advanced glycation end-products and their receptors (AGEs and RAGEs), activation of the DAG/PKC cascade. Diabetes and obesity. Biochemical indicators in the diagnosis of diabetes.

Practice:

1. Determination of glucose in urine sample using Fehling's solution.

Test, questions for self-study.

EXERCISE №14 – 3 hours

Biochemistry of blood

1. Biochemistry of blood. Biomedical importance of the blood. Blood cells. Erythrocytes: erythropoiesis and role of erythropoietin; hematocrit, enzymopathies and anemias, metabolism and bioenergetics. Leukocytes: metabolism, bioenergetics and phagocytosis. Regulation of T-lymphocytes metabolism. T-cell receptor complex (TCR).

2. Biochemistry of blood. Blood plasma and blood serum. Plasma proteins – fractions, representative and biological role. Albumin. Acute-phase proteins. C-reactive protein (CRP). Haptoglobin, hemopexin. Transferrin, ferritin, ceruloplasmin. α 2-Macroglobulin. α 1-Antitrypsin. Complement system. Matrix metalloproteinases. Serum amyloid A (SAA). Plasma immunoglobulins. Participation of plasma proteins in inflammatory response.

3. Biochemistry of blood coagulation. Hemostasis and thrombosis. Blood coagulation cascade: extrinsic, intrinsic and common pathways of coagulation. Conversion of fibrinogen in fibrin. Proteins involved in blood coagulation. Vitamin K-dependent post-translational modifications. Fibrinolysis. Regulation of hemostasis.

Practice:

1. Determination of the prothrombin complex factors (prothrombin time).
 2. Quantitative determination of CRP (C-reactive protein) by ELISA method.
- Test, questions for self-study.

EXERCISE №15 – 3 hours

Nutrition and digestion. Biochemistry of the liver

1. Nutrition and digestion. Different food types and their biological and nutritional value. Some clinical aspects of feeding. Digestion and absorption of carbohydrates, lipids, proteins, vitamins and minerals. Processes in the colon. Microbiome. Secretory activity of the gastrointestinal tract. Disorders of digestion and absorption.
2. Biochemistry of the liver. Metabolic functions. Synthesis of specific products. Metabolism of xenobiotics.

Practice:

1. Determination of hydrochloric acid in gastric juice.
 2. Determination of lactic acid in gastric juice.
- Test, questions for self-study.

LITERATURE FOR SELF-STUDY

1. Lecture course in Biochemistry, Prof. Tatyana Vlaykova, PhD
2. Bivolarska A. Biochemistry guide book for students in Medicine, Dental medicine and Pharmacy. Lax book, 2021.
3. Rodwell V, D Bender, K Botham, P Kennelly, P Weil. Harper's Illustrated Biochemistry. Thirtieth Edition., 2015.
4. Ferrier D. Lippincott Biochemistry 6th Edition. Editor R. Harvey. 2014.
5. Lieberman M. and Marks A. Marks' Basic Medical Biochemistry a Clinical Approach, (2009), Lippincott Williams & Wilkins.

QUESTIONNAIRE IN BIOCHEMISTRY FOR STUDENTS OF MEDICINE II COURSE

▪ GENERAL PART

1. Protein functions. Molecular forms of proteins (hetero-, iso- and aleoproteins). Oligopeptides, polypeptides and proteins. Amino acids – types and classification. Levels of organization of the protein molecule. Primary structure of proteins. Types of bonds in protein molecules - properties of the peptide bond, weak bonds, disulfide bridges.
2. Conformation. Secondary structure - α -helix and β -sheet, random coil characterization. Supersecondary structures – motifs and domains. Tertiary structure. Fibrous and globular proteins.
3. Quaternary structure. Mechanisms maintaining the conformation of proteins. Relation between the structure and the function of proteins - medical importance: defects in receptors (familial

hypercholesterolemia, diabetes insipidus); diseases due to impaired conformation (prion disease, Alzheimer's disease); molecular diseases (sickle cell anemia); defects in the post-translational modification of proteins (scurvy and glycated hemoglobin).

4. Proteins as polyelectrolytes: isoelectric point, precipitation of protein. Denaturation. Electrophoresis. Methods for protein examination – electrophoresis, chromatography, etc. Electrophoresis of plasma proteins – fractions.

5. Nucleic acids – types and biological role. Chemical composition – structure of nucleotides, chemical bonds. Free nucleotides of biological importance. Features of polynucleotide chains. Watson and Crick model. Purine and pyrimidine analogues as anticancer and antiviral agents.

6. Primary structure of nucleic acids. Conformation of DNA and of the different types of RNA. Nucleosomes. Importance of histone and nonhistone proteins. Denaturation and renaturation of DNA. Ribozymes, RNA maturation, microRNAs – role in the regulation of gene expression.

7. Characteristics of enzymes as biological catalysts. Structure, names and classification of enzymes. Mechanisms of enzyme catalysis. Enzyme–substrate complex. Active site. Specificity of the enzyme action.

8. Water-soluble vitamins – structure, biological role. Vitamin and vitamin derivatives as cofactors. Avitaminoses.

9. Lipid-soluble vitamins – structure, biological role. Hyper- and avitaminoses.

10. Enzyme kinetics. Enzyme units. Factors affecting the enzyme reaction rate: time, temperature, pH, concentration of the enzyme and of the substrate. Michaelis constant. Michaelis – Menten equation and Lineweaver – Burk plot (equation).

11. Reversible and irreversible inhibition. Competitive and noncompetitive inhibitors. Enzyme activators.

12. Enzyme activity regulation. Regulation of the absolute enzyme amount – constitutive and inducible enzymes; control of the half-life of enzymes. Regulation of the catalytic activity – compartmentalization, shuttle mechanisms, multienzyme complexes, covalent modification (phosphorylation – dephosphorylation) and allosteric control. Retroinhibition.

13. Clinical significance of enzymes: functional and non-functional plasma enzymes. Role in the diagnosis of myocardial infarction and hepatitis. Diagnostic significance of isoenzymes (creatin phosphokinase and lactate dehydrogenase). Hereditary enzyme diseases (Gout, Lesch-Nyhan syndrome). Enzyme therapy. Enzymes and enzyme inhibitors in the treatment of cancer.

▪ BIOENERGETICS

14. Bioenergetics. Features of organisms as open chemical systems. General laws of thermodynamics and their application in living organisms. Coupling of endergonic and exergonic processes. Macroergic compounds. Role of the system ATP/ADP. Characteristics of biological

oxidation. Substrates of biological oxidation and final hydrogen acceptors. Oxidoreductases. Redox systems.

15. Oxidative phosphorylation at substrate level: oxidative phosphorylation of glyceraldehyde-3-phosphate, enolase reaction. Oxidative decarboxylation of the α -keto acids pyruvate and α -ketoglutarate; regulation.

16. Respiratory chain – localization, function and molecular structure. Oxidative phosphorylation coefficient (P/O). Respiratory control, phosphate potential. Inhibitors of the electron transport. Chemiosmotic theory for the mechanism of oxidative phosphorylation in the respiratory chain. ATP synthase. Effect of uncoupling agents and inhibitors of the oxidative phosphorylation.

17. Free oxidation. Heat production. Brown adipose tissue. Role of thermogenin. Short electron transport chains. Reactive oxygen and nitrogen species (ROS and RNS) -generation and neutralization. Antioxidant enzymes and non-enzymatic antioxidants.

▪ METABOLISM

18. Citric acid cycle – importance for catabolism and anabolism. Chemical reactions, metabolic and energetic balance. Connection of the TCA cycle with the respiratory chain and with the other metabolic pathways. Regulation mechanisms. Pyruvate dehydrogenase deficiency.

19. Digestion and absorption of carbohydrates in the gastrointestinal tract. Glycolysis – importance, chemical reactions, energy production under anaerobic and aerobic conditions, tissue specificity. Metabolic fate of NADH and pyruvate – shuttle systems (malate and glycerophosphate shuttles). Pasteur effect and Warburg effect (in cancer). Clinical aspects - lactic acidosis, enzymopathies, hemolytic anemia.

20. Gluconeogenesis. Cellular compartmentalization and tissue localization, substrates. Importance. Overcoming the irreversible steps of glycolysis. Regulation. Role of gluconeogenesis in the kidney and in the small intestine.

21. Pentose phosphate pathway and NADPH – role in metabolism. Oxidative, isomerase and transferase reactions. Importance of the pentose phosphate pathway for erythrocytes. Glucose-6-phosphate dehydrogenase deficiency.

22. Fructose metabolism – resorption, organ specificity of degradation and relation with other metabolic pathways. Defects in the metabolism of fructose – essential fructosuria and fructose intolerance. Galactose metabolism – resorption; degradation; synthesis of lactose in lactating mammary glands. Defects in the metabolism of galactose – lactase deficiency, galactosemia type I and II.

23. Glycogen metabolism – structure, degradation and synthesis. Regulation of glycogenolysis and glycogenogenesis. Glycogenoses.

24. Regulation of carbohydrate metabolism and blood sugar level. Role of insulin, glucagon and other hormones. Hypoglycemia, hyperglycemia and glucosuria.
25. Features of carbohydrate metabolism in the different tissues and organs: gastrointestinal tract, liver, nervous tissue, muscles, kidneys, adipose tissue, erythrocytes.
26. Lipids – classification. Lipid digestion – enzymes. Composition, origin and functions of the lipoprotein complexes. Receptors, apolipoproteins, enzymes of the lipoprotein metabolism. Familial hypercholesterolemia.
27. Degradation and biosynthesis of triacylglycerols. Metabolism of glycerol. Fate of the fatty acids. Regulation of the degradation of triacylglycerols in the adipose tissue - hormone-sensitive lipase.
28. Oxidation of fatty acids. β -oxidation of fatty acids with an even and an odd number of carbon atoms and of polyunsaturated fatty acids. Carnitine shuttle. Regulation. Energetic balance. Peroxisomal β -oxidation. α -oxidation of branched fatty acids. Peroxide oxidation of unsaturated fatty acids. Enzyme defects in the oxidation of fatty acids.
29. Ketone bodies metabolism. Ketogenesis and ketolysis. Regulation of the ketogenesis. Ketosis and ketoacidosis.
30. Biosynthesis of fatty acids. Citrate shuttle. Acylsintase complex. Regulation of the lipogenesis. Fatty acids chain elongation and synthesis of unsaturated fatty acids.
31. Synthesis and degradation of phospholipids. Biological role of phospholipases A₁, A₂, C and D. Sphingolipids – types, structure and importance. Sphingolipidoses.
32. Essential fatty acids and their derivatives – eicosanoids (prostaglandins, tromboxanes, prostacyclins and leucotrienes). Cyclic and linear pathways of formation. Steroidal and non-steroidal anti-inflammatory drugs – mechanism of action. Essential fatty acids deficiency.
33. Structure and biological role of cholesterol. Cholesterol pathways in the organism. Cholesterol synthesis. Regulation – control by covalent modification and at the transcription level. Removal from the body.
34. Cholesterol derivatives. Synthesis of bile acids, regulation, cholelithiasis (gallstone disease). Steroid hormones – structure, synthesis and functions. Synthesis and biological functions of vitamin D₃.
35. Lipid metabolism disorders. Atherosclerosis. Obesity and fatty liver disease. Adipokines (leptin, adiponectin, etc.) – synthesis, secretion and their role in obesity and in the development of insulin resistance.
36. Digestion and absorption of proteins in the gastro-intestinal tract. Mechanisms for intracellular degradation of proteins. Nitrogen balance and the end products of nitrogen metabolism. General reactions in amino acid metabolism – transamination, oxidative deamination, transdeamination and

decarboxylation. Amines of biological significance. Clinical significance of the enzymes called aminotransferases.

37. Ammonia toxicity. Detoxification of ammonia. Reductive amination of α -ketoglutarate. Synthesis of glutamine. Amoniogenesis in the kidneys (renal amoniogenesis). Urea cycle – interrelationships with the citric acid cycle, regulation and metabolic disorders. Glucose-alanine cycle.

38. Catabolism of amino acids. General pathways for degradation of the C-skeletons of amino acids. Pathways for degradation of glucogenic and ketogenic amino acids. Single carbon atom units – types, sources, importance. Vitamin B₁₂, folic acid and S-adenosyl methionine. Therapeutic application of folate analogues. Catabolism of phenylalanine and tyrosine. Catabolism of tryptophan. Catabolism of branched amino acids.

39. Essential and nonessential amino acids. Common reactions in the synthesis of nonessential amino acids. Selenocysteine. Conversion of amino acids to specialized products – arginine (synthesis of creatine phosphate, citrulline, nitric oxide and polyamines) and serine (synthesis of ethanolamine, choline and phospholipids).

40. Conversion of amino acids to specialized products – tryptophan (NAD⁺, serotonin, melatonin), tyrosine (thyroid hormones, catecholamines, dopamine, melanin). Products of glutamine and glutamate metabolism. The γ -glutamyl cycle. Glutathione as a reducing agent, antioxidant and as a participant in the metabolism of xenobiotics. Tissue specificities in amino acid metabolism.

41. Impairments of amino acids metabolism. Enzymopathies associated with metabolism of tyrosine (phenylketonuria, tyrosinosis, alkaptonuria, albinism), tryptophan (pellagra) and aliphatic amino acids (methylmalonic acidemia). Parkinson's disease and L-DOPA.

42. Synthesis and degradation of purine nucleotides. Regulation of the pathway. Tissue specificities. Hyperuricemia and gout. Inhibition of the enzyme activity of xanthine oxidase. Enzyme defects – Lesch-Nyhan syndrome and immunodeficiencies. Purine analogues used as anticancer and antiviral drugs.

43. Synthesis and degradation of pyrimidine nucleotides. Regulation of the pathway. Synthesis of CTP and TMP from UMP. Ribonucleotide reductase reaction. Thymidylate synthase reaction. Orotaturia.

44. Iron metabolism. Absorption of haem-bound iron and nonhaem iron. Transferrin receptors. Iron-binding and iron storage proteins. Heparin. Post-transcriptional control over iron homeostasis. Disorders of iron homeostasis.

45. Synthesis of porphyrins. Organ and intracellular localization of the pathway. Regulation and regulatory enzymes. ALA-synthase and its control – enzyme inducers and repressors. Types of porphyrias. Application of exogenous porphyrins in the treatment of certain cancer diseases.

46. Hemoglobin degradation. Haptoglobin, hemopexin and scavenger receptors. Haem oxygenase. Direct and indirect bilirubin. Bile pigments. Enterohepatic circulation of the bile pigments. Jaundice.

47. Metabolism integrity. Integration at the level of a single protein molecule and multienzyme complexes. Compartmentalization and selective permeability – transport mechanisms and shuttle mechanisms. Role of the key enzymes, metabolites and cofactors. Regulation through limiting metabolites and cofactors. Control at the level of the slowest steps of a metabolic pathway.

48. Metabolism integrity. Tissue and organ specificities – brain, liver, muscles, heart and adipose tissue. Adaptation in starvation.

49. Molecular diseases. Mutations as a reason for the development of molecular diseases. Consequences from the existence of point mutations that affect enzymes of the pathway for synthesis of hemoglobin. Defects that affect enzyme activities. Molecular diseases due to defects in the DNA repair mechanisms.

50. DNA replication – types of DNA polymerases and other proteins involved in the process. Cell cycle and its control – role of the cyclins, cyclin-dependent kinases (CDK), the retinoblastoma protein (Rb), p53 and the inhibitors of the cyclin-dependent kinases (CDI). Replication mechanisms. DNA repair mechanisms.

50. Recombinant DNA technologies. DNA recombination. Role of restriction enzymes, reverse transcriptase and chemical methods. DNA sequences identification – electrophoresis, Southern blotting. Sanger dideoxynucleotide method for DNA sequencing. DNA amplification: cloning, polymerase chain reaction (PCR).

51. Regulation of the gene expression at the level of the process of transcription. Regulation of RNA polymerase II in eukaryotes through phosphorylation and suppressor proteins. Regulatory sites in the promoter regions in eukaryotes. Transcription factors (TF) and transcription complexes. Epigenetic modifications – DNA methylation and covalent modification of histones – role in the processes of replication and transcription.

52. Regulation of the gene expression. Post-transcriptional control of the gene expression – splicing. Regulation through the transport and stability of mRNA molecules. Post-transcriptional editing of mRNA molecules. Control at the level of translation. Regulation of the synthesis of ferritin at the level of translation.

53. Regulation at the post-translational level. Proteolytic cleavage of proteins. Post-translational modifications – methylation, acetylation, myristoylation and prenylation. Phosphorylation and sulfation. Vitamin C and vitamin K-dependent modifications. Selenoproteins. Ubiquitin, ubiquitination and targeted degradation of proteins.

▪ FUNCTIONAL BIOCHEMISTRY

54. Principles of the intercellular communication and signal transduction. Types of intercellular interactions: endocrine, paracrine, autocrine mechanisms and intercellular junctions. Principles in cell signaling: signaling molecules and receptors. Intracellular participants in cell signaling: a signal cascade. Adaptor proteins and effector molecules: G-proteins, protein kinases and phosphatases. General features of the signal cascades: convergence, divergence and cross-talk.
55. Types of plasma membrane receptors. Receptors associated with ion channels. G-protein coupled receptors. Receptors with intrinsic enzyme activity. Receptors, associated with enzyme activity molecules (tyrosine kinase activity).
56. Secondary messengers in signal transduction. Types of secondary messenger. The adenylyl cyclase system, cyclic AMP (cAMP), cyclic GMP (cGMP), G-proteins and nitric oxide (NO).
57. Secondary messenger in signal transduction. Calcium and calmoduline. Lipid mediators: inositol-3-phosphate, diacylglycerols (DAG), eicosanoids, ceramides and sphingosine-1-phosphate.
58. Pituitary and hypothalamic hormones. Hypothalamo-pituitary axis: releasing hormones. Hormones of the anterior pituitary. The hypothalamo-pituitary-thyroid (HPT) axis. Synthesis, secretion and biological effects of the thyrotropin-releasing hormone (TRH) and thyroid-stimulating hormone (TSH). Synthesis, secretion and effects on metabolism of the thyroid hormones. Deiodinases. Thyroid gland diseases.
59. The hypothalamo-pituitary-adrenal (HPA) axis. General characteristics of the steroid hormones. Synthesis of mineralocorticoids and glucocorticoids. Hormonal control over synthesis of steroid hormones: corticotropin-releasing hormone (CRH), proopiomelanocortin (POMC) and adrenocorticotrophic hormone (ACTH). Regulatory mechanisms that control synthesis of glucocorticoids and mineralocorticoids in the adrenal cortex. Biological and metabolic effects of cortisol. Clinical cases with increased or decreased secretion of cortisol.
60. The hypothalamo-pituitary-gonadal (HPG) axis. Gonadotropin-releasing hormone (GnRH). Follicle stimulating hormone (FSH) and luteinizing hormone (LH). Synthesis of sex hormones. The hypothalamic-pituitary-somatotropic (HPS) axis. Defects in synthesis and the signaling pathways of growth hormone. Insulin-like growth factors (IGF-1, 2). Hormones of the posterior pituitary.
61. Hormones that regulate water and salt balance. Renin-angiotensin-aldosterone system. Natriuretic peptides. Antidiuretic hormone (ADH or vasopressin). Calcitonin and parathyroid hormone (PTH). Synthesis, secretion and signaling.
62. Hormones of the pancreas – insulin, glucagon and somatostatin. Synthesis, secretion, signaling pathways and biological effects.
63. Catecholamines. Hormones of the gastrointestinal tract. Synthesis, secretion, signaling pathways and biological effects.

64. Hormones that bind intracellular receptors. General characteristics of nuclear receptors. Different types of intracellular receptors. Retinoic acid receptors (RAR). Receptors that bind thyroid hormones. Receptors that bind steroid hormones. Anti-inflammatory effects of the glucocorticoids through inhibition the NF- κ B-signaling pathway. Antiestrogens. The intracellular signaling pathways of vitamin D₃. Other families of intracellular receptors: retinoid X receptors (RXR's), liver X receptors (LXR's), peroxisome proliferator-activated receptors (PPAR's), farnesoid X receptor (FXR) and pregnane X receptor (PXR).

65. Molecular mechanisms of oncogenesis. Tumor cells features. Tumor markers. Factors that cause cancer. Direct carcinogens and pro-carcinogens. Pro-carcinogen metabolic activation. Stages of chemical carcinogenesis. Oncogenes and proto-oncogenes. Mechanisms of transformation of oncogenes into proto-oncogenes. Oncogenes and growth factors. Oncogenic viruses. Oncogenes and signal transduction. Tumor-suppressor genes. Mechanisms of tumor cell progression and metastasis. Telomerase and cancer. Anticancer therapy drugs – mechanism of action. P-glycoproteins.

66. Apoptosis – molecular mechanisms and biological role. Internal and external pathways of apoptosis. The role of mitochondria in apoptosis. Signals from death-receptors. The role of caspases in apoptosis. TNFR and Fas signal pathways. Anti-apoptotic signals for cell survival – the role of PI3K and PKB/Akt. p53 signal pathway. Regulation and clinical significance of programmed cell death.

67. Pathobiochemical mechanisms of *Diabetes mellitus (DM)*. Classification. Genetic and environmental factors as a predisposition for the development of DM. Type I diabetes (T1DM) and Type II diabetes (T2DM). Metabolic disorders and complications of T1DM and T2DM. Glucose as a regulator of gene transcription – the role of carbohydrate-responsive element-binding protein (ChREBP) protein. T2DM and hyperglycemia: oxidative stress, the sorbitol pathway, advanced glycation end-products and their receptors (AGE's and RAGE's), activation of the DAG/PKC cascade. Diabetes and obesity. Biochemical indicators in the diagnosis of diabetes.

68. Blood. Biochemical features and biomedical importance. Blood cells. Erythrocytes: erythropoiesis, erythropoietin, hematocrit. Bioenergetics and specificities in metabolism of erythrocytes – enzymopathies and anemias. Metabolism of leucocytes – bioenergetics and phagocytosis. Regulation of metabolism in T-lymphocytes. T-cell receptor complex (TCR).

69. Biochemistry of the blood. Blood serum and plasma. Biological role of the plasma proteins. Albumin. Acute-phase proteins: C-reactive protein (CRP), serum amyloid-A (SAA) haptoglobin and hemopexin. Complement system. Matrix metalloproteinases. Immunoglobulins. Plasma proteins and inflammation.

70. Hemostasis and thrombosis. Blood coagulation cascade: intrinsic and extrinsic pathways. Conversion of fibrinogen to active fibrin. Proteins, involved in hemostasis. Vitamin K-dependent post-translational modifications. Fibrinolysis. Regulation of hemostasis.

71. Mechanisms of cellular adhesion. Types of adhesion molecules – structure and biological role – integrins, cadherins, immunoglobulin-like cell adhesion molecules (IgSF CAM's). Cytoskeleton and cell adhesion. Types of cell contacts. Actin and actin filaments – assembly and regulation of actin filaments. Clinical significance.

72. Extracellular matrix (connective tissue). Types and functions of the structural proteins. Types and functions of the proteoglycans and glycosaminoglycans. Diseases due to mutations in genes that encode for structural proteins. Mucopolysaccharidoses.

73. Bones as a mineralized connective tissue. Chemical composition of the bones. Osteoblasts, osteocytes and osteoclasts – role in the formation and remodeling of bones. Biochemistry of the ossification and bone resorption. Regulation of the bone metabolism. Metabolic and genetic disorders that affect the bones. Biochemistry of cartilage. Calcium homeostasis and factors that affect calcium homeostasis.

74. Nutrition and digestion. Food and its biological meaning and value. Some clinical aspects of feeding. Digestion and absorption of carbohydrates, lipids, proteins, vitamins and minerals. Processes in the colon. Secretion of molecules, involved in digestion, in the lumen of the gastrointestinal tract. Disorders of digestion and absorption.

75. Biochemistry of the liver. Metabolic functions. Synthesis of specific products. Metabolism of xenobiotics.

Plovdiv Medical University
Faculty of Medicine

SYLLABUS
in
Human Physiology

Approved at a meeting of the Department of Human Physiology on № 24/16.05.2022

Confirmed by the Faculty Council – Protocol №6/15.06.2022

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								2nd year	
		Total	Lectures	Practices	ECTS			III	IV
Physiology	IV sem.	195	75	120	6.5	8.5	15.0	2/4	3/4

DISCIPLINE:

Human Physiology.

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

Human Physiology.

LEVEL OF QIALIFICATION:

Master (M).

FORMS OF TRAINING:

Lecture course. Practical exercises. Ongoing assessment tests. Consultations. Participation in experiments conducted at the department. Homework, using textbooks and manuals recommended by the department.

YEAR OF TRAINING:

Second Year.

DURATION OF TRAYNING:

Two semesters.

ACADEMIC HOURS:

75 hours of lectures and 120 hours of laboratory practical sessions.

TECHNICAL ECQIPMENT APPLIED IN THE TRAINING:

- Textbooks, seminar manuals for medical students, physiology quizzes guide.
- Visualizing teaching tools.
- Specially equipped laboratories for registration and evaluation of physiological functions and their regulation. Video monitors; disks with educational videos; computers; complete multimedia lecture course; CARDIOVIT-AT 104, SCHILLER, Switzerland, the Schiller AT-104 Ergospirometric system; BIOPAC Systems, Inbody 270, InBody Co, Ltd, Korea Inc., USA a three-channel ECG recorder (RFT, Germany); a multi-function patient monitor (Hewlett Packard, USA); MIOTON AS,TALLINN, ESTONIA, Manual CNAP TM Monitor 500, CNSystems Medizintechnik AG, Austria, a special external respiration spirometer ('Flowscreen', Jaeger, Germany); 'Oxymax'- a device for monitoring the metabolism of test animals (Columbus, USA); A Jaeger veloergometer (Germany); operation boards for small

animals; a device for controlled breathing of small animals ('Hugo Sachs', Germany); a Laborlux capillary scope; microscopes; devices for registration of muscle contractions; rheograph; audiometers; colour perimeter; blood pressure measuring devices; complete multimedia lecture course (in Bulgarian and in English); complete multimedia lecture course in English for master programs in medical physics and engineering; seminar manuals for medical students

FORMS OF EVALUATION:

Preliminary assessment of progress: Evaluation of 7 chapters; oral and written examination.

Final evaluation: Assessment test of the final examination. Written exam topic drawn from the syllabus on the day of the final exam. Oral examination. Evaluation of practical skills.

EVALUATION CRITERIA:

Two preliminary evaluation scores for each of the two semesters and a final examination comprising a general assessment multiple-choice question test, written, practical and oral presentation.

ASPECTS OF EVALUATION CRITERIA:

Active participation in the practical course, accompanying discussions, tests, written and oral exams.

SEMESTER EXAM – at the end of the 4th semester.

Affirmative (general assessment test, written exam practical exam and oral presentation).

STATE EXAM:

Negative.

LECTURER:

Lecturer with an academic degree from the Department of Human Physiology.

DEPARTMENT: Department of Physiology.

ANNOTATION

Cell physiology. The human body systems. Physiological functions and general principles of their regulation – cybernetic and physiological aspects. Homeostasis. General and specific properties of excitable cells. Synapse types. Chemical synapses. Neuro-reflex regulation of physiological functions. Functional morphology and main physiological properties of the autonomous nervous system. General principles of humoral regulation of physiological functions; physiological effects of the hormones released by the thyroid gland, adrenal glands, pituitary gland and pancreas. Functional morphology of the skeletal and smooth muscles. Blood physiology. The cardiovascular system – physiological characteristics of the working myocardium and the cardiac conduction system; electrical phenomena accompanying cardiac activity; registration and assessment of the ECG; heart sounds; regulation of cardiac activity; arterial pulse; nervous and humoral effects on vascular tone. Regulation of blood pressure. The respiratory system – regulation of respiration; lung volumes and capacities and gas exchange. Functions and regulation of the digestive system. Nutrition and metabolism of proteins, fats, sugars and energy. Excretory functions of the body. Water/electrolyte and acid/base balance. Sensory systems – somatosensory physiology, vision, hearing, smell and taste. Wakefulness and sleep. Higher nervous activity.

BASIC AIMS OF THE DISCIPLINE

Attaining relevant theoretical knowledge and practical skills.

1. Study of the normal physiological functions and their parameters.
2. Introduction to regulation of physiological functions.
3. Introduction to the body's capacity to respond to internal and external stimuli while preserving its uniqueness and integrity in achieving goals concerning oneself and one's surroundings.
4. Building a theoretical basis for uncovering pathophysiological processes as well as for the management of physical and drug therapies.
5. Learning the main medical and instrumental methods for evaluation of physiological parameters.
6. Introduction to the basic principles of experimental medicine.

EXPECTED RESULTS:

Following termination of the course the students must attain the following knowledge and skills:

1. The basic physiological functions of the human body and their normal indices.
2. Regulation of physiological functions.
3. The ability of the human body to respond to internal and external stimuli, while maintaining its relative independence and integrity in achieving its goals pertaining to itself and the environment.
4. To develop skills in uncovering pathological processes and those of physical and drug therapy.
5. To learn the main methods of evaluation of the physiological indices through physical methods and investigative techniques.
6. Basic principles of experimental work.

LECTURES

Lecture № 1 - 2 acad. hours

Organization of the cell. Physical structure of the cell. Functional systems of the cell. Properties of the cell membrane and junctions between the cells. Intercellular signalization. Transport of substances through the cell membrane.

The human body. Homeostasis. General principles of the homeostatic regulation – regulatory systems and elements of the homeostatic regulatory system. Levels of physiological regulation.

Lecture № 2 - 2 acad. hours

Physiology of the excitatory tissues. Irritability and excitability. General and specific properties of the excitable cells. Membrane potential – ionic basis of the membrane potentials.

Measurement of excitability. Changes in the excitability during excitation. Inhibition. Conduction of the excitation.

Transmission of the excitation (inhibition) from an excitable cell to another. Synapses - types of synapses. Chemical synapses. Transmitters and modulators. Postsynaptic potentials. Summation of the postsynaptic potentials.

Lecture № 3 - 2 acad. hours

Functions of the nervous system – functional morphology of the nervous system. Physiology of the nerve cell. Glial cells. Neuronal circuits and processing of information form group of nerve cells – convergence, divergence, reverberating circuits, inhibition.

Lecture № 4 - 2 acad. hours

Reflex regulation of the physiological functions. Type of reflexes according to the mechanism of formation and the characteristics of the reflex arc.

Nerve centers. Types and properties. Cerebral blood flow. Cerebrospinal fluid.

Lecture № 5 - 2 acad. hours

The autonomic nervous system. General organization of the autonomic nervous system. Autonomic nerve centers, ganglia, transmitters and receptors in the autonomic nervous system.

Effects of sympathetic and parasympathetic stimulation on specific organs. Autonomic reflexes.

Role of the hypothalamus, reticular formation, cerebellum, basal ganglia and cerebral cortex in the control of the autonomic functions. Integration of the central nervous system in the adaptation processes of the body – “alarm” or “stress” response of the sympathetic nervous system.

Lecture № 6 - 2 acad. hours

General principles of the humoral control of the physiologic functions. Telecrinia and paracrinia. Classification, synthesis and mechanism of action of the hormones. Control on the hormone secretion.

Lecture № 7 - 2 acad. hours

Hypothalamic-neurohypophysial system. Neurosecretion. Hormones of the neurohypophysis. Physiologic effects and control of secretion.

Hypothalamo-adenohypophysial system. Hormones of the adenohypophysis. Physiologic effects and control of secretion.

Functional morphology of the thyroid gland. Iodine containing thyroid hormones. Physiologic effects and control of secretion. Hyperthyroidism and hypothyroidism.

Lecture № 8 - 2 acad. hours

Functional morphology of adrenal glands. Hormones of the adrenal medulla. Physiologic effects and control of secretion of adrenaline (epinephrine) and noradrenaline (norepinephrine).

Hormones of adrenal cortex – glucocorticoids. Physiologic effects and control of secretion. Pharmacologic effects of glucocorticoids.

Hormones of adrenal cortex – mineralcorticoids and adrenal androgens. Abnormalities of the adrenocortical secretion.

Lecture № 9 - 2 acad. hours

Physiology of reproduction. Male reproductive system. Spermatogenesis. Male sex hormones (androgens) – types, physiologic effects and control of secretion. Erection and ejaculation.

Physiology of reproduction. Female reproductive system. Ovogenesis. Female sex hormones (estradiol and progesterone) – types, physiologic effects and control of secretion. Regulation of the female monthly rhythm. Pregnancy and lactation. Tests for early pregnancy.

Lecture № 10 - 2 acad. hours

Endocrine functions of the pancreas – type of hormones, physiologic effects and control of secretion. Diseases of the endocrine pancreas.

Calcium and phosphate homeostasis. Parathyroid hormone, calcitonin, vitamin D - physiologic effects and control of secretion. Impairment of the calcium and phosphate homeostasis.

Lecture № 11 - 2 acad. hours

Physiology of skeletal muscles – functional morphology, mechanism and energy of muscle contraction. Types of muscle contractions. Types of muscle fibers. Muscle work and muscle fatigue. Electromyography.

Lecture № 12 - 2 acad. hours

Functional morphology of smooth muscles. Excitation, electrophysiologic characteristics and mechanism of contraction of smooth muscles.

Lecture № 13 - 2 acad. hours

Physiology of respiration. Lung ventilation. Functional organization of the airways, lungs and thoracic basket. Mechanics of breathing. Intrapleural and intrathoracic pressure. Role of the surfactant. Reflexes – cough and sneeze.

Rate and rhythm of breathing. Pulmonary and alveolar ventilation. Elastic and non-elastic resistance to breathing. Air flow during breathing. Work of breathing.

Static lung volumes and capacities and their functional concern. Anatomic and physiologic dead space. Estimation of the external respiration.

Lecture № 14 - 2 acad. hours

Physical basis of gas exchange. Solubility, diffusion coefficient and diffusion capacity of the gases. Composition of the gases in air, lungs and blood. Diffusion of gases across the alveolocapillary membrane. Ventilation-perfusion ratio.

Transport of O₂ in the blood. Oxyhemoglobin dissociation curves. Oxygen exchange in lungs and tissues.

Transport of CO₂ in the blood. Carbon dioxide exchange in lungs and tissues.

Lecture № 15 - 2 acad. hours

Control of respiration. Respiratory center and rhythm of breathing. Chemical control of respiration. Reflex control of respiration. Effects of the cerebral cortex on the respiratory functions.

Aviation, high altitude and space physiology, physiology of deep-sea diving.

Lecture № 16 - 3 acad. hours

Physical basis of gas exchange. Solubility, diffusion coefficient and diffusion capacity of the gases. Composition of the gases in air, lungs and blood. Diffusion of gases across the alveolocapillary membrane. Ventilation-perfusion ratio.

Transport of O₂ in the blood. Oxyhemoglobin dissociation curves. Oxygen exchange in lungs and tissues.

Transport of CO₂ in the blood. Carbon dioxide exchange in lungs and tissues.

Control of respiration. Respiratory center and rhythm of breathing. Chemical control of respiration. Reflex control of respiration. Effects of the cerebral cortex on the respiratory functions.

Lecture № 17 - 3 acad. hours

Cardiovascular system. Systemic and pulmonary circulation. Heart as an organ –functional morphology of the pericardium, endocardium and myocardium. Nerve supply. Myocardial blood supply.

Functional morphology and physiological characteristics of the excitatory and conductive system of the heart. Automaticity. Cardiac rhythm. Abnormalities of conductivity.

Physiological characteristics of the working myocardium. Excitation and contraction. Refractory periods. Extrasystoles, flutter and fibrillation. Myocardial metabolism.

Dynamics of the cardiac contractions – cardiac cycle. States of the valvular apparatus during different phases of the cardiac cycle.

Lecture № 18 - 3 acad. hours

Electrical events during cardiac performance. Origin, registration and evaluation of the electrocardiogram.

Functions of the heart valves of the heart. Heart sounds. Methods of examination. Stenosis and insufficiency of the valves. Correlation between a synchronous phonocardiographic and electrocardiographic record.

Heart rate. Stroke volume and cardiac output and their changes during different physiological conditions.

Control of the cardiac performance – intrinsic (self-control). Energetics of the heart pumping.

Extracardial neural regulation of the cardiac performance – characteristics of the sympathetic and parasympathetic effects. Humoral factors affecting cardiac performance.

Lecture № 19 - 3 acad. hours

Functional characteristics of blood vessels. Hemodynamic principles – characteristics of the vessels and the blood. Hemodynamic indices. Volume and linear velocity of the blood flow through the various parts of vascular system and factors determining them.

Blood pressure in the various parts of the cardiovascular system. Arterial blood pressure – methods of measurements and normal values. Factors determining the blood pressure levels.

Lecture № 20 - 3 acad. hours

Physiology of the microcirculation. Functional organization of the microcirculation unit.

Organ-related peculiarities of the capillaries. Control of the microcirculation.

Lecture № 21 - 3 acad. hours

Vascular tone. Basal tone of blood vessels. Local, neural and humoral regulatory mechanisms of the vascular tone.

Control of the circulation. Characteristic and localization of the receptors. Vasomotor center. Supramedullary control of the circulation.

Control of the arterial blood pressure. Mechanisms of the quick short-term, quick ongoing, and long-term regulation.

Lecture № 22 - 3 acad. hours

Gastrointestinal system – functions. Digestion in the Mouth: processes of mastication, secretion, enzyme destruction and absorption. Swallowing – phases and regulation.

Motor functions of the Stomach – hunger contractions, storage function, mixing and propulsion of food. Emptying of the Stomach. Control of the Stomach motor activity. Vomiting.

Secretion, enzyme destruction and absorption in the Stomach. Gastric juice: composition, mechanism of secretion and functions. Gastric secretion and its control: cephalic, gastric and intestinal phases. Protective potentialities of the gastric barrier.

Lecture № 23 - 3 acad. hours

Small Intestine – motor activity: type of movements and regulation; secretion, digestion and absorption.

Colon – type of movements and their regulation; secretion, digestion and absorption. Defecation.

Pancreatic juice – composition and functions. Control of the pancreatic secretion.
Processes of formation and secretion of Bile. Composition and functions of the Bile. Regulation of the Bile secretion. Functions of the Liver.

Lecture № 24 - 3 acad. hours

Digestion and absorption of Proteins, Fats and Carbohydrates in the Gastrointestinal Tract. Absorption of Salts, Water and Vitamins.

Metabolism of the Nutrients in the organism. Metabolism of Carbohydrates: the level and regulation of Glucose in the circulating blood. Metabolism of Proteins and its control. Metabolism of Lipids and its control.

Energy metabolism in the organism. Energy values of the Nutrients. The Energy Equivalent of Oxygen. The measurement of the Metabolic Rate: Direct and Indirect Calorimetry. The Basal Metabolic Rate and the Daily Energy Requirements for different physiologic states.

Lecture № 25 - 3 acad. hours

Excretion functions of the organism and systems, accomplishing them. The Kidneys – functional structure. Peculiarities of the kidneys blood supply and innervation. Mechanism and control of glomerular filtration. Methods of glomerular function assesment.

Functions of renal tubules. Transport processes within the different parts of the tubules. Mechanisms for excretion of a dilute urine and a concentrated urine. Renal excretion.

Renal clearance tests. Volume of the urine and its components. Micturition. Endocrine and metabolic functions of the kidneys. Control of the renal functions.

Lecture № 26 - 3 acad. hours

Temperature regulation. Body temperature and isothermia. Mechanisms of heat production and heat loss. Neurophysiologic bases of temperature regulation. Hyperthermia and hypothermia. Acclimatization. Regulation of body temperature within exerscise.

Lecture № 27 - 3 acad. hours

Water-electrolyte balance of the organism. Body fluids and electrolytes. Dynamics of body fluids volume and osmolality. Control of Water-Salts homeostasis. Thirst – physiologic mechanisms.

Acid-Base Balance of the organism. Buffer systems of the body fluids. Respiratory regulation of pH. Renal regulation of pH. Abnormalities in Acid-Base Balance.

Lecture № 28 - 3 acad. hours

Sensory systems. Functional morphology. General principles of sensory systems information coding and processing. Sensory systems adaptation.

General sensation. Somatosensory system – organization and modalities. Mechanisms of thermo- and mechanoreception. Pain sensation. Itch.

Lecture № 29 - 3 acad. hours

States of brain activity and sleep. The role of the different neuronal structures in the maintenance of the brain activity. Physiologic changes within sleep. Electroencephalography.

Lecture № 30 - 3 acad. hours

Higher nerve activity – types and characteristics. Learning and memory: types and physiologic bases. Primary and secondary signalling systems. Communicative capabilities of man. Reading and writing speech. Auditory and visual gnosis.

PRACTICES

Laboratory exercise № 1 - 4 acad. hours

General physiology of excitable systems. The living organism. Homeostasis. Irritability and excitability of living organism. 1. Elaboration of a frog neuromuscular preparation. 2. Galvani's experiments. 3. Mateucci's experiment. 4. Types of stimuli. 5. Determination of the threshold of the stimulus (both direct and indirect) as applied to a muscle.

Laboratory exercise № 2 - 4 acad. hours

General physiology of excitable systems. Excitability and Excitation. Physiology of the Nerve Cells and Peripheral Nerves. Functions of the Nervous System. 1. Registration of response gradation relative to stimulus strength or frequency. 2. The effect of low temperature on the excitability of a frog sciatic muscle. 3. Electroneurogram (ENG) of a frog mixed nerve (the sciatic nerve). 4. Determining the conduction velocity of different nerve fibres of the sciatic nerve. 5. Relatedness between stimulus intensity (I) and duration (t), and excitation (the Horveg-Weiss curve).

Laboratory exercise № 3 - 4 acad. hours

General physiology of excitable systems. Synapses. Reflex activity of the nervous system. Unconditioned reflexes. 1. Analysis of the reflex arc. 2. Measuring reflex time (after Turk). 3. Irradiation of excitation in the CNS. 4. The effect of Strychnine on the CNS. 5. Effect of narcosis on reflex activity.

Laboratory exercise № 4 - 4 acad. hours

General physiology of excitable systems. Nerve centres. Unconditioned reflexes. Clinically important reflexes. 1. Reflexes of a spinal frog. 2. Investigating of frog segmental reflexes. 3. Clinically important reflexes. 4. Examination of the papillary reflex to light, convergence and accommodation.

Laboratory exercise № 5 - 4 acad. hours

General physiology of excitable systems. Conditioned reflexes. The electroencephalography (EEG). 1. Conditioned reflexes in animals. 2. Conditioned reflexes in man. 3. The EEG – a method for registering summated bioelectric activity.

Laboratory exercise № 6 - 4 acad. hours

General physiology of excitable tissues. Review of 'General Physiology of Excitable Systems'.

Laboratory exercise № 7 - 4 acad. hours

Blood. Functions and Properties of Blood. Blood Constituents. Blood Types. 1. Taking blood. 2. Haematocrit determination. 3. The erythrocyte sedimentation rate (ESR) by the Westergren method. 4. Determination of blood types.

Laboratory exercise № 8 - 4 acad. hours

Blood. Red Blood Cells (RBC, Erythrocytes). Hemoglobin. 1. The chamber method for counting of erythrocytes. 2. Measurement of haemoglobin concentration of the blood. 3. Measurement of osmotic resistance of erythrocytes. 4. Measurement of erythrocyte indices.

Laboratory exercise № 9 - 4 acad. hours

Blood. White Blood Cells (WBC, Leucocytes). The Lymphatic System. 1. Chamber method for counting of leukocytes. 2. WBC differential count. 3. Platelet count. 4. Electronic methods for counting formed elements.

Laboratory exercise № 10 - 4 acad. hours

Blood. Haemostasis and coagulation. Review questions on Blood. Colloquium on the Chapter “Blood”. 1. Bleeding time determination (Duke’s method). 2. Thrombin (thromboplastin) time determination (Quick’s method).

Laboratory exercise № 11 - 4 acad. hours

The Endocrine System. Hormonal Regulation. 1. Examination of the thyroid gland. 2. Methods for examining the adrenal gland. 3. Methods for examining the pancreas. 4. Hypoglycaemic shock in rabbit.

Laboratory exercise № 12 - 4 acad. hours

The Endocrine System. Hormonal Regulation (continued) – Sex Hormones. Revision of ‘Endocrine Physiology’. 1. The Galli-Mainini Test. 2 Immunologic pregnancy tests.

Laboratory exercise № 13 - 4 acad. hours

Sensory Systems. 1. Visual acuity. 2. Perimetry. 3. Color vision test. 4. Audiometry. 5. Acoumetry. 6. Aesthesiometry. 7. Skin sensitivity. 8. Kinaesthetic sensitivity.

Laboratory exercise № 14 - 4 acad. hours

The Locomotor System. Skeletal muscles. (Seminar question N 14 of the Examination Synopsis). **Smooth muscles.** (Seminar Question N 25 of the Examination Synopsis). **Practical Tasks:** 1. Recording of a single muscle contraction. 2. Recording of incomplete and complete tetanus. 3. Measurement of the absolute and specific strength of a frog muscle. 4. The effect of loading on amplitude and performance. 5. Myoneural transmission- the Claude Bernard test. 6. Recording of the muscle fatigue curve from an isolated frog muscle. 7. Measurement of muscle strength.

Laboratory exercise № 15 - 4 acad. hours

The Locomotor System. Skeletal Muscles (part II). Smooth Muscles. 1. Recording of the fatigue curve of an isolated frog muscle. 2. Measurement of muscle strength. 3. Ergography. 4. Demonstration of smooth muscle contractions using a section of the small intestine.

Laboratory exercise № 16 - 4 acad. hours

Respiratory system. External respiration. Lung volumes and lungs capacities. 1. Donders’ model. 2. Physical examination of lungs. 3. Measurement of lung volumes and capacities.

Laboratory exercise № 17 - 4 acad. hours

Respiratory system. Exchange and transport of oxygen and carbon dioxide. 1. Calculation of the partial pressure of oxygen in the air. 2. Calculation of the partial pressure of O₂ in alveolar air. 3. Calculation of the chemically bound O₂ in the blood. 4. Calculation of the Ventilation/Perfusion ratio in the different parts of the lungs in straight position at rest. 5. Calculation of the coefficient of utilization (UC) of O₂ in the tissues. 6. Measurement of O₂ consumption and CO₂ release.

Laboratory exercise № 18 - 4 acad. hours

Respiratory system. Regulation of Respiration. Review of ‘Respiratory Physiology’.

Laboratory exercise № 19 - 4 acad. hours

The Cardiovascular System. The Heart. Physiological Features of the Cardiac Conduction System and of the Working Myocardium. 1. Mechanogram of a frog heart. 2. Effect of temperature on a frog venous sinus. 3. Stannius' ligatures. 4. Recording of ventricular extrasystoles.

Laboratory exercise № 20 - 4 acad. hours

Cardiovascular system. Cardiac Cycle. Electrical Phenomena Accompanying Cardiac Activity. Functions of the Heart Valves. 1. Auscultation of heart sounds. Recording and analysis of the ECG. 3. Registrasion and analysis of ST-segment. 4. Phonocardiography.

Laboratory exercise № 21 - 4 acad. hours

Cardiovascular system. Stroke Volume and Cardiac Output. Regulation of Cardiac Function. 1. Stroke Volume and Cardiac Output. Regulation of Cardiac Function. 2. Calculation of the stroke volume of the heart by Starr's formula. 3. Determining the cardiac output by the Fick method using data in a table. 4. Effects of vagal stimulation, epinephrine, acetylcholine and atropine on the cardiac activity of a warm-blooded test animal.

Laboratory exercise № 22 - 4 acad. hours

Cardiovascular system. Blood Vessels. Hemodynamic Indices. Arterial Pulse. Capillary Physiology. 1. Defying the characteristics of arterial pulse. 2. Sphygmography. Measurement of pulse wave velocity of conduction. 3. Plethysmography. 4. Capilliaroscopy. 5. Investigation of frogs' tongue capillaries.

Laboratory exercise № 23 - 4 acad. hours

Cardiovascular system. Regulation of vascular tone. Arterial blood pressure and its control. 1. Claude-Bernard's experiment. 2. Measuring the arterial blood pressure with the Riva-Rocci device by the Korotkoff method. 3. Neural and humoral effects on the blood pressure of a warm-blooded animal.

Laboratory exercise № 24 - 4 acad. hours

Cardiovascular system. Review of 'Cardiovascular Physiology'.

Laboratory exercise № 25 - 4 acad. hours

The Digestive System. 1. Demonstration of the motor activity of a frog's small intestine in situ.. 2. Demonstration of movements of the small intestine of a warm-blooded animal in vitro. 3. Effect of bile on the filtration speed of vegetable oil (cooking oil). 4. Effect of bile on the sedimentation of sulphur powder.

Laboratory exercise № 26 - 4 acad. hours

Digestion, Energy Metabolism and Nutrition. 1. Methods of determining the basal metabolic rate. 2. Measurement of loading providing maximal fat catabolism using indirect calorimetry. Principles of rational nutrition. Composing a meal plan.

Laboratory exercise № 27 - 4 acad. hours

The Excretory System and Water/Electrolyte Balance of the Body. 1. Effect of ADH on the diuresis of white mice. 2. Determining the effective filtration pressure (EFP) 3. Calculation of the clearance and transport maximum (Tm).

Laboratory exercise № 28 - 4 acad. hours

The Gastrointestinal System, Energy Metabolism and Nutrition. The Renal excretory System, Water-electrolyte and Acid-base Balance. (Review)

Laboratory exercise № 29 - 4 acad. hours

Body Changes during Physical Exercise. Assessment of the Body Condition by Function Tests.

1. Gas exchange changes during load testing. Spiroergometry. 2. Combined functional test of the cardiovascular system 3. Harvard step test. 4. Evaluation of the physical aerobic work capacity by the Sjostrand – PWC₁₇₀ test.

Laboratory exercise № 30 - 4 acad. hours

Higher Nervous Activity. 1. Tachistoscopia. 2. Determination of types of higher nervous activity by the Sharankov test. 3. Bay Miller's visual memory test. 4. Raven's test.

BIBLIOGRAPHY

Ganong W, Medical Physiology, 17th ed, 1996; A. C. Guyton and J. E. Hall. Textbook of Medical Physiology, 13th ed. 2016; W. Boron and E. Boulpaep. Medical Physiology, Elsevier 3th ed., 2017.

CONSPECTUS

1. Organization of the cell. Physical structure of the cell. Functional systems of the cell. Properties of the cell membrane and junctions between the cells. Intercellular signalization. Transport of substances through the cell membrane.
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23. Epiphysis, thymus and non-endocrine organs with endocrine functions. Tissue hormones – types, physiologic effects and control of secretion.
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26. Physiology of the blood. Functions of the blood. Composition and volume of the circulating blood – regulation of the volume. Blood plasma – composition and its regulation. Hematocrit. Blood reservoirs.
27. Erythrocytes. Count and functions. Erythrocyte sedimentation rate. Hemoglobin. Erythrocyte indices. Iron metabolism. Hemolysis. Control of erythropoiesis and erythrocyte count in the bloodstream.
28. Blood types. Physiological and clinical significance. ABO and Rh blood type systems. Methods of analysis. Principles of blood transfusion.
29. Leukocytes. Count and functions of the different leukocyte types. Control of leukopoiesis and leukocyte count in the bloodstream. Immunity.
30. Hemostasis and hemocoagulation. Vascular-thrombocyte and coagulation hemostasis. Fibrinolysis and anticoagulational mechanisms. Control of hemostasis.

31. Physiology of lymphatic system. Formation, composition and functions of lymph. Physiological role of the spleen.
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67. Excretion functions of the organism and systems, accomplishing them. The Kidneys – functional structure. Peculiarities of the kidneys blood supply and innervation. Mechanism and control of glomerular filtration. Methods of glomerular function assesment.
68. Functions of renal tubules. Transport processes within the different parts of the tubules. Mechanisms for excretion of a dilute urine and a concentrated urine. Renal excretion.
69. Renal clearance tests. Volume of the urine and its components. Micturition. Endocrine and metabolic functions of the kidneys. Control of the renal functions.

70. Water-electrolyte balance of the organism. Body fluids and electrolytes. Dynamics of body fluids volume and osmolality. Control of Water-Salts homeostasis. Thirst – physiologic mechanisms.
71. Acid-Base Balance of the organism. Buffer systems of the body fluids. Respiratory regulation of pH. Renal regulation of pH. Abnormalities in Acid-Base Balance.
72. Sensory systems. Functional morphology. General principles of sensory systems information coding and processing. Sensory systems adaptation.
73. General sensation. Somatosensory system – organization and modalities. Mechanisms of thermo- and mechanoreception. Pain sensation. Itch.
74. Vision sensory system. Functional morphology of the eye – the optics of the eye; the mechanism of accommodation; errors of refraction. The pupillary reflex. Eyes movements and their control. Protective appliances of the eyes.
75. Detection, transmission and processing of the information in the retina. Central neurophysiology of vision. Light and dark adaptation. Visual acuity. Color vision.
76. The sense of hearing. Functional morphology of the external, middle and inner ear. Processing of the sound signal. Central auditory mechanisms. Vestibular apparatus. Central mechanisms of the maintenance of equilibrium. Vestibular reflexes.
77. Physiology of the chemical senses - taste and smell. Peripheral and central mechanisms of taste and smell sensations.
78. General characteristics of motor control. Muscle receptors – functions of the muscle spindles and tendon receptors. Spinal cord control of motor activity. The spinal cord reflexes. Motor control from higher levels of the brain.
79. States of brain activity and sleep. The role of the different neuronal structures in the maintenance of the brain activity. Physiologic changes within sleep. Electroencephalography.
80. Higher nerve activity – types and characteristics. Learning and memory: types and physiologic bases. Primary and secondary signalling systems. Communicative capabilities of man. Reading and writing speech. Auditory and visual gnosis.

AUTHOR OF THE PROGRAMME:

**Prof. Nikolay Boyadjiev, MD,PhD,
Head of the Department of Physiology**

16.05.2022

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
SOCIAL MEDICINE
WITH MEDICAL ETHICS – PART I

Approved by the Department Council on 01.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

Social medicine with medical ethics – Part I

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
								^{2nd} year
		Total	Lectures	Practices	ECTS			III
Social medicine with medical ethics – Part I	III	60	30	30	2.0	3.0	5.0	2/2

DISCIPLINE:

“Social medicine and medical ethics – Part I”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master degree

FORMS OF TRAINING:

Lectures, Practices, Self-training

YEAR OF TRAINING:

II year

DURATION OF TRAINING:

One semester

ACADEMIC HOURS:

30-hour lecture course, 30-hour practice course

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, discussions, case studies, problem-based education, role plays, work in small groups, educational films

FORMS OF EVALUATION:

Semester monitoring: section control reviews; oral and written examination

Final exam: entry test, written and oral examination, discussion of ethical cases, solution of statistical problems.

EVALUATION CRITERIA:

The final grade is formed by a final semester exam, including an entry test, a written examination and an oral examination.

ASPECTS OF EVALUATION CRITERIA:

Participation in discussions, answering questions, colloquium results, discussion of cases, solution of statistical problems

SEMESTER EXAM:

Yes /entry test, written and oral examination/

STATE EXAM:

Yes/ Social medicine/

LECTURER:

Habilitated professors from the Department of Social Medicine and Public Health

DEPARTMENT:

Department of Social Medicine and Public Health

ANNOTATION

The compulsory course in Social Medicine with Medical Ethics – Part I presents basic theoretical concepts and practical tools of medical ethics and medical statistics. The course provides an introduction in:

- Basic ethical principles in medical practice; patients' rights and responsibilities. Different and complex ethical scenarios, contemporary topics related to transplantation, euthanasia, experimental medicine and human reproduction are included in order to obtain practical skills and knowledge.
- Basic introduction in medical statistics; methods for collection, aggregation and presentation of public health data. Exploratory data analysis, statistical inference, hypothesis testing.

The aim is to develop an ethical approach in students in different situations, as well as to acquire practical statistical skills.

BASIC AIMS OF THE DISCIPLINE

1. Introduction in various types of ethical issues.
2. Introduction in Bulgarian and international documents, related to ethical behavior, patient rights, physician's behavior towards terminally ill patients, experimental research, etc.
3. Case studies related to ethical standards in medicine.
4. Introduction and application of basic approaches and tools for collection, aggregation and presentation of empirical data.
5. Introduction and application of basic statistical tools for analysis of empirical frequency distributions.
6. Introduction and application of basic statistical tools for hypothesis testing.
7. Introduction and application of basic statistical tools for analysis of correlation and regression.

EXPECTED RESULTS

Students are expected to acquire professional competencies regarding ethical and deontological problems in the medical practice, as well as basic skills for statistical collection, aggregation, presentation and interpretation of data.

Lectures

LECTURE № 1 – 2 hours

ORIGIN AND ESSENCE OF MEDICAL ETHICS

1. The essence of medical ethics
2. Ethics from a philosophical point of view and its relationship with other sciences
3. Legal and moral norms in Ancient times, the Middle ages, the Renaissance, the Twentieth century
4. Basic concepts and ethical values of the Twentieth century
5. New landmarks of American bioethics
6. Development of ethics in Bulgaria

LECTURE № 2 – 2 hours

BASIC CONCEPTS. PHYSICIAN-PATIENT RELATIONSHIP

1. Informed consent – definition, elements
2. Autonomy of the patient
3. Confidentiality
4. Levels of breaching
5. Documents regulating the respect of confidentiality
6. Models of physician-patient relationship

LECTURE № 3– 2 hours

ETHICAL PRINCIPLES. CHRONICALLY ILL PATIENT – CHALLENGES AND DECISIONS

1. Ethical principles and norms
2. Historical development of the moral principles
3. Practical application of the moral principles
4. Coping approaches with chronically ill patient

LECTURE №4 – 2 hours

BEHAVIOR OF THE PHYSICIAN TO TERMINALLY ILL PATIENT. PALLIATIVE CARE. PROBLEM WITH DEATH. BREAKING BAD NEWS. EUTHANASIA

5. Terminally ill patients. Palliative care, hospice – definition
6. Documents regulating the palliative care
7. Breaking bad news – the six-step protocol of Robert Buckman
8. Euthanasia – historical development of the concept, types, arguments pros and contra

LECTURE № 5 – 2 hours

PATIENT'S RIGHTS. ETHICS IN EXPERIMENTAL STUDIES

1. Types of patient's rights – general and special
2. Documents concerning patient's rights
3. The European charter for patient's rights
4. Types of experimental studies – with animals and humans
5. Documents regulating the participation in experimental studies

LECTURE № 6 – 2 hours

ETHICAL PROBLEMS OF TRANSPLANTATION. FETAL TISSUES

1. Transplantation – historical development
2. Legal requirements for transplantation
3. Ethical problems in the utilization of the fetal tissues

LECTURE № 7 – 2 hours

ETHICAL PROBLEMS OF THE HUMAN REPRODUCTION

1. Contraception and abortion
2. Ethical problems in new reproductive technologies – in-vitro fertilization
3. Ethical problems of the cloning – types of cloning

LECTURE № 8 – 2 hours

EDUCATIONAL MOVIE FOR EUTHANASIA

1. Discussion after the movie

LECTURE № 9 – 2 hours

INTRODUCTION TO MEDICAL STATISTICS (PART 1)

1. Subject of medical statistics

2. Population and sample
3. Systematic and random error
4. Random and representative sample
5. Sampling techniques

LECTURE № 10 – 2 hours

INTRODUCTION TO MEDICAL STATISTICS (PART 2)

1. Research plan and programme
2. Variables and scales of measurement
3. Frequency distribution
4. Graphical summary of frequency distributions

LECTURE № 11 – 2 hours

DESCRIPTIVE AND INFERENTIAL STATISTICS (PART 1)

1. Measures of central tendency – advantages and disadvantages
2. Measures of spread – advantages and disadvantages
3. Normal distribution
4. 3-sigma rule
5. Skewness and kurtosis
6. Left- and right-skewed distribution

LECTURE № 12 – 2 hours

DESCRIPTIVE AND INFERENTIAL STATISTICS (PART 2)

1. Descriptive and inferential statistics
2. Estimation of population parameters
3. Central limit theorem
4. Standard error
5. Confidence interval
6. Sample size calculation

LECTURE № 13 – 2 hours

PARAMETRIC TESTS

1. Null, alternative and working hypothesis
2. P-value

3. Level of significance and power
4. Type I and type II errors
5. Selection of hypothesis test
6. Parametric tests

LECTURE № 14 – 2 hours

NON-PARAMETRIC TESTS

1. Normality check
2. Kolmogorov-Smirnov test
3. Non-parametric tests
4. Rank tests
5. Pearson's chi-squared test
6. Fisher's exact test

LECTURE № 15 – 2 hours

CORRELATION AND REGRESSION

1. Correlation
2. Correlation analysis
3. Coefficient of correlation and coefficient of determination
4. Regression analysis
5. Types of regression models

Practices

PRACTICE № 1 – 2 hours

INFORMED CONSENT. CONFIDENTIALITY

1. Review of documents related to confidentiality and informed consent
2. Review of cases from the practice

PRACTICE № 2 – 2 hours

MORAL ASPECTS OF PHYSICIAN–PATIENT RELATIONSHIP

1. Models of physician–patient relationship
2. Psychological aspects of the physician–patient relationship
3. Circumstances that arise conflict situations in physician–patient relationship
4. Review of cases from the practice

PRACTICE № 3 – 2 hours

MORAL CRITERIA IN THE APPROACH TO THE CHRONICALLY ILL PATIENTS AND THEIR FAMILIES

1. Modeling and structure of the patient's adaptive responses
2. Behavior to the terminally ill patients
3. Chronically ill patients in society and family

PRACTICE № 4 – 2 hours

THE PHYSICIAN AND TERMINALLY ILL PATIENT. EUTHANASIA

1. Euthanasia – contemporary views
2. Review of cases from the practice

PRACTICE № 5 – 2 hours

TRANSPLANTATION

1. Types of deaths
2. Types of transplantations

3. Documents regulating the transplantation

PRACTICE № 6 – 2 hours

ETHICAL AND DEONTOLOGICAL ASPECTS OF EXPERIMENTAL STUDIES

1. Requirements for experiments with animals and people
2. Helsinki Declaration

PRACTICE № 7 – 2 hours

ETHICAL CODES

1. Basic aspects of the Code of professional ethics of BPU
2. Seminar

PRACTICE № 8 – 2 hours

DIRECT STANDARDISATION

1. Subject of medical statistics
2. Absolute and relative indicators
3. Intensive and extensive indicators
4. Direct standardisation

PRACTICE № 9 – 2 hours

CONFIDENCE INTERVAL FOR POPULATION PARAMETERS

1. Data grouping methods
2. Confidence interval for population mean
3. Dichotomous variables
4. Confidence interval for population proportion

PRACTICE № 10 – 2 hours

STUDENT'S T-TEST FOR COMPARISON OF 2 INDEPENDENT SAMPLES

1. Null, alternative and working hypothesis
2. P-value and significance level
3. Parametric tests
4. Student's t-test for comparison of 2 independent samples

PRACTICE № 11 – 2 hours

PEARSON'S CHI-SQUARED TEST

1. Non-parametric tests
2. Pearson's chi-squared test
3. Fisher's exact test
4. Association and causation

PRACTICE № 12 – 2 hours

CORRELATION ANALYSIS

1. Correlation
2. Correlation analysis
3. Correlation coefficient for quantitative variables
4. Correlation coefficient for qualitative variables

PRACTICE № 13 – 2 hours

REGRESSION ANALYSIS

1. Regression analysis
2. Types of regression models
3. Simple linear regression
4. Least squares method

PRACTICE № 14 – 2 hours

MEDICAL STATISTICS COLLOQUIUM

PRACTICE № 15 – 2 hours

SEMINAR PRACTICE

Bibliography

1. Lecture course in medical ethics.
2. Lecture course in medical statistics.
3. Motulsky H. Essential biostatistics: a nonmathematical approach. Oxford University Press; 2016.
4. Bowers D. Medical statistics from scratch: an introduction for health professionals. Wiley; 2020.
5. Bioethics topics – University of Washington School of Medicine, 2010, <https://depts.washington.edu/bioethx/topics/>.

Conspectus

1. Bioethics introduction – definition, history, principles
2. Informed consent
3. Parental decision making. Maternal fetal conflict
4. Advance care planning. Advance directives
5. Confidentiality
6. Cross-cultural issues and diverse beliefs with an emphasis in pediatrics
7. Mistakes. Relationship between law and medical ethics
8. Truth-telling and withholding information. Breaking bad news
9. End of life issues. Euthanasia
10. Spirituality and medicine. Futility
11. Models of physician – patient relationship
12. Patients' rights. Professionalism
13. Moral aspects of human reproduction
14. Moral aspects of transplantation
15. Definition of biostatistics. Research programme and plan. Types of variables and scales of measurement

16. Population and sample. Random sample. Representative sample. Random and systematic error. Sampling techniques
17. Direct standardisation
18. Frequency distribution. Data grouping methods. Graphical summaries
19. Measures of central tendency – advantages and disadvantages. Measures of spread – advantages and disadvantages
20. Normal distribution. 3-sigma rule. Central limit theorem
21. Skewness and kurtosis. Left- and right-skewed distributions
22. Normality tests. Kolmogorov-Smirnov test. Coefficient of variation
23. Descriptive and inferential statistics. Estimation of population parameters. Confidence interval. Standard error. Sample size calculation
24. Null, alternative and working hypothesis. P-value. Level of significance. Power. Type I and II errors
25. Parametric tests. Selection of hypothesis test. Student's t-test
26. Non-parametric tests. Rank tests. Pearson's chi-squared test. Fisher's exact test
27. Correlation. Correlation analysis. Correlation coefficient. Coefficient of determination
28. Regression analysis. Types of regression models
29. Simple linear regression. Least squares method

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
SOCIAL MEDICINE
WITH MEDICAL ETHICS – PART II

Approved by the Department Council on 01.06.2022
Confirmed by the Faculty Council – Protocol №6/15.06.2022

Social medicine with medical ethics part II

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
								^{3rd} year
		Total	Lectures	Practices	ECTS			VI
Social medicine with medical ethics – Part II	VI	60	30	30	2.0	1.0	3.0	2/2

DISCIPLINE:

“Social medicine with medical ethics – part II”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master degree

FORMS OF TRAINING:

Lectures, Practices, Self-training

YEAR OF TRAINING:

III year

DURATION OF TRAINING:

One semester

ACADEMIC HOURS:

30-hour lecture course, 30-hour practice course

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, discussions, case studies, problem-based education, role plays, work in small groups, educational films

FORMS OF EVALUATION:

Semester monitoring: section control reviews; oral and written examination

Final examination: entry test, written and oral examination, discussion of case studies.

EVALUATION CRITERIA:

The grade is formed by a final semester exam, including an entry test, a written examination, and an oral examination.

ASPECTS OF EVALUATION CRITERIA:

Participating in discussions, answering a question, taking a test, colloquium result, case and problem solving

SEMESTER EXAM:

Yes /entry test, written and oral examination/

STATE EXAM:

Yes/ Social medicine/

LECTURER:

Habilitated professors from the Department of Social Medicine and Public Health

DEPARTMENT:

Department of Social Medicine and Public Health

ANNOTATION

The discipline "Social Medicine with Medical Ethics - Part II" provides an opportunity to gain knowledge and professional competences related to the three pillars of Public Health: medical demography, morbidity, and physical development. The course is presenting the problems connected with Public health level in Bulgaria and other world regions with an accent to Health promotion and prevention, epidemiology and health services management.

BASIC AIMS OF THE DISCIPLINE

- ✓ Introduction in demographic and incidence indices.
- ✓ Studying the incidence with temporary working incapacity and disability aiming to receive practical abilities for assessing patient's temporary and permanent working incapacity.

- ✓ Public health systems – structure, organization, financing.
- ✓ Studying the different types of epidemiological studies and their application in daily practice for proper planning of population needs.
- ✓ Studying the organization of children and mother's public health.
- ✓ Contemporary interpretation of "quality of life" and "disease burden".
- ✓ Introduction of current health legislation.
- ✓ Studying the new management strategies in healthcare.

EXPECTED RESULTS

Upon completion of the course, students are expected to have the following knowledge and skills:

- ✓ Analysis and assessment of public health, health promotion and prevention.
- ✓ Assessment of temporary and permanent working incapacity.
- ✓ Basic knowledge of contemporary public health legislation.
- ✓ Knowledge of different types of epidemiological studies and their application.
- ✓ Making appropriate evidence based medical and ethical decisions.
- ✓ Preparing and developing a social history in a clinical setting.

Lectures

LECTURE 1 - 2 hours

SOCIAL MEDICINE AS A SCIENCE

1. Origin and history of social medicine
2. Subject and objectives of social medicine
3. Structure and functions of social medicine
4. Methods of social medicine:
 - Historical methods
 - Epidemiological methods
 - Sociological methods
 - Statistical methods
 - Experimental methods

LECTURE 2 - 2 hours

DEMOGRAPHY. DEMOGRAPHIC PROCESSES AS A INDICATOR OF PUBLIC HEALTH

1. Demographic policy
2. State of the world population
3. Demographic trends to 2050
4. Population statics
5. Medico-social aspects of fertility and mortality
6. Life expectancy

LECTURE 3 - 2 hours

INDIVIDUAL, GROUP AND PUBLIC HEALTH

1. Demographic status
2. Morbidity, basic principles in the morbidity study
3. International classification of diseases (ICD)
4. Medico-social aspects of morbidity
5. Physical development
6. Indicators of physical development of the population
7. Health indicators

LECTURE 4 - 2 hours

EPIDEMIOLOGY. PRINCIPLES. CAUSATION. RISK FACTORS

1. Historical development
2. Definition and scope of epidemiology
3. Natural history of the disease
4. Risk factors, causality. Bradford Hill criteria
5. Disease and exposure assessment. Risk evaluation

LECTURE 5 - 2 hours

EPIDEMIOLOGICAL STUDIES. EPIDEMIOLOGY AND SOCIAL BURDEN OF CHRONIC DISEASES

1. Types of epidemiological studies:
 - Observational
 - Descriptive
 - Analytical
 - Experimental
 - Randomized controlled trials
 - Ecological
 - Population-based studies
2. Epidemiology and social burden of chronic disease. Medico-social aspects
3. Global burden of diseases

LECTURE 6 - 2 hours

HEALTH SYSTEMS. HEALTH POLICY AND HEALTH SYSTEM REFORM IN BULGARIA. NATIONAL HEALTH STRATEGY

1. Types of health systems
2. Background and priorities of health policy in Bulgaria
3. Structure of health policy:
 - Descriptive
 - Prescriptive
4. Trends and priorities of health policy in developed countries
5. Aims, objectives, and principles of the National Health Strategy

LECTURE 7 - 2 hours

INTERNATIONAL HEALTH COLLABORATION. HEALTH POLICY OF THE EUROPEAN UNION. WORLD HEALTH ORGANISATION

1. Background, principles, and forms of international health collaboration
2. Programs and priorities for international health collaboration

3. Health policy of the European Union
4. Structure, purpose, and functions of WHO

LECTURE 8 - 2 hours

BULGARIAN HEALTH LEGISLATION (PART 1)

1. Health Act:

- general principles.
- governing bodies of the national health care system
- health protection activities.
- medical care; health protection of specific population groups (mothers, children).
- mental health.
- non-conventional methods of beneficial influence on individual health.
- medical education, medical profession, medical science.
- administrative penalties

2. Medical establishment act

- general principles
- types of medical establishments
- medical establishments for nonstationary care
- medical establishments for stationery care
- structure and management of a medical establishments

LECTURE 9 - 2 hours

BULGARIAN HEALTH LEGISLATION (PART 2)

1. Health Insurance Act:

- general principles
- types of health insurance
- compulsory
- voluntary
- insured individuals, rights, and obligations
- objectives and activities of the NHIF
- compulsory health insurance medical care.

2. Pharmacy and medicines policy:

- conditions, procedure, and control of pharmaceutical products

3. Physicians' legal responsibilities

LECTURE 10 - 2 hours

PREVENTIVE MEDICINE. HEALTH PROMOTION. OCCUPATIONAL MEDICINE. EXPERT EVALUATION OF WORKING INCAPACITY

1. Prophylaxis types

2. Origin, content, and development of health promotion

3. Principles of health promotion

4. Health motivation

5. Health education - principles, methods, and practice

6. Expert evaluation of working capacity:

- types of working incapacity
- evaluation of temporary and permanent incapacity for work

LECTURE 11 - 2 hours

PRIMARY MEDICAL CARE. DISPENSARY METHOD OF OBSERVATIONS

1. Primary medical care structure

2. General practitioner functions and responsibilities

3. Principles of the dispensary method
4. Types of dispensary groups
5. Types of dispensaries

LECTURE 12 - 2 hours

MATERNAL AND CHILDREN'S HEALTH

1. Medical and social problems of childhood
2. Children's Health Programme of the NHIF
3. Medical and social problems of women and maternity
4. Maternal Health Programme of the NHIF

LECTURE 13 - 2 hours

HEALTH MANAGEMENT (PART 1)

1. Definition and principles
2. Health management levels
3. Management functions
4. Management of human resources:
 - organization culture
 - iceberg model
 - management style - types
 - Maslow's hierarchy of needs

LECTURE 14 - 2 hours

HEALTH MANAGEMENT (PART 2)

1. Management team:
 - role types
 - basic team characteristics
2. Financial resource management:
 - financial resource sources
3. Organizational change management:
 - types of organizational change
 - effects of organizational change
4. Marketing:
 - definition and principles
 - factors influencing consumer decision
 - types of marketing
 - marketing mix

LECTURE 15 - 2 hours

HEALTH ECONOMICS AND STRATEGIC PLANNING

1. Basic aspects of strategic planning in healthcare
 - types
 - strategic planning cycle
2. Planning Councils and Planning Bodies
3. Health economics - definition, subject

Practices

PRACTICE №1 - 2 hours

PUBLIC HEALTH INDICES. DEMOGRAPHICAL INDICES

1. Demography- definition and types
2. Population statics indicators
3. Population dynamics indicators
4. Impact of demographic indicators for population health evaluation
5. Birth and death registration documents
6. Assessment of the demographic status

PRACTICE №2 - 2 hours

PUBLIC HEALTH INDICES. INCIDENCE AND PREVALENCE.

1. Impact of morbidity assessment for public health
2. Data sources on incidence and prevalence
3. Methods for studying morbidity indicators
4. Comparative evaluation of methods for studying morbidity
5. Analysis of morbidity indicators

PRACTICE №3 - 2 hours

EPIDEMIOLOGY- BASIC PRINCIPLES

1. Definition and scope of epidemiology
2. Basic objectives of epidemiology
3. Natural history of disease
4. Incidence and prevalence assessment
5. Comparison of disease morbidity indicators:
 - Absolute comparison.
 - Relative comparison.
6. Risk assessment

PRACTICE № 4 - 2 hours

EPIDEMIOLOGICAL STUDIES

1. Epidemiology methods.
 - Descriptive epidemiology - hypothesis formulation
 - Analytical epidemiology - testing and evaluating of potential risk factors
 - Computation of risk indicators
 - experimental epidemiology - intervention studies
 - mathematical epidemiological modelling

PRACTICE № 5- - 2 hours

BULGARIAN HEALTH LEGISLATION (PART 1)

1. Health Care Act:
 - general principles
 - governing bodies of the national health care system
 - health protection activities
 - medical care; health protection of specific population groups (mothers, children)
 - mental health
 - non-conventional methods of beneficial influence on individual health

- medical education, medical profession, medical science
- administrative penalties
- 2. Medical establishment act
 - general principles
 - types of medical establishments
 - medical establishments for nonstationary care
 - medical establishments for stationery care
 - structure and management of a medical establishments

PRACTICE №6 2 hours
HEALTH INSURANCE

1. Health insurance act:
 - general principles
 - types of health insurance
 - compulsory health insurance
 - voluntary health insurance
 - insured patients' rights and obligations
2. Health insurance:
 - governance structure.
 - financial structure.
 - coverage of health care under Health insurance act.
 - good medical practice (GMP)

PRACTICE №7 2 hours
PRIMARY HEALTH CARE

1. Primary healthcare - principles
2. Medical establishment for primary health care
3. Population healthcare:
 - structure
 - processes
 - outcomes
4. Indicators
5. GP objectives and targets

PRACTICE №8 2 hours
STATIONARY HEALTHCARE

1. Stationary medical establishments-types
2. Hospitals - structure
3. Hospitals- functions
4. Hospital regime
5. Hospital data management.
6. Indicators and analysis of hospital workflow
7. Tasks and organization of the home hospital services

PRACTICE №9 2 hours
DISPENSARY ATTENDANCE OF THE POPULATION

1. Dispensary method-definition and principles
2. Phases of dispensary attendance
3. Prophylactic examinations- types
4. Statistical indicators and evaluation of dispensary workflow

5. Efficiency and quality of dispensing method

PRACTICE №10 2 hours

MATERNAL AND CHILDREN HEALTHCARE

1. NHIF Maternal and child health programme
 - pregnant women and mothers- rights
 - labour Code - maternity protection
 - maternal leave entitlement
 - cash benefits for pregnancy and childbirth
 - obstetric and gynecological risk groups
2. NHIF Child Health Program
 - functions and objectives of the personal physician serving children
 - dispensary monitoring of children at increased medical and social risk, children with chronic diseases
 - primary and secondary prophylaxis in childhood.

PRACTICE №11 - 2 hours

SOCIAL HISTORY

1. Elements of social history:
 - personality characteristics
 - family and home environment
 - work environment
 - social and household environment
 - health service and the patient contacts
2. Medico-social conclusions
3. Medico-social plan

PRACTICE №12 - 2 hours

SEMINAR: PUBLIC HEALTH AND HEALTHCARE RELATED TOPICS

PRACTICE №13 - 2 hours

EXPERT EVALUATION OF TEMPORARY AND PERMANENT INCAPACITY FOR WORK

1. Types of working incapacity
2. TEMC - Structure and functions
3. Determination of temporary incapacity for work: cases and examples
4. Sick leave certificate: Requirements
5. Indicators and analysis of temporary incapacity for work
6. Indicators and analysis of permanent incapacity for work. Disability groups

PRACTICE №14 - 2 hours

SOCIOLOGICAL METHODS IN MEDICINE (PART 1)

1. Inquiry method:
 - definition and principles.
 - survey types
 - questionnaires: requirements and development
 - advantages and disadvantages
2. Observation method:
 - definition and principles.

- types of the observation method
- advantages and disadvantages

PRACTICE №15 - 2 hours

SOCIOLOGICAL RESEARCH METHODS IN MEDICINE (PART 2)

1. Interview:

- definition and principles
- types of the method
- preliminary preparation requirements
- requirements during the interview
- advantages and disadvantages

2. Documentary method:

- definition and principles
- types of documents.
- basic structural elements of documentary analysis
- requirements
- advantages and disadvantages

Bibliography

1. Social medicine training approaches and models.- Plovdiv 2011, prof. Rumen Stefanov.
2. Lecture course in social medicine
3. Practical classes in social medicine
4. Boniata R, Beaglehole R. Basic epidemiology
5. Preston S. Demography

Conspectus

1. Social medicine - definition, history, objectives, tasks, and methods.
2. Social etiology, social prophylaxis, social therapy, and social rehabilitation of diseases – definition and objectives.
3. Basic aspects of human health. Social factors of health and disease – classification and mechanism of influence.
4. Individual health. Criteria of health and disease. Health classification.
5. Group and public health – definition, indicators.
6. Health determinants. Health indicators.
7. Medical demography – history, classification. Demographic transition model.
8. Demographic policy. Family planning.
9. Medical demography. Population dynamics. Migration: types and health aspects.
10. Medical demography. Population dynamics. Natural and vital events. Indicators.
11. Factors for birth and mortality. Causes of death. Birth and death registrations. Indicators.

12. Infant mortality. Causes, dynamics. Medico – social prophylaxis. Indicators.
13. Physical development and activity. Acceleration.
14. Risk factors, causality. Bradford Hill's criteria.
15. Measurement of diseases and exposure. Risk assessment.
16. Incidence and prevalence - definition. Methods of collecting morbidity statistics. Indicators. International classification of diseases (ICD).
17. Epidemiology – definition, tasks, methods. Natural history of the disease.
18. Epidemiological studies – observational studies.
19. Epidemiological studies – experimental studies.
20. Burden of disease – medico-social aspects.
21. Health policy – structure, factors, principles. Health in all policies.
22. Health care systems – types.
23. Health policy and reforms in Bulgaria. National health strategy.
24. Health legislation in Bulgaria. Health act.
25. Health legislation in Bulgaria. Health Care Establishments Act.
26. Health legislation in Bulgaria. Health Insurance Act.
27. International collaboration for Global Public Health. WHO. Programs and priorities.
28. European Union health policy. Programs and priorities.
29. Health culture and health behavior. Humanitarian Non-governmental organizations.
30. Health education - basic principles, methods and forms.
31. Methods of sociological investigation in medicine. Questionnaire. Observation.
32. Methods of sociological investigation in medicine. Interview. Documents review.
33. Social history of the patient. Family anamnesis.
34. Family health care. Physician's role in problem families (single parents, cohabitation, concubine, divorced parents, families with chronic or terminal patients).
35. Physician's role for family planning. Prophylaxis of congenital diseases, prenatal and postnatal screening.
36. Occupational medicine – definition, principles, organization in Bulgaria.
37. Expert evaluation of temporary incapacity for work. Indicators.
38. Expert evaluation of permanent incapacity for work. Territorial expert medical commission.
39. Primary health care. Outpatient care. General Practitioner's functions. Hospital at home.

40. Preventive medicine - definition and objectives. Primary, secondary, and tertiary prophylaxis. Health promotion.
41. Dispensary method - types and patient groups. Indicators.
42. Hospital care. Functions, structure, and organization. Indicators.
43. Hospitalization: reasons and types of hospitalization. Rights and obligations of hospitalized patients. Indicators.
44. Hospitalized patients. Quality of hospital health care. Patient and his family experience of the hospitalization. Patient discharge planning.
45. Medico-social issues of women and maternal care. Maternal Health Programme of National Health Insurance Fund.
46. Medico - social issues of childcare. Child health Programme of National Health Insurance Fund.
47. Medico - social issues of maternal and child health care – abortions, infertility, single mothers, unwanted child, children with chronic diseases, adopted children and medical treatment of children without physician consultation. Sexual education.
48. Medico – social issues of adolescence – acceleration problems, alcoholism, and drugs. Prevention of the most common diseases till 18 years of age.
49. Health management – basic principles. Management of human resources.
50. Health management. Governance. Management of financial resources. Management of the organizational change.
51. Public health planning, economy, and marketing.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
MICROBIOLOGY

Approved by the Department Council - Protocol №6/13.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

MICROBIOLOGY

Syllabus

Discipline	Final exam/ semester	Academic hours				Extracurricular load/activity	Total credits	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			II/III year	
Microbiology	V	135	60	75	4.5	3.5	8.0	IV	V
								2/3	2/2

DISCIPLINE:

Microbiology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: Mandatory

LEVEL OF EDUCATION:

Master's Degree /M/

FORMS OF TRAINING: Full-time study

YEAR OF TRAINING: 2nd and 3rd year

DURATION OF TRAINING: 1 year (2 semesters)

ACADEMIC HOURS:

60 hours of lectures, 75 hours of practical classes

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

- multimedia
- demonstration materials
- lectures
- handbooks
- electronic platforms (MS Office 365, Zoom, etc.)

FORMS OF EVALUATION: Semester exam

EVALUATION CRITERIA:

The final grade is multicomponent and includes the marks from the written final exam and the following components:

- average mark from ongoing control (colloquiums, tests)
- mark from the practical final exam
- mark from the oral final examination

If one of the components of the final grade is poor 2, then the final grade is necessarily poor 2.

ASPECTS OF EVALUATION CRITERIA:

For each component participating in the final evaluation, a significance coefficient (from 0 to 1) is determined, and the total sum of the coefficients must always be 1. The overall mark is obtained as the sum of the evaluation marks on a six-point scale from the various components multiplied by the respective coefficients of significance.

$Q \text{ final grade} = K1 \text{ Q grade from current control} + K2 \text{ Q grade from written exam} + K3 \text{ Q grade from the oral exam}$

K1 = 0.20; **K2** = 0.50; **K3** = 0.30

SEMESTER EXAM: Yes

STATE EXAM: No

LECTURER:

Habilitated lecturer from the Department of Medical Microbiology and Immunology
Prof. Mariana Murdjeva, MD, PhD, MHM

DEPARTMENT: Medical microbiology and Immunology “Prof. dr. Elissey Yanev”

ANNOTATION

The main goal of the Microbiology course is to thoroughly introduce medical students to the morphological and biological characteristics of microorganisms, the patterns of the development of the infectious process, the specific and nonspecific immune defence of the body, the diagnosis of infectious diseases, the main point and problems of antimicrobial chemotherapy, specific prevention and control of infection.

The goal is in accordance with:

- the scope and credits of the course (according to the ECTS system), as noted in the curriculum, available on the website of MU – Plovdiv;
- the qualification characteristics of the specialty;
- the educational degree (master’s degree).

The goal conforms with the place of the microbiology discipline in the specialty of Medicine in its importance and chronology in the curriculum. As a fundamental discipline, it predominantly serves the next stages of training.

BASIC AIMS OF THE DISCIPLINE

- Introduction to the morphology, physiology, and pathogenicity factors of microorganisms that play a role in human pathology;
- Studying the patterns of occurrence and course of the infectious process, the pathogenesis of infectious diseases and various forms of infection;
- Studying the mechanisms for the protection of macroorganisms - natural resistance and acquired immunity, as well as the principles of immunoprophylaxis and immunotherapy of infectious diseases;

- Antimicrobial chemotherapy - mastering the mechanisms of action of the main groups and types of antimicrobial agents, as well as the mechanisms for the development of bacterial resistance;
- Principles and basic methods for sterilization and disinfection;
- Mastering the microbiological diagnostics of infectious diseases; the structure and role of the microbiological laboratory for the etiological diagnosis of infectious diseases; skills for correct clinical interpretation and analysis of laboratory results;
- Learning the methods for microbiological, immunological, and molecular-biological diagnostics of the infectious diseases, as well as the correct interpretation of the obtained results;
- Studying the composition and role of the normal microflora of the human body;
- Studying the external environment's role in the spread of infectious agents and methods and means for microbiological control of the environment.

➤ **EXPECTED RESULTS**

After the microbiology course, medical students should be familiar with the morphological and biological characteristics of the most important microorganisms for human pathology, their pathogenic factors, patterns for the development of the infectious process, and the forms of specific and nonspecific immune defense against a given microorganism. They must have mastered the rules for collecting and sending pathological material for microbiological examination, the methods for microbiological examination, the interpretation of the obtained results depending on the clinical syndrome, as well as the diagnosis, prevention, and control of the infection.

LECTURES

LECTURE PROGRAM

II year, IV semester

№	TOPIC	HOURS	DATE
1.	Subject, tasks, historical development, and achievements of microbiology. Introduction to general microbiology.	2	
2.	Morphology and structure of microorganisms.	2	
3.	Physiology of bacteria. Bacterial genetics – I part.	2	
4.	Genetics of microorganisms – 2 part.	2	
5.	Influence of environmental factors on microorganisms. Disinfection and sterilization.	2	
6.	Antimicrobial therapy of infectious diseases. Classes and groups of antibiotics. Antimicrobial resistance.	2	
7.	The study of infection. Characteristics and forms of the infectious process. The role of the microorganism in the infectious process. Pathogenic factors.	2	
8.	The role of the external environment in the occurrence of the infectious process. Epidemic process. Factors and mechanisms for the transmission of infectious agents in the epidemic process.	2	
9.	Immunity. Natural resistance. Protective role of skin, mucous membranes, normal microflora. Cellular and humoral factors of natural resistance. Phagocytosis. Inflammation.	2	
10.	Antigens and antibodies.	2	
11.	Specific humoral immunity. Specific cellular immunity. Immunological tolerance.	2	
12.	Immunopathology. Allergies - definition and forms.	2	

13.	Immunopathology. Immunodeficiency conditions and diseases. Autoimmunity.	2	
14.	Immunoprophylaxis and immunotherapy.	2	
15.	Scheme and course of microbiological research.	2	

HOURS: 30

LECTURE PROGRAM
III year, V semester

№	TOPIC	HOURS	DATE
1.	Cocci - staphylococci, streptococci.	2	
2.	Streptococcus pneumoniae. Mycobacterium tuberculosis. The causative agent of leprosy. Causative agents of mycobacteriosis.	2	
3.	Corynebacteria. Pertussis bacteria. Hemophilus spp.. Neisseria spp.	2	
4.	Anaerobes. Spore-forming - tetanus bacillus, gas gangrene bacilli, botulinum bacillus. Non-spore-forming anaerobes.	2	
5.	Causes of particularly dangerous infections. The causative agent of plague. Vibrio cholerae. Bacillus anthracis.	2	
6.	Causes of particularly dangerous infections. Brucella spp. Tularemia bacterium. Legionellosis. Facultative pathogenic intestinal bacteria - Escherichia coli, Klebsiella spp., Proteus spp., and others.	2	
7.	Pathogenic enteric bacteria: Dysenteric bacteria. Salmonella - Salmonella typhi, Salmonella paratyphi A and B, Salmonella spp., causes of food poisoning.	2	
8.	Spirochetes. Cause of syphilis. Cause of typhus. Cause of Lyme disease. Leptospira. Spirilla.		
9.	Mycoplasma spp. and Rickettsia spp. Chlamydia spp.	2	
10.	Pathogenic fungi – Candida spp., actinomycetes, Aspergillus spp., cryptococci.	2	

11.	Viruses - nature and properties. Picornaviruses.	2	
12.	Ortomyxoviruses. Paramyxoviruses. Cause of COVID-19 (SARS-2)	2	
13.	Adenoviruses. Togaviruses. Flaviviruses. Rhabdoviruses. Ebola and Zika viruses.	2	
14.	Hepatitis viruses. AIDS viruses.	2	
15.	Herpesviruses. Poxviruses.	2	

HOURS: 30

PRACTICES

PROGRAM FOR PRACTICAL CLASSES II year, IV semester

№	TOPIC	HOURS	DATE
1.	Structure and equipment of the microbiological laboratory and rules for work in it. Methods for studying the morphology of microorganisms. Types of microscopes. Immersion system microscopy. Study of the morphology of microorganisms in a colored state. Simple staining methods - Löffler and Pfeiffer stain.	3	
2.	Complex methods for staining the microorganisms. Gram and Neisser stain. Ziehl-Neelsen staining (acid-fast bacteria). Möller staining (spores).	3	
3.	Cultivation of microorganisms. Types of nutrient media. Methods for isolation of microorganisms in pure culture. Types of cultures and colonies.	3	
4.	Biochemical activity of bacteria. Pathogenic factors in bacteria.	3	
5.	Determination of the in vitro susceptibility of bacteria to antibiotics (antibiogram). Other methods for detection of antimicrobial resistance.	3	
6.	Resistance of microorganisms. Sterilization and sterilization methods. Disinfection and disinfectants.	3	
7.	Recapitulation of the studied material in practical classes from №1 to №6 included.	3	

8.	SEMINAR on the topic: Morphology, physiology, and genetics of microorganisms. Test №1.	3	
9.	Cellular and humoral basis of the immune response. Antigen-antibody reactions. Agglutination reaction. Precipitation reaction. Neutralization reaction (ASO).	3	
10.	Antigen-antibody reactions. Bacteriolysis, hemolysis, cytolysis. Complement fixation test. Immune reactions with labeled antibodies or antigens: immunofluorescence assay (IFA), radioimmunoassay (RIA), enzyme-linked immunosorbent assay (ELISA).	3	
11.	Flowcytometry to determine cell subpopulations (immunophenotyping). Examination of the allergic condition. Bioproducts - vaccines and sera.	3	
12.	SEMINAR on the topic: Infection and Immunity. Test №2	3	
13.	Laboratory diagnosis of diseases caused by viruses and rickettsiae. Chlamydia?	3	
14.	Methods for microbiological diagnosis of infectious diseases. General scheme for microbiological research.	3	
15.	Assessment of the practical skills of students, acquired during the semester.	3	

HOURS: 45

PROGRAM FOR PRACTICAL CLASSES
III year, V semester

№	TOPIC	HOURS	DATE
1.	Microbiological diagnosis of staphylococcal and streptococcal infections. Microbiological examination of pus.	2	
2.	Microbiological examination in diseases caused by <i>Streptococcus pneumoniae</i> . Microbiological diagnosis of tuberculosis and leprosy. Microbiological examination of sputum.	2	
3.	Microbiological diagnosis of diphtheria and pertussis. Microbiological examination of throat swabs.	2	
4.	Microbiological diagnosis of gas gangrene and tetanus. Microbiological examination of wound secretions.	2	

5.	Microbiological examination of CNS materials. Microbiological diagnosis and differential diagnosis of bacterial meningitis (<i>Neisseria meningitidis</i> and <i>Haemophilus influenzae</i>).	2	
6.	Microbiological diagnosis of particularly dangerous infections plague, cholera, and anthrax.	2	
7.	SEMINAR on the topic: Microbiological diagnostics of microorganisms, studied in practical classes from №1 to №7. Test №1.	2	
8.	Microbiological examination of materials from the digestive system (feces). Microbiological diagnosis of bacterial dysentery, <i>E. coli</i> enteritis, salmonellosis. Food poisoning by <i>Staphylococcus aureus</i> , clostridia (<i>C. botulinum</i> , <i>C. perfringens</i>). Microbiological examination of gastric mucosa biopsy material (<i>Helicobacter pylori</i>).	2	
9.	Microbiological examination of urine. Microbiological diagnosis of pathogens causing urinary tract infections: opportunistic pathogens (<i>E. coli</i> , <i>Klebsiella</i> , <i>Proteus-Providencia-Morganella</i> group, <i>Pseudomonas spp.</i>) and obligatory pathogenic (streptococci, salmonella, <i>Leptospira spp.</i> , <i>Mycobacterium tuberculosis</i>).	2	
10.	Microbiological examination for sexually transmitted infections caused by <i>Neisseria gonorrhoeae</i> , <i>Treponema pallidum</i> , <i>Candida albicans</i> , <i>Chlamydia spp.</i> , and mycoplasmas.	2	
11.	Microbiological examination of blood - blood culture. Causes of septic conditions: obligatory pathogenic (<i>Salmonella typhi</i> , <i>Brucella spp.</i> , <i>Borrelia spp.</i>) and facultative pathogenic.	2	
12.	Problematic microorganisms causing healthcare-associated infections (HAIs) - <i>Pseudomonas spp.</i> , <i>Enterococcus spp.</i> , MRSA, <i>C. difficile</i>). Systemic mycoses, caused by <i>Candida</i> , <i>Aspergillus</i> , <i>Actinomyces</i> , <i>Cryptococcus</i> . Antimitotic therapy.	2	
13.	Microbiological diagnosis of diseases caused by viruses – HIV and hepatitis A, B, C D and E, influenza and coronaviruses – SARS-CoV-2.	2	
14.	Sanitary-microbiological examination of water, air, hospital environment. Sanitary-indicative microorganisms - <i>E. coli</i> , <i>Enterococcus spp.</i> , <i>C. perfringens</i> , staphylococci, streptococci. Test 2 (includes practicals 8-13)	2	
15.	Recapitulation of the students' practical skills, acquired during the two semesters with an evaluation mark.	2	

HOURS: 30

LECTURES

LECTURE №1 – 2 hours

Subject, tasks, historical development, and achievements of microbiology.
Introduction to general microbiology.

Introduction. Subject, tasks, historical development, and achievements of microbiology. The contribution of L. Pasteur and R. Koch. General Microbiology. Taxonomy of microorganisms. Characteristics of major groups of microorganisms: higher protists (Eucaryote) and lower protists (Procaryotae).

LECTURE №2 – 2 hours

Morphology and structure of microorganisms.

Morphology of microorganisms – size, shape and arrangement. Major types according to the morphology – rod-shaped, round-shaped and curved bacteria; structure of the bacterial cell, essential and non-essential organelles. Methods of studying the morphology of bacteria, fungi, mycoplasmas, and viruses.

LECTURE №3 – 2 hours

Bacterial physiology

Chemical composition of bacteria – water, minerals, proteins, carbohydrates, lipids, and nucleic acids. The significance of bacteria for diagnosis, pathogenesis, and therapy of infectious diseases. Bacterial enzymes. Bacterial metabolism – catabolic (dissimilation). Types of bacteria according to the mechanism of biological oxidation. Anabolic processes (assimilation). Bacterial productivity and its significance in infectious diseases pathogenesis, diagnosis, and therapy. Bacterial growth and reproduction. Principles of in vitro culturing and nutritional requirements of bacteria. Prototrophs and auxotrophs.

LECTURE №4 – 2 hours

Bacterial genetics

Genotype and phenotype in bacteria, viruses and phages. Bacterial genome – chemical composition, structure, and functions. Plasmids (extrachromosomal elements). Types of plasmids and their significance. Bacteriophages and their importance – structure, temperate phages, lytic phages. Inheritance and mutation in microorganisms – definitions. Types of mutations; factors causing mutations. Recombination – significance for biological and medical practice. Gene engineering – significance for the medical theory and practice. Molecular methods (PCR, DNA probes) in the diagnosis of infectious diseases.

LECTURE №5 – 2 hours

Influence of environmental factors on microorganisms. Disinfection and sterilization.

Microbiota of the human body – role in the normal physiological processes, protection, and pathology. Distribution of microorganisms in soil, water, food, hospital environment, instruments, and the objects in the surrounding environment. Influence of physical factors on microorganisms – heat, desiccation, pH, osmotic pressure, light, ultrasound, ionizing

radiation. Sterilization. Methods of sterilization. Influence of chemical factors on microorganisms. Oligodynamia. Disinfections. Types of disinfectants. Mechanism of action. Influence of biological factors on microorganisms – symbiosis, synergy, antagonism, bacteriocins, bacteriophages.

LECTURE №6 – 2 hours

Antimicrobial therapy of infectious diseases. Classes and groups of antibiotics. Antimicrobial resistance.

Chemotherapy. Antibiotics. Types of antimicrobial drugs. Classification of antibiotics according to: origin, spectrum of action, chemical composition. Antibiotic drugs by groups according to chemical composition and mechanism of action. Basic principles of chemotherapeutic and antibiotic drug application. Mechanism of resistance in microorganisms. Measures against drug resistance. Side effect of antibiotic treatment. Antimicrobial susceptibility testing to antibiotics. Antibigrams. Other methods for in vitro antimicrobial susceptibility testing in microorganisms.

LECTURE №7 – 2 hours

The study of infection. Characteristics and forms of the infectious process. The role of the microorganism in the infectious process. Pathogenic factors.

Relationships between micro- and macroorganism - mutualism, commensalism, parasitism, saprophytism. Infection, infectious process, infectious disease – definition. Role of the microorganism in infectious process: pathogenicity, virulence, infectious dose, contagiousity, invasiveness, toxigenicity. Virulence factors: adhesion factors, factors of invasion, factors of aggression – endotoxins, exotoxins, etc. Mechanism of action.

LECTURE №8 – 2 hours

The role of the external environment in the occurrence of the infectious process. Epidemic process. Factors and mechanisms for the transmission of infectious agents in the epidemic process.

Pathogenesis of the infectious process – entry, dissemination, localization, and damage to the host. Characteristics of the infectious disease. Types of infectious process: exogenic and endogenic infection. Primary infection, re-infection, secondary infection; superinfection, co-infection; localized and systemic infection; focal infection; septicaemia, bacteraemia, viremia, toxemia, pyemia, systemic inflammatory response syndrome (SIRS). Role of the host in the infectious process. Role of the environment for the origination and course of the infectious process. Epidemic process – factors and mechanisms. Factors for origination of the epidemic process: source of infection, mechanism of transmission, and susceptible population. Primary and secondary forces of the epidemic process.

LECTURE №9 – 2 hours

Immunity. Natural resistance. Protective role of skin, mucous membranes, normal microflora. Cellular and humoral factors of natural resistance. Phagocytosis. Inflammation.

Types of protection of the host – natural resistance, acquired immunity. Protective role of skin and mucous membranes, their secretions, resident microbiota. Cellular factors of the innate immunity – macrophages, microphages, NK cells. Phagocytosis. Humoral factors of

the innate immunity: complement system, interferons, lysozyme, cytokines, acute phase proteins. Inflammations – protective and pathologic mechanisms.

LECTURE №10 – 2 hours

Antigens and antibodies.

Antigens – characteristics; antigen determinants (epitopes), antigen valence, haptens; types of antigens; microbial antigens. Structure of antibodies. Classes of antibodies and their function.

LECTURE №11 – 2 hours

Specific humoral immunity. Specific cellular immunity. Immunological tolerance.

Immune system: anatomy and structure. Central and peripheral organs of the immune system. Formation of immunocompetent cells – T-cells and B-cells and their subpopulations. CD-molecules, defining lymphocyte subpopulations and the significance of the immune reaction. T-cell receptor and B-cell receptor for antigens. Cell-mediated immunity – types. Humoral immunity. Antigen presentation. Development of the immune response; cell-to-cell cooperation. Primary and secondary immune response. Genetic control and regulation of immune response. HLA system. Immune tolerance – mechanisms.

LECTURE №12 – 2 hours

Immunopathology. Allergies - definition and forms.

Allergic reactions. Type of allergens. Types of hypersensitivity reactions according to the Coombs and Gell classification: Type I anaphylactic and atopic allergic reactions with participation of IgE and release of biological active substances – tissue damage and clinical presentation; type II (cytotoxic); type III (Ag-Ab complexes); type IV (infectious, delayed). Autoimmune reactions. Definition. Types. Mechanisms of origin.

LECTURE №13 – 2 hours

Immunopathology. Immunodeficiency conditions and diseases. Autoimmunity.

Types of pathological conditions and diseases of the immune system – primary and secondary; Causes – defects in the cell-mediated immunity, humoral immunity, phagocytosis, and complement system; combined immunodeficiencies. Clinical presentation. Laboratory diagnosis. Immune status.

LECTURE №14 – 2 hours

Immunoprophylaxis and immunotherapy.

Immunoprophylaxis: vaccine prophylaxis – types of vaccines according to the origin; characteristics, duration of the postvaccinal immunity. Specific immunotherapy with serum and immunoglobulins. Types of immune serums – antitoxic, antibacterial, antiviral. Other methods and approaches for immunotherapy.

LECTURE №15 – 2 hours

Scheme and course of microbiological research.

Type of clinical specimens and tools for collection. Principles of collection and transport of clinical specimens for microbiological examination. Purpose of the microbiological

examination. Course of microbiological examination: direct microscopy (types of smears – wet mount, stained – simple and complex staining methods, immunofluorescent smears); culturing – types of growth media, other requirements for culturing – atmosphere, temperature, humidity, time, etc.; method for obtaining a pure culture; identification of pure cultures – morphological, culture, biochemical, antigenic. Antibigram. Serological diagnosis. Rapid methods for microbiological diagnosis – ELISA, RIA, IFA, molecular methods – DNA probes, PCR. Automated systems – for blood cultures, identification of microorganisms, etc.

LECTURE №16 – 2 hours

Cocci - staphylococci, streptococci.

Family *Micrococcaceae*. *Staphylococcus* spp.: *S. aureus*. *Streptococcus* spp.: *S. pyogenes*.

LECTURE №17– 2 hours

***Streptococcus pneumoniae*. *Mycobacterium tuberculosis*. The causative agent of leprosy. Causative agents of mycobacteriosis.**

Streptococcus spp.: *S. pneumoniae*. Family *Mycobacteriaceae*. *Mycobacterium* spp.: *M. tuberculosis*, *M. leprae*. *M. kansasii*, *M. avium* complex, etc.

LECTURE №18 – 2 hours

Corynebacteria. Pertussis bacteria. *Hemophilus* spp., *Neisseria* spp.

Corynebacterium spp.: *C. diphtheriae*. *Haemophilus* spp.: *H. influenzae*. *Neisseria* spp.: *N. meningitidis*, *N. gonorrhoeae*. *Bordetella* spp.: *B. pertussis*, *B. parapertussis*.

LECTURE №19 – 2 hours

Anaerobes. Spore-forming - tetanus bacillus, gas gangrene bacilli, botulinum bacillus. Non-spore-forming anaerobes.

Family *Clostridiaceae*. *Clostridium* spp. *C. tetani* – causative agent of tetanus. Causative agents of gas gangrene - *C. perfringens*, *C. novyi*, *C. septicum*, *C. histolyticum*. Causative agent of botulism - *C. botulinum*. *Clostridioides* spp. Causative agent of pseudomembranous colitis - *C. difficile*. Family *Bacteroidaceae*: *Bacteroides* spp. *Fusobacterium* spp. *Leptotrichia* spp.

LECTURE №20 – 2 hours

Causes of particularly dangerous infections. The causative agent of plague. *Vibrio cholerae*. *Bacillus anthracis*.

Family *Yersiniaceae*: *Yersinia* spp.: *Y. pestis*, *Y. enterocolitica*. Family *Vibrionaceae*. *Vibrio* spp.: *V. cholerae* biotype cholerae, *V. cholerae* biotype El Tor. *Bacillus* spp.: *B. anthracis*.

LECTURE №21 – 2 hours

Causes of particularly dangerous infections. *Brucella* spp. Tularemia bacterium. Legionellosis. Facultative pathogenic intestinal bacteria - *Escherichia coli*, *Klebsiella* spp., *Proteus* spp., and others.

Brucella spp. *Francisella* spp.: *F. tularensis*. *Legionella* spp.: *L. pneumophila*. Order *Enterobacterales*. Family *Enterobacteriaceae*. *Escherichia* spp.: *E. coli*, *Enterobacter* spp., *Citrobacter* spp., *Klebsiella* spp. Family *Yersiniaceae*: *Serratia* spp. Family *Morganellaceae*: *Proteus* spp. *Providencia* spp. *Morganella* spp.

LECTURE №22 – 2 hours

Pathogenic enteric bacteria: Dysenteric bacteria. *Salmonella* - *Salmonella typhi*, *Salmonella paratyphi* A, B and C, *Salmonella* spp., causes of food poisoning.

Family *Enterobacteriaceae*. *Shigella* spp. *Salmonella* spp.: *S. typhi*, *S. paratyphi* A, B, C. *Salmonella* spp., causing food toxoinfectious disease.

LECTURE №23 – 2 hours

Spirochetes. Cause of syphilis. Cause of typhus. Cause of Lyme disease. *Leptospira* spp. *Spirilla*.

Order *Spirochaetales*. Family *Treponemataceae*. *Treponema* spp. *T. pallidum* – the causative agent of syphilis. Family *Borreliaceae*. *Borrelia* spp.: *B. recurrentis* – the causative agent of relapsing fever, *B. burgdorferi* – the causative agent of Lyme disease. Family *Leptospiraceae*. *Leptospira* spp. – *L. interrogans*, *L. biflexa*.

LECTURE №24 – 2 hours

***Mycoplasma* and *Rickettsia*. *Chlamydia* spp.**

Family *Mycoplasmataceae*. Genus *Mycoplasma*: *M. pneumoniae*, *M. hominis*, *M. orale*, *M. salivarium*, *M. fermentans*. Family *Rickettsiaceae*. Genus *Rickettsia*: *R. prowazekii* – causative agent of epidemic typhus, *R. conorii* – causative agent of Mediterranean spotted fever, etc. Family *Coxiellaceae*. Genus *Coxiella*. *C. burnetii*. Family *Chlamydiaceae*. Genus *Chlamydia*: *C. trachomatis*. Genus *Chlamydophila*. *C. pneumoniae*. *C. psittaci*.

LECTURE №25 – 2 hours

Pathogenic fungi – *Candida* spp., *Actinomyces*, *Aspergillus* spp., *Cryptococci*.

Genus *Candida*: *C. albicans*. Genus *Actinomyces*: *A. bovis*, *A. israeli*. Genus *Aspergillus*, Genus *Cryptococcus*.

LECTURE №26 – 2 hours

Viruses – nature and properties. *Picornaviruses*.

History of virology. General characteristics of viruses. Viral taxonomy. Morphology and structure of viruses: DNA/RNA genome, capsid, supercapsid; biology of viruses: viral reproduction, cultivation methods. Epidemiology and pathogenesis of viral diseases; immunity, specific prophylaxis, therapy. Laboratory diagnosis. Family *Picornaviridae*. Genus *Enterovirus*: Human polioviruses 1, 2, 3. Human coxsackieviruses A, B. Human echoviruses. Human enteroviruses 68 – 71.

LECTURE №27 – 2 hours

***Orthomyxoviruses*. *Paramyxoviruses*. Causative agent of COVID-19 (*SARS-CoV-2*).**

Family *Orthomyxoviridae*. Influenza A, B, C viruses – causative agents of Flu. Causative agents of bird flu and swine flu. Family *Paramyxoviridae*: Human Parainfluenza

viruses 1-4, Morbillivirus, Mumps virus. Family Pneumoviridae – hRSV, Human Metapneumovirus. Family Coronaviridae. SARS-CoV, MERS-CoV, SARS-CoV-2.

LECTURE №28 – 2 hours

Adenoviruses. Togaviruses. Flaviviruses. Rhabdoviruses. Ebola and Zika viruses.

Family Adenoviridae. Family Togaviridae – Rubella virus and others. Family Flaviviridae – yellow fever virus, Zika virus and others. Family Rhabdoviridae – rabies virus. Family Filoviridae – Ebola virus.

LECTURE №29 – 2 hours

Hepatitis viruses. AIDS viruses.

Hepatitis viruses: Causative agents of viral hepatitis - HAV, HBV, HDV, HCV, HEV. Hepatitis viruses with fecal-oral transmission mechanism - hepatitis A and E viruses. Hepatitis viruses with multiple transmission mechanisms - hepatitis B, D, and C viruses. Characteristics of the virus, the clinical presentation of the disease, laboratory diagnosis (hepatitis markers), specific prevention, and therapy. Fam. Retroviridae. Subfamily Lentivirinae: AIDS viruses (HIV-1 and HIV-2). Acquired Immune Deficiency Syndrome (AIDS): historical data; structure and reproductive cycle of HIV; epidemiology of AIDS; Clinical presentation; laboratory diagnosis; therapeutic approach; prevention

LECTURE №30 – 2 hours

Herpesviruses. Poxviruses.

Family Herpesviridae. Subfamily Alpha herpes virinae: Herpes simplex virus 1, 2; Human herpes virus – 3, Varicella herpesvirus (V. varicellae, V. herpes zoster). Subfamily Beta herpes virinae: Human herpes virus 5 (Human cytomegalovirus). Subfamily Gamma herpes virinae: Human herpes virus 4 (Epstein-Barr herpes virus). Family Poxviridae: Orthopoxvirus variolae.

PRACTICAL CLASSES - THESES

PRACTICAL CLASS №1 – 3 hours

Structure and furnishing of the clinical microbiology laboratory, safety practices and rules. Methods for studying the morphology of microorganisms. Types of microscopes. Immersion oil microscopy. Simple staining methods - Loeffler and Pfeiffer.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the specifics of microbiological practice and basic microbiological materials. Mastering the microscopy slide preparation techniques and staining by the Loeffler and Pfeiffer methods. Working with immersion system on a light microscope.

DEMONSTRATION OF: Structure of a microbiological laboratory and safety rules upon handling infectious materials. Microbiological lab equipment, tools, and glassware. Basic microbiological manipulations and requirements when working with infectious materials. Work rules for immersion oil microscopy on a regular light microscope. Preparation of slides, stained by the Loeffler and Pfeiffer methods.

PRACTICAL TASKS: Preparation and staining microscopy slides by the Loeffler and Pfeiffer Пфайффер from microorganisms cultivated on solid and liquid growth media (*S. epidermidis* и *E. coli*). Observation and description of the microscopy field. Immersion oil microscopy of pre-stained slides. Diagnostic application of simple stainings – microscopy of gonococci stained by the Loeffler method on a direct microscopy slide from urethral secretion. Microscopy of *Helicobacter pylori* in a slide from gastric mucosa biopsy, stained by the Pfeiffer method.

PRACTICAL CLASS №2 – 3 hours

Complex staining methods. Gram and Neisser staining. Ziehl-Neelsen staining (for acid-fast bacteria). Moeller staining (spores).

PURPOSE OF THE PRACTICAL CLASS: Mastering the microscopy slide preparation and staining techniques by the Gram, Neisser, Ziehl-Neelsen and Moeller.

PRACTICAL TASKS: Gram staining and observation of a microscopy slide with a mixed culture of Gram / + / and Gram / - / bacteria. Staining by the Neisser method (for metachromatic granules) of a slide with diphtheroid bacteria and observation of a pre-made microscopy slide with Diphtheria bacteria. Preparation of a direct microscopy slide from sputum and staining it by the Ziehl-Neelsen and Kinyon methods. Detection of tuberculosis bacteria in a ready-made and stained microscopy slide from sputum. Preparation of a microscopy slide with spore-bearing bacteria (bacilli) and staining it by the Moeller method. Microscopy of ready-made slides of anthrax bacilli with central non-deforming spores.

PRACTICAL CLASS №3 – 3 hours

Cultivation of microorganisms. Types of growth media. Methods for isolation of microorganisms in pure culture. Types of microbial cultures and colonies.

PURPOSE OF THE PRACTICAL CLASS: To introduce students to the types of growth media and ways of their preparation and use. To master the streaking technique and methods for isolation of microorganisms in pure culture. To be able to characterize the bacterial growth on solid and liquid culture media.

DEMONSTRATION OF: Different types of ready-made solid and liquid sterile growth media. Cultures of various microorganisms on liquid and solid growth media - nutrient broth, glucose broth, nutrient agar, EMB agar, apocholate-citrate agar, blood agar, Lowenstein-Jensen agar, Zeissler agar and others. Different types of colonies. Streaking technique on Petri dishes with nutrient agar. Inoculation on agar slant. Preparation of inoculum in a deep agar.

PRACTICAL TASKS: Streaking *S. epidermidis* on nutrient agar from a pathological material – pus (primary inoculation). Subcultivation of *S. epidermidis* on agar slant. Inoculating a liquid nutrient medium with pathological material (pus). Description of microbial growth from ready-made cultures on liquid and solid media.

PRACTICAL CLASS №4 – 3 hours

Biochemical activity of bacteria. Pathogenic factors of bacteria.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the methods for biochemical (enzymatic) activity testing – part of the pure culture identification process. Introduction to the pathogenic factors of bacteria and laboratory methods for their determination.

DEMONSTRATION OF: IMVUC tests (conventional – in tubes and semi-automated in microplate systems as API). Tests for saccharolytic activity: decomposition of sugars with and without gas formation; the degree of acidity with methyl-red reagent; Voges-Proskauer test. Tests for proteolytic activity: formation of indole in tryptophan broth; hydrogen sulfide formation; urease activity, etc. Deamination and decarboxylation of the amino acids arginine, lysine, ornithine. Oxidase and catalase activity. Alpha- and beta- hemolysis of blood agar. Plasma coagulase test. Plasma agglutination (clumping-test). Microscopy of encapsulated bacteria (pneumococci and anthrax bacilli) stained by Klett. Identification by MALDI-TOF, Vitek-2 and other automatic methods.

PRACTICAL TASKS: Description of the growth on inoculated plates by the students in the previous practical class. Adding reagents to IMVUC tests and analyzing the results. Testing for indole with Ehrlich reagent. Degree of acidity of bacterial culture with a methyl-red reagent. Inoculating Kligler slant medium. Reporting the results from ready-made biochemical tests on *Escherichia coli* and *Klebsiella pneumoniae*. Plasma agglutination.

PRACTICAL CLASS №5 – 3 hours

Determination of the in vitro susceptibility of bacteria to antibiotics (antibiogram). Other methods for antimicrobial resistance detection.

PURPOSE OF THE PRACTICAL CLASS: To master the technique for preparing an antibiogram by the Bauer-Kirby disk-diffusion method and the principles of its reading and interpretation. To get acquainted with the principles of preparation of E-test, microdilution test, D-test, and phenotypic detection of ESBL producing strains and others.

DEMONSTRATION OF: Preparation and interpretation of a Bauer-Kirby antibiogram. Different types of phenotypic tests to determine in vitro antibiotic resistance. Printouts of mPCR samples with resistance gene detection.

PRACTICAL TASKS: Mastering the technique for preparing an antibiogram by the Bauer-Kirby disk-diffusion method. Reporting the results from ready-made antibiograms of different microbes. Reporting the results of pre-made: E-test, microdilution test, D-test, test for ESBL-producing strains.

PRACTICAL CLASS №6 – 3 hours

Resistance of microorganisms. Sterilization and methods of sterilization. Disinfection and disinfectants.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the devices and methods for sterilization and disinfectants.

DEMONSTRATION OF: The sterilization rooms in the department, Koch's apparatus, autoclave, and dry sterilizer. Materials, laboratory vessels and utensils to be sterilized. Method of packaging the laboratory utensils. Disinfectant solutions. Means for sterilization and disinfection control.

PRACTICAL CLASS №7 – 3 hours

Recapitulation of the studied material from practical classes from №1 to №8 included.

PURPOSE OF THE PRACTICAL CLASS: To establish knowledge and practical skills in microbiology.

PRACTICAL CLASS №8 – 3 hours

SEMINAR on the topic: Morphology, physiology, genetics and antimicrobial resistance of microorganisms. Test №1.

PURPOSE OF THE PRACTICAL CLASS: To consolidate the theoretical knowledge of the studied material. To check the knowledge gained from the lectures, practical classes and independent preparation of students on topics 1-8 of the syllabus.

PRACTICAL CLASS №9 – 3 hours

Cellular and humoral basis of the immune response. Antigen-antibody reactions. Agglutination reaction. Precipitation reaction. Neutralization reaction (ASLO).

PURPOSE OF THE PRACTICAL CLASS: Introduction to the morphology of cells involved in the immune response and the structure of antibodies and their functional areas. Mastering the technique for performing immune diagnostic reactions - agglutination and precipitation, their diagnostic significance, and interpretation.

DEMONSTRATION OF: Microscopy slides of blood smears with macrophages, leukocytes, lymphocytes, blast, and plasma cells. Types of agglutination reactions - Gruber and Widal. Types of precipitation reactions - Ascoli ring test, Mancini test, immunodiffusion in agar. ASLO (AST), turbidimetry and nephelometry.

PRACTICAL TASKS: Observation and drawing cells involved in the immune response. Performing Gruber agglutination test, Ascoli ring test. Interpretation of AST titers.

PRACTICAL CLASS №10 – 3 hours

Antigen-antibody reactions. Bacteriolysis, hemolysis, cytolysis. Complement fixation test (CFT). Immune reactions with labeled antibodies or antigens: immunofluorescence method (IFA), radioimmunoassay (RIA), enzyme-linked immunosorbent assay (ELISA).

PURPOSE OF THE PRACTICAL CLASS: Introduction to the technique of immune reactions CFT and the principles of marked immune reactions, their interpretation, and diagnostic value.

DEMONSTRATION OF: Hemolysis. Wasserman's complement-fixation test. ELISA equipment and ready-made ELISA plate. Immunofluorescence microscope and immunofluorescence test for *Chlamydia trachomatis* in cervical secretions.

PRACTICAL TASKS: Reading a Wasserman sample. Reporting positive and negative ELISA results from sera for anti-HCV, HBsAg or other suitable samples. Reading and reporting immunofluorescence test for *Chlamydia* and others.

PRACTICAL CLASS №11 – 3 hours

Flow cytometry for the determination of cellular subpopulations (immunophenotyping). Allergy testing. Biological products – vaccines and sera.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the operation principles of the flow cytometer and diagnostic capabilities of the equipment for immune status testing. Mastering the techniques of allergic tests for the diagnosis of fast and delayed type of hypersensitivity. Biological products used for specific therapy and prophylaxis of infectious diseases - vaccines and sera.

DEMONSTRATION OF: Flow cytometry test of a patient whole blood. Different types of vaccines – mandatory, according to the immunization calendar of the Republic of Bulgaria, recommended ones for different groups of people and for travelers. Antitoxic, antiviral and antibacterial sera. Guinea pig Mantoux allergy test.

PRACTICAL TASKS: Interpretation of flow cytometry protocol results Mastering the technique of the Mantoux test - intradermal injection of allergens.

PRACTICAL CLASS №12– 3 hours

SEMINAR on: Infection and immunity. Test №2.

PURPOSE OF THE PRACTICAL CLASS: To consolidate the theoretical knowledge on the studied material. To control the knowledge gained from lectures, exercises and independent preparation of students on topics №11-22 of the syllabus.

PRACTICAL CLASS №13– 3 hours

Laboratory diagnosis of diseases caused by viruses and rickettsia.

PURPOSE OF THE PRACTICAL CLASS: To introduce students to the particularities of the diagnosis of diseases caused by viruses and rickettsia.

DEMONSTRATION OF: Tissue cultures - normal and with cytopathic effect. Chicken embryos Hearst phenomenon and Hearst reaction (HIA). ELISA plate with positive and negative samples for HBsAg and anti-HCV antibodies. Immunofluorescence test.

PRACTICAL TASKS: Observation and drawing tissue cultures - normal and with cytopathic effect. Reporting the results from HIA in influenza, ELISA tests for hepatitis markers and HIV, immunofluorescence test for Chlamydia.

PRACTICAL CLASS №14 - 3 hours

Methods for microbiological diagnosis of infectious diseases. General scheme for microbiological examination.

PURPOSE OF THE PRACTICAL CLASS: Applying the acquired knowledge in a consecutive scheme for microbiological diagnosis of infectious diseases.

DEMONSTRATIONS AND PRACTICAL TASKS: Introduction to the general rules for collecting and sending pathological materials to the microbiological laboratory. Transport culture media. Preparation of a microscope slide from pathological material. Gram staining. Microscopy with immersion oil. Microscopy of ready-made slides. Recognition of pure microbial cultures on various growth media. Identification tests - cultural; biochemical; determination of pathogenic factors; serotyping by Gruber agglutination test. Antibigram interpretation.

PRACTICAL CLASS №15 - 3 hours

Evaluation of the practical skills acquired during the semester.

PRACTICAL CLASS №16 - 2 hours

Microbiological diagnosis of staphylococcal and streptococcal infections.

Microbiological examination of pus.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the most common causative agents of purulent infections in the human body. Methods for microbiological diagnostics.

DEMONSTRATION OF: Prepared microscope slides with Gram-stained staphylococci and streptococci. Demonstration of the cultural features of staphylococci and streptococci on different growth media and tests for their identification. Methods for determination of methicillin-resistant staphylococci.

PRACTICAL TASKS: Identification of staphylococcal and streptococcal cultures on blood agar. Reporting alpha- and beta-hemolysis. Reading bacitracin and optochin test results. Performing a coagulase slide test. Coagulase tube test reading. Result interpretation of antibiograms of staphylococci, beta-hemolytic, and viridans streptococci. Reading and interpretation of ASLO test. Differential diagnosis between alpha-hemolytic streptococci and pneumococci. MRSA screen agar – result interpretation.

PRACTICAL CLASS №17 - 2 hours

Microbiological examination in diseases caused by *Streptococcus pneumoniae*.

Microbiological diagnosis of tuberculosis and leprosy. Microbiological examination of sputum.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the methods of collection and microbiological examination of sputum, features of the specific inflammatory process. Introduction to the microbiological diagnosis of tuberculosis, leprosy, and pneumococcal infections. Bioproducts for specific prevention and therapy.

DEMONSTRATION OF: Microscopic slides: a) Pneumococci stained by Klett method; b) Tuberculosis bacteria in sputum smear, stained by Ziehl-Neelsen method. Culture features of pneumococci on blood agar and glucose broth. Optochin and inulin test. Culture of tuberculosis bacteria on Lowenstein-Jensen agar. Gamma-interferon-based tests

PRACTICAL TASKS: Preparation of a microscopic smear of sputum and stain it by Ziehl-Neelsen staining for the detection of tuberculosis bacteria. Reporting the positive and negative optochin tests of alpha-hemolytic microorganisms. Reading an antibiogram of pneumococci on blood agar. Introduction to the principles of gamma-interferon-based tests. Introduction to bioproducts for specific prophylaxis (pneumococcal vaccine, BCG - vaccine) and for allergic diagnosis (PPD) of tuberculosis.

PRACTICAL CLASS №18 - 2 hours

Microbiological diagnosis of diphtheria and pertussis. Microbiological examination of throat swabs.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the microbiological diagnosis of diphtheria and pertussis and bioproducts for specific prophylaxis and treatment.

DEMONSTRATION OF: Ready-made microscope slides with diphtheria bacteria stained by the Neisser method. Cultural features of diphtheria bacteria in the Löffler and Klauberg media. Growth of *Bordetella pertussis* on the Bordet-Gengou culture media.

PRACTICAL TASKS: Microscopic observation of a ready-made microscope slide with *Bordetella pertussis*, Gram-stained. Preparation of a slide with pseudodiphtheria bacteria and Neisser staining. Introduction to bioproducts for specific prophylaxis (DTP and DT vaccines) and specific therapy for diphtheria (diphtheria antitoxin).

PRACTICAL CLASS №19 - 2 hours

Microbiological diagnosis of gas gangrene and tetanus. Microbiological examination of wound secretions.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the microbiological diagnosis of gas gangrene and tetanus, the particularities of collecting and sending pathological materials for anaerobic bacteria, and bioproducts for specific prophylaxis and therapy.

DEMONSTRATION OF: Ready-made microscope slides of *C. perfringens* and *C. tetani*, stained by the Gram method. Culture media for anaerobic bacteria - Kitt-Tarozzi, thioglycolate broth, Zeissler, and Wilson-Blair agars and the cultural features of gas gangrene agents and the tetanus bacillus. Tetanic seizure of a mouse injected with blood from a sick patient.

PRACTICAL TASKS: Preparation of a microscope slide with Gram-stained wound swab containing clostridia. Introduction to bioproducts for specific prophylaxis and therapy of gas gangrene and tetanus.

PRACTICAL CLASS №20 - 2 hours

Microbiological examination of CNS materials. Microbiological diagnosis and differential diagnosis of bacterial meningitis (*Neisseria meningitidis* and *Haemophilus influenzae*).

PURPOSE OF THE PRACTICAL CLASS: Mastering the differential microscopic diagnosis of bacterial meningitis.

DEMONSTRATION OF: Ready-made microscope slides from cerebrospinal fluid with *Neisseria meningitidis*, stained with methylene blue and Gram-stain, *H. influenzae*, stained by the Gram method and other microorganisms, causing bacterial meningitis. Cultural features of *H. influenzae* on chocolate agar, Levinthal agar, and blood agar – satellite phenomenon. Methods for microanaerophilic cultivation and cultures of *Neisseria meningitidis* on Levinthal agar and blood agar. Other causative agents of bacterial meningitis - pneumococci, staphylococci, streptococci and tuberculosis bacteria. Latex agglutination tests to detect microbial antigens in the cerebrospinal fluid of patients

PRACTICAL TASKS: Preparation of a microscope slide with cerebrospinal fluid and stained by the Gram method. Observation of ready-made microscope slides with *Neisseria meningitidis* and *H. influenzae*. Reporting the phenomenon of satellite growth in *H. influenzae*.

PRACTICAL CLASS №21 - 2 hours

Microbiological diagnosis of particularly dangerous infections plague, cholera, and anthrax.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the microbiological diagnosis of plague, cholera, and anthrax and the relevant bioproducts for specific prophylaxis and therapy.

DEMONSTRATION OF: Ready-made microscopic slides - blood smear with *Bacillus anthracis*, stained by the Klett method for capsules and Moeller - for spores, *Vibrio cholerae* - stained by the Gram method and *Yersinia pestis* - stained by Giemsa method. Culture media, bacterial cultures, and biochemical tests for identification of *Vibrio cholerae*. Ascoli precipitation test for anthrax antigen.

PRACTICAL TASKS: Microscopy and drawing of a slide with *B. anthracis*, *V. cholerae* and *Y. pestis*. Performing the Ascoli precipitation test. Immunofluorescence microscopy of *B. anthracis*.

PRACTICAL CLASS №22 - 2 hours

SEMINAR on the topic: Microbiological diagnostics of microorganisms, studied in practical classes from №1 to №7. Test №1.

Staphylococcus spp. Streptococcus spp. Streptococcus pneumoniae. Tuberculosis bacteria and other mycobacteria. Mycobacterium leprae. Neisseria meningitidis. Corynebacterium diphtheriae. Bordetella pertussis. Haemophilus influenzae. Causative agents of gas gangrene. Clostridium tetani. Bacillus anthracis. Vibrio cholerae. Yersinia pestis

PRACTICAL CLASS №23 - 2 hours

Microbiological examination of materials from the digestive system (feces). Microbiological diagnosis of bacterial dysentery, E.coli enteritis, salmonellosis. Food poisoning by Staphylococcus aureus, salmonella, and clostridia (C. botulinum, C. perfringens). Microbiological examination of gastric mucosa biopsy material (Helicobacter pylori).

PURPOSE OF THE PRACTICAL CLASS: Introduction to the scheme for bacteriological examination of feces in diseases caused by members of the family Enterobacteriaceae (pathogenic E. coli, Shigella, Salmonella). Introduction to the microbiological diagnosis of food poisoning by bacterial agents and methods for bacterial diagnosis of Helicobacter pylori from biopsy material.

DEMONSTRATION OF: Microscope slide with Gram-negative microorganisms. Selective and differentiating media for enteric bacteria - Levine, deoxycholate-citrate agar with cultures of lactose-positive and lactose-negative bacteria; blood agar with S. aureus; culture media for clostridia. Biochemical tests for identification. Serotyping by agglutinating sera. Microscopic preparation of H. pylori.

PRACTICAL TASKS: Preparation of a microscope slide from a culture of E. coli and Gram staining. Performing biochemical tests - indole formation, acidity (MR), Voges-Proskauer test, etc. Performing type Gruber agglutination test. Inoculation of feces on a differentiating medium.

PRACTICAL CLASS №24 - 2 hours

Microbiological examination of urine. Microbiological diagnosis of pathogens causing urinary tract infections: opportunistic pathogens (E. coli, Klebsiella, Proteus-Providentia-Morganella, Pseudomonas) and obligatory pathogenic (streptococci, salmonella, leptospira, M. tuberculosis).

PURPOSE OF THE PRACTICAL CLASS: To introduce the rules for collection and sending urine for bacteriological examination and the methods for detection and isolation of the most common bacterial agents.

DEMONSTRATIONS OF: Cultural and biochemical features of E. coli, Klebsiella, Proteus, Pseudomonas. Inoculation of urine culture by the quantitative method with a calibrated loop. Demonstration of leptospira in a wet mount slide on dark-field microscopy. Ready-made microscopic preparations of Gram-negative rods, streptococci, tuberculosis bacteria.

PRACTICAL TASKS: Inoculation of urine on Levine agar with calibrated loop. Reading and interpretation of urine cultures with different degrees of bacteriuria - determination of microbial count. Observation and drawing of leptospira. Interpretation of an antibiogram of microorganisms isolated from urine.

PRACTICAL CLASS №25 - 2 hours

Microbiological examination for sexually transmitted infections caused by *Neisseria gonorrhoeae*, *Treponema pallidum*, *C. albicans*, chlamydia, and mycoplasmas.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the morphology and biology of the most common causative agents of sexually transmitted infections.

DEMONSTRATIONS OF: Ready-made microscope slide of urethral smear with *N. gonorrhoeae*; ready-made microscope slide with *Candida albicans*. Immunofluorescence slide with elementary bodies of chlamydia in cervix cells. Bacterial cultures of *Candida albicans* on Sabouraud agar; chlamydospores of *Candida albicans* on rice agar; filamentation test. ELISA. Inoculation of fungi on ChromagarCandida. sowing of ChromagarCandida fungi. Positive and negative CFT (Wasserman) and VDRL tests - as screening tests for syphilis. Multiplex PCR - results from a patient.

PRACTICAL TASKS: Microscopy and recognition of *N. gonorrhoeae* in Gram and Löffler-stained urethral secretions. Reporting positive and negative samples of Wasserman and VDRL test. Observation and detection of chlamydospores of *Candida albicans* on rice agar. Working with mPCR protocols for sexually transmitted infections.

PRACTICAL CLASS №26 - 2 hours

Microbiological examination of blood - blood culture. Causative agents of septic conditions: obligatory pathogenic (*Salmonella typhi*, *Brucella*, *Borrelia*) and facultative pathogenic bacteria.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the microorganism cause bacteremia and sepsis and methods for the microbiological examination of bloodstream infections - conventional and automatic methods.

DEMONSTRATION OF: Blood culture media - soy-casein broth, thioglycollate broth, etc. *Salmonella* spp. and *Proteus* spp. cultures on Levine agar, deoxycholate-citrate agar and selenite broth. IMVUC tests of *Salmonella typhi* and *Proteus mirabilis*. *Brucella* culture media. Microscopic preparations of *Salmonella* spp. and *Brucella* spp. according to Gram stain. Cultures of streptococci and staphylococci on blood agar and tests for their identification. Analytical Vidal for typhoid fever and Right's agglutination for brucellosis.

PRACTICAL TASKS: Observation of ready microscopic slides. Reporting of positive and negative blood cultures cultured in the BactAlert apparatus. Characterization of salmonella and proteus growth on differentiating media. Reporting conventional tests for identification and the API system for *Salmonella typhi* and *Proteus mirabilis*. Determination of sample titers of Vidal and Right.

PRACTICAL CLASS №27 - 2 hours

Problematic microorganisms causing nosocomial and iatrogenic infections - *Pseudomonas*, *Acinetobacter*, *Enterococcus*, MRSA, *C. difficile*. Systemic mycoses caused by *Candida*, *Aspergillus*, *Actinomyces*, and *Cryptococcus*. Antifungal therapy.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the most common microorganisms that caused nosocomial and iatrogenic infections, methods for microbiological diagnosis, and interpretation of results. Introduction to the causative agents systemic mycoses - *Candida*, *Aspergillus*, *Actinomyces*, *Cryptococcus* and modern antifungal therapy

DEMONSTRATION OF: Cultures, identification tests, and AST of *Pseudomonas*, *Acinetobacter*, *Enterococcus*, MRSA. ELISA test for *C. difficile* toxins. Cultures, tests for the identification of *Candida*, *Aspergillus*, *Actinomyces*, *Cryptococcus*, and E-tests for antifungal drugs.

PRACTICAL TASKS: Reporting and identification of cultures, AST of multidrug-resistant *Pseudomonas* and *Acinetobacter*. Determination of ESBL (+) *E. coli*. Determination of MRSA and MSSA strains on MRSA screen agar. Reading AST of vancomycin-resistant enterococci - VRE. Resistance gene detection by mPCR. Characterization of cultures of *Candida*, *Aspergillus*, *Actinomyces*, *Cryptococcus* and reporting E-tests for antifungal drugs - voriconazole, anidulafungin, caspofungin, and others.

PRACTICAL CLASS №28 - 2 hours

Microbiological diagnosis of diseases caused by viruses - HIV, hepatitis A, B, C, D, and E, flu, and coronaviruses - SARS-CoV-2.

PURPOSE OF THE PRACTICAL CLASS: Introduction to the specificities of the viral diagnosis, viruses important for human pathology.

DEMONSTRATION OF: Hearst phenomenon and Hearst reaction (HFA) for Influenza viruses. ELISA - conventional and automated and CLIA equipment; real-time PCR and mPCR. ELISA samples for the diagnosis of viral markers (HBsAg, anti-HCV antibodies, anti-HIV-1,2 antibodies, etc.). mPCR for detection of influenza viruses, SARS-CoV-2, etc. respiratory pathogens.

PRACTICAL TASKS: Performing an ELISA test for anti-HCV antibodies. Reporting and interpretation of the result. Reporting of results from the mPCR respiratory panel - with SARS-CoV-2.

PRACTICAL CLASS №29 - 2 hours

Sanitary-microbiological examination of water, air, hospital environment. Sanitary-indicative microorganisms - *E. coli*, *Enterococcus*, *C. perfringens*, staphylococci, streptococci. TEST (practical classes №8-13)

PURPOSE OF THE PRACTICAL CLASS: Introduction to the methods of collection, transport, and basic scheme for sanitary-microbiological examination. Criteria for the identification of microorganisms as nosocomial agents.

DEMONSTRATION OF: Nutrient media and materials needed to determine the microbial count and *E. coli* titer in the sanitary-microbiological examination of water. Biochemical tests for differentiation of *E. coli* and *Klebsiella* - IMVUC. Sedimentation plates method for microbial air monitoring. Enterococcal nutrient media and cultures. Sherman's test.

PRACTICAL TASKS: Taking a hand swab for sanitary-microbiological examination and broth inoculation. Identification of *E. coli*, *Klebsiella*, *Enterococcus*, *C. perfringens*. Determination of microbial biotype, serotype, resistotype, etc. Identifying intrahospital infections. Characterization of the growth of *Staphylococcus* and *Streptococcus* strains on blood agar and identification according to specific tests.

EXERCISE №30 - 2 hours

Recapitulation of the students' practical skills, acquired during the two semesters with an evaluation mark.

➤ **Bibliography:**

Textbooks for medical students in Microbiology - English training

Obligatory:

1. Review of Medical Microbiology and Immunology, Warren Levinson, 13 e. McGraw Hill Education, 2014, ISBN 978-0-07-181811-7, 789 pp or
2. Medical Microbiology. Patrick R. Murray, Ken Rosenthal, Michael Pfaller. 8 e. Elsevier, 2016, ISBN 978-0-323-29956- 5, 848 pp.

Recommended:

1. Medical Microbiology. S. Baron, 4 ed, 2000, ISBN-10: 0-9631172-1-1, <http://www.ncbi.nlm.nih.gov/books/NBK7627/> or
2. Todar's online textbook of bacteriology. K. Todar, 2009, http://www.textbookofbacteriology.net/kt_toc.html
3. Medical microbiology / Patrick R. Murray et al . - 8th ed. - Philadelphia : Elsevier, 2016 . - 836 p. - (Student consult)
4. Cases in medical microbiology and infectious diseases / Peter H. Gilligan et al . - 4th ed. . - Washington : ASM Press, 2014 . - 589 p.
5. Laboratory exercises in microbiology : For students of medicine / Galina Zhelezova et al. - Sofia : St. Kliment Ohridski University Press, 2014 . - 256 p.
6. Mims' medical microbiology / Richard V. Goering et al. - 5th ed. . - Philadelphia: Elsevier, Saunders, 2013 . - 565 p. - (Student consult)
7. Manual for practical exercises in microbiology / Mariya Petrova Sredkova et al. - Pleven: Publ. center, Medical University - Pleven, 2012 . - 155 p.
8. Medical microbiology / Ed. Michael Ford . - 2nd ed. . - Oxford : Oxford University Press, 2014. - 484 p.

➤ **SYLLABUS FOR THE SEMESTER EXAM**

GENERAL MICROBIOLOGY

1. Subject and tasks of microbiology. Pasteur and Koch's contributions to the development of microbiology. Taxonomy of microorganisms - nomenclature and classification. General characteristics of the separate groups of microorganisms.
2. Morphology of bacteria - basic shapes, size. Methods for studying the morphology of bacteria. Bacterial structure - capsule, bacterial wall, cytoplasmic membrane, cytoplasm, and cytoplasmic inclusions. Flagella, pili, spores.
3. Bacterial genetics. Bacterial genotype and phenotype. Genetic apparatus in bacteria. The bacterial chromosome as a genetic system. Extrachromosomal genetic elements. Bacteriophages - main types, structure. Forms of the interaction of bacteriophages with bacteria - lytic cycle, moderate phage, phage conversion. Phage typing. Practical applications.
4. Microbial variability. Mutation. Mutagenic factors - chemical and physical, mechanism of action, practical significance, and application. Genetic exchange between bacteria: transformation, transduction, conjugation - mechanisms. Significance of bacterial and phage genetics. Genetic engineering. Modern genetic methods in clinical microbiology. DNA probes, PCR - polymerase chain reaction..
5. Bacterial physiology. Chemical composition of bacteria. Types of bacterial enzymes and their practical significance. Metabolism in bacteria - catabolic and anabolic processes. Bacterial respiration. Bacterial nutrition. Nutrient transfer.

6. Growth and multiplication of bacteria. Growth phases and growth curves. Bacterial cultivation - basic principles, types of nutrient media. Growth factors in bacteria.
7. Influence of physical factors on microorganisms: heat, drying, lyophilization, light, atmospheric pressure, osmotic pressure, pH, radiation, sound energy. Sterilization. Sterilization methods. Influence of chemical factors on microorganisms; Mechanism of action. Oligodynamic effect. Disinfection. Types of disinfectants. Influence of biological factors on microorganisms: symbiosis, antagonism, antibiosis
8. Antimicrobial agents. Antibacterial drugs - main groups and mechanisms of action. Mechanisms of resistance. Determination of bacterial susceptibility to antibiotics.
9. Viruses. Nature and properties. Cultivation methods. Classification. *Rickettsia*. Nature and properties. Cultivation methods. Classification.
10. The external environment as a factor in the spread of infectious diseases. Microflora of water, soil, and air. Microorganisms in food products, hospital rooms, etc. Sanitary-indicative microorganisms in the environment.

INFECTION AND IMMUNITY

11. Infection and infectious process. The role of microorganisms in the infectious process. Pathogenicity, virulence, contagiousness, invasiveness, toxigenicity. Pathogenicity factors. Pathogenesis of the infectious process. Characteristics of infectious disease. Forms of the infectious process. The role of the macroorganism in the infectious process. The role of the external environment for the occurrence and course of the infectious process. Epidemic process. Factors and mechanisms of transmission of infectious agents in the epidemic process.
12. Natural resistance. Protective role of the skin, mucous membranes, organs, and normal microflora. Humoral factors of natural resistance. Lysozyme. Complement. Interferon. Cellular factors of natural resistance. Phagocytosis. Inflammation.
13. Immunity. Definition. Types of immunity. Anatomy and structure of the immune system. Central and peripheral immune organs. Cells of the immune system.
14. Antigens. Types of antigens. Antigenic characteristics of microorganisms.
15. Humoral immunity. Characteristics of antibodies (immunoglobulins). Structure and functions of different classes of immunoglobulins. Mechanism of action of antibodies. Local immunity.
16. Cellular immunity. Cells and mechanism of action. Forms of cellular immunity. Cellular cooperation in the immune response.
17. Development of the immune response. Dynamics of the immune response – primary and secondary immune response. Humoral regulation of the immune response. Genetics and genetic control of the immune response. APC. The role of MHC - antigen recognition molecules
18. Allergy - definition and forms. Fast type of allergy - anaphylaxis, atopy, clinical significance. Cytotoxic allergic reactions. Allergic phenomena of immune complexes – Arthus phenomenon, serum sickness, clinical significance. Slow type of allergy - cell-mediated hypersensitivity. Contact dermatitis. Clinical significance.
19. Immunopathology. Immunopathological reactions and diseases. Immunological tolerance. Autoimmune diseases. Immunodeficiency conditions and diseases. Infectious diseases of the immune system.
20. Antigen-antibody reaction. Types of immune diagnostic reactions - agglutination, precipitation, neutralization - toxin-antitoxin, AST, virus-neutralizing reaction. Complement dependent - bacteriolysis, cytolysis, hemolysis, complement fixation test (CFT). Mechanism of reactions and application in microbiological diagnostics.

21. Labeled immune reactions - immunofluorescence (IFA), radioimmune (RIA) and enzyme-linked immunosorbent assay (ELISA) tests. Hybridoma biotechnology. Monoclonal antibodies.
22. Immunoprophylaxis and immunotherapy. Vaccines and serums. Immunomodulation.

MICROBIOLOGY

23. Staphylococci. (*Staphylococcus*) Species, morphology, biology, biochemical productivity, pathogenicity factors. Signs of pathogenicity in staphylococci. Diseases, immunity. Microbiological diagnosis. Antibiotic therapy. MRSA - clinical significance and diagnosis.
24. Streptococci (*Streptococcus*). Classifications. Morphology, biology, antigenic structure, pathogenicity factors. Diseases. Immunity. *Streptococcus* as a cause of scarlet fever. Microbiological diagnosis. Antibiotic therapy. Pneumococci (*Streptococcus pneumoniae*). Morphology, biology, biochemical productivity. Antigenic structure. Pathogenicity factors. Diseases. Immunity. Microbiological diagnosis. Therapy and specific prevention.
25. Meningococci (*Neisseria meningitidis*). Morphology, biology, biochemical productivity. Antigenic structure - serogroups. Pathogenicity factors. Pathogenesis and clinical forms of meningococcal infection. Immunity. Microbiological diagnosis. Specific prevention and therapy. Gonococci (*Neisseria gonorrhoeae*). Morphology, biology, biochemical productivity. Pathogenicity factors. Pathogenesis and clinical forms of gonococcal infection. Immunity. Microbiological diagnosis. Prevention and therapy.
26. Family Enterobacteriaceae. Groups of intestinal bacteria according to pathogenicity. General characteristics: morphology, biology, biochemical productivity. Antigenic structure. Pathogenicity factors. Properties of endotoxin. Coli bacteria (*Escherichia coli*). Morphology, biology, biochemical productivity. Antigenic structure. Pathogenicity factors. Diseases. Pathogenic *Escherichia coli* in the intestinal tract. Immunity. Microbiological diagnosis.
27. *Proteus*. *Providencia*. *Morganella*. Species. General characteristics: morphology, biology, biochemical productivity. Diseases. Therapy. Microbiological diagnosis. Tribus *Klebsiellae*. Species. Morphology, biology, biochemical productivity. Pathogenicity factors. Diseases. Immunity. Microbiological diagnosis. Therapy. *Pseudomonas*. Morphology, biology, biochemical productivity. Pathogenicity factors. Diseases. Microbiological diagnosis. Therapeutic problems.
28. *Salmonella*. General characteristics: morphology, biology, biochemical productivity. Kaufman antigenic characterization and classification. Antigenic formulas. Pathogenicity factors. Pathogenesis, immunity, and specific prophylaxis in typhoid and paratyphoid fever. *Salmonella* – as causative agents of food poisoning. Characteristic. Microbiological diagnosis.
29. Dysenteric bacteria (*Shigella*). Classification. Morphology, biology, biochemical productivity. Antigenic structure. Pathogenicity factors. Pathogenesis and immunity. Microbiological diagnosis. *Helicobacter pylori*. Morphology, biology, biochemical productivity. Diseases. Microbiological diagnosis. Therapy. *Clostridium difficile*. Morphology, biology, biochemical productivity. Pathogenicity factors. Pathogenesis and immunity. Microbiological diagnosis. Therapy.
30. The causative agent of plague (*Yersinia pestis*). Morphology, biology, biochemical productivity. Pathogenicity factors. Pathogenesis and immunity. Microbiological diagnosis. Specific prevention and therapy. *Yersinia enterocolitica* - morphology,

- biology, biochemical productivity. Pathogenicity factors. Pathogenesis. Microbiological diagnosis.
31. *Vibrio cholerae*. Morphology, biology, biochemical productivity. Antigenic structure. Serological types. Pathogenicity factors. Pathogenesis and immunity. Microbiological diagnosis. Specific prevention and therapy.
 32. Pertussis and pertussis bacteria (*Bordetella pertussis*, *B. parapertussis*). Morphology, biology. Pathogenicity factors. Pathogenesis and immunity. Microbiological diagnosis. Specific prevention and therapy. Genus *Haemophilus*. Morphology, biology. Antigenic structure. Pathogenicity factors. Diseases. Immunity. Microbiological diagnosis. Specific prevention and therapy. *Listeria monocytogenes*. General characteristics.
 33. *Brucella*. Species. Morphology, biology, biochemical productivity. Pathogenicity factors. Pathogenesis and immunity. Microbiological diagnosis. Specific prevention. Causative agent of tularemia (*Francisella tularensis*) - general characteristics. *Legionella pneumophila* - general characteristics.
 34. Causative agent of diphtheria (*Corynebacterium diphtheriae*). Morphology, biology, biochemical productivity. Pathogenicity factors. Pathogenesis and immunity. Microbiological diagnosis. Specific prevention and therapy. Diphtheroid bacteria (*C. jeikeium*, *C. urealyticum*, *C. amiculatum*, *C. pseudo-diphtheriticum*). Clinical significance.
 35. *Mycobacterium*. Causative agent of tuberculosis (*Mycobacterium tuberculosis*). Morphology, biology, pathogenesis, clinical forms, immunity, allergy. Specific prevention of tuberculosis. Therapy. Microbiological diagnosis. The causative agent of leprosy (*Mycobacterium leprae*). Morphology, biology. Pathogenesis. Clinical forms. Prevention. Microbiological diagnosis.
 36. Causative agent of anthrax (*Bacillus anthracis*). Morphology, biology. Pathogenesis, clinical forms. Immunity. Specific prevention and therapy. Microbiological diagnosis. The causative agent of typhoid fever (*Borrelia recurrentis*). Morphology, biology. Pathogenesis, immunity. Microbiological diagnosis. The causative agent of Lyme disease (*Borrelia burgdorferi*). Pathogenesis. Immunity. Microbiological diagnosis
 37. Anaerobic spore-forming bacteria - genus *Clostridium*. General characteristics - morphology, biology. Tetanus bacillus (*Clostridium tetani*). Pathogenicity factor. Pathogenesis and immunity. Specific prevention and therapy. Microbiological diagnosis. Causative agents of gas gangrene (*C. perfringens*, *C. novyi*, *C. septicum*, *C. histolyticum*). Pathogenicity factors. Pathogenesis, immunity, prevention, and therapy. Microbiological diagnosis. The causative agent of botulism (*C. botulinum*). Pathogenicity factor. Pathogenesis and immunity. Prevention and specific therapy. Microbiological diagnosis.
 38. Spirochetes (family Spirochaetaceae) - general characteristics. The causative agent of syphilis (*Treponema pallidum*). Morphology, biology. Pathogenesis and immunity. Microbiological diagnosis. *Leptospira*. Species. Morphology, biology. Antigenic structure. Pathogenesis and immunity. Microbiological diagnosis
 39. Genus *Mycoplasma*. Classification. Morphology, biology. Diseases. Microbiological diagnosis. L-forms of bacteria. Genus *Chlamydia*. General characteristics. Species. Causative agents of ornithosis and trachoma. Morphology, biology. Pathogenesis. Diseases. Microbiological diagnosis
 40. The causative agent of typhus (*Rickettsia prowazekii*). Morphology, biology. Pathogenesis and immunity. Specific prevention. Microbiological diagnosis. The causative agent of Marseille fever (*Rickettsia conorii*). Morphology, biology. Pathogenesis and immunity. Microbiological diagnosis. The causative agent of Q fever (*Coxiella burnetii*). Morphology, biology. Microbiological diagnosis.

41. Pathogenic fungi (*Fungi*). *Candida* (genus *Candida*). Morphology, biology. Pathogenesis, clinical forms. Microbiological diagnosis. Therapy. *Aspergillus*, *Cryptococcus*, Actinomycetaceae. Morphology, biology, diseases, and microbiological diagnosis.

VIROLOGY

42. Family Picornaviridae. Genus *Enterovirus* - poliovirus, Coxsackie viruses, ECHO viruses. Genus *Rhinovirus*. Genus *Aphtovirus* - the causative agent of foot-and-mouth disease.
43. Family Orthomyxoviridae. *Influenza viruses*
44. Family Paramyxoviridae - parainfluenza viruses; the causative agent of mumps; the causative agent of measles. Respiratory syncytial virus.
45. Arbovirus infections and rubella. The family Togaviridae - genus *Alphavirus* and genus *Rubivirus*. Family Flaviviridae - causative agents of yellow fever, dengue, pappataci fever, tick-borne encephalitis. Family Bunyaviridae – causative agents of Crimean hemorrhagic fever and hemorrhagic fever with renal syndrome.
46. Family Poxviridae - the causative agent of smallpox. Family Adenoviridae.
47. Family Retroviridae - the causative agent of AIDS. Family Rhabdoviridae – the causative agent of rabies.
48. Family Herpesviridae - Herpes simplex virus type 1 and 2, Varicella-Zoster virus, *Cytomegalovirus*, Epstein-Barr virus, other herpes viruses.
49. Causative agents of viral hepatitis (HAV, HBV, HCV, HDV, HEV).
50. Family Coronaviridae. SARS-CoV-2, the causative agent of COVID-19.

MEDICAL UNIVERSITY - PLOVDIV

MEDICAL FACULTY

SYLLABUS

IN

MEDICAL GENETICS

Accepted by the Department Council №9 on May 04, 2022

Approved by the Faculty Council with Protocol №6/15.06.2022

MEDICAL GENETICS

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								4 th year	
MEDICAL GENETICS	VII	Total	Lectures	Practices	ECTS	1.0	3.0	VII	VIII
		60	15	45	2.0			1/3	

DISCIPLINE:

Medical Genetics

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master / M /

FORMS OF TRAINING:

Lectures, practicals, self-preparation.

YEAR OF TRAINING:

IV

DURATION OF TRAINING:

One semester

ACADEMIC HOURS:

15 hours of lectures, 45 hours of exercises

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, discussions, demonstration of methods for genetic analysis, observation of microscopic preparations, karyograms for analysis, reagents for the implementation of methods, solving practical problems, building and analyzing a pedigree.

FORMS OF EVALUATION:

Current evaluation, tests, colloquiums, essay writing.

EVALUATION CRITERIA:

The average current grade for the semester is formed.

ASPECTS OF EVALUATION CRITERIA:

Participation in discussions, solving tests.

SEMESTER EXAM:

Yes (written test and oral)

STATE EXAM:

No

LECTURER:

Full Professor from the Department of Pediatrics and Medical Genetics.

DEPARTMENT:

Pediatrics and Medical Genetics

ANNOTATION

The discipline "Medical Genetics" provides an opportunity to acquire modern knowledge about the patterns of inheritance of genetic diseases; features of hereditary pathology; etiology and clinic of the most common genetic diseases - chromosomal, monogenic and multifactorial and skills for active involvement in the prevention of hereditary diseases and predispositions.

BASIC AIMS OF THE DISCIPLINE

☐ Acquisition of knowledge about the basics of medical genetics; understanding the genetic nature of hereditary diseases, hereditary predispositions to diseases and pathology due to somatic mutations;

- Introduction to modern diagnostic methods of medical genetics and algorithm of behavior;
- Acquisition of skills for active participation in the prevention of hereditary diseases and predispositions through competent referral of patients to genetic counseling, assistance in conducting screening programs, assessment of indications for DNA diagnostics, cytogenetic analysis, prenatal, preimplantation and postnatal diagnosis.

EXPECTED RESULTS

After completing the training, students must have knowledge and specific practical skills:

- to build pedigrees of families with hereditary diseases and predispositions;
- to determine the type of inheritance, to assess the genetic risk in Mendelian and multifactorial diseases;
- recognize, classify and interpret congenital malformations;
- know the cytogenetic, molecular genetic and biochemical diagnostic tests;
- to know the indications, the main tasks and the organization of the medical-genetic consultation;
- to know the indications for prenatal diagnosis and types of antenatal diagnosis;
- to assist in the implementation of existing screening programs;
- use clinical information to search for various inherited diseases in databases.

LECTURES

LECTURE № 1 - 2 hours. Genetic counselling. Prophylactic and diagnostics of genetic disorders.

Genetic counselling: nature, indications, tasks. The organization of the medical-genetic consultation. Prenatal diagnosis - methods, indications. Mass and selective screening. Prenatal diagnosis - methods, indications.

LECTURE № 2 - 2 hours. Chromosomal abnormalities - numerical And structural. Clinical and cytogenetic characteristics. Genetic counselling.

Chromosomal pathology. Numerous and structural chromosomopathies: etiology, pathogenesis, cytogenetic forms, clinical and characteristics, genetic counselling.

LECTURE № 3 - 3 hours. Monogenic disorders. Pedigree analysis. Autosomal dominant and autosomal recessive type of inheritance – criteria and exceptions. Genetic counselling. Examples.

Autosomal dominant and autosomal recessive type of inheritance type of inheritance: clinical and genealogical criteria, features, deviations. Examples: etiology, pathogenesis, clinical characteristics, genetic counselling.

LECTURE № 4 - 2 hours. X-linked disorders. X-linked dominant and x-linked recessive type of inheritance. Genetic counseling. Examples.

X-dominant and X-recessive type of inheritance: clinical and genealogical criteria, features. Examples: etiology, pathogenesis, clinical characteristics, genetic counselling.

LECTURE № 5 - 2 hours. Non-mendelian patterns of inheritance. - multifactorial inheritance. Common multifactorial disorders.

Genetics of diseases with multifactorial heredity - criteria, features. Multifactorial inheritance and common diseases. Genetics of congenital defects with multifactorial heredity. Genetic predisposition to certain mental, cardiovascular, gastrointestinal and other diseases. Genetic counselling.

LECTURE № 6 - 2 hours. Cancer genetics.

Genetic aspects of cancer. Cell cycle. Apoptosis. Tumorigenesis - oncogenes, tumor suppressor genes, activation mechanisms. Hereditary and sporadic cancers.

Pharmacogenetics and pharmacogenomics - definition, characteristics, application.

LECTURE № 7 - 2 hours. Pharmacogenetics and pharmacogenomics.

Pharmacogenetics and pharmacogenomics. History, principles. Types of pharmacogenetic variations. Pharmacogenetics in practice.

PRACTICES

№ 1 - 3 hours:

Organization of genetic material in the cell. Cell cycle. Types of mutations. Revision

1. Cell Cycle and Mitosis.
2. Spermatogenesis and ovogenesis.
3. DNA, Replication, Transcription and Translation.
4. Subcellular organization of the genome.
5. Mutations. Mutations at the gene level. Mutations at the chromosome level.

6. Karyotype.

№ 2 - 3 hours: Genetic methods

1. Introduction to the cytogenetic laboratory
2. Technique for obtaining chromosomes
 - a. Preparation of lymphocyte cultures from peripheral blood (application of biostimulants and mitostatics)
 - b. Hypotonic processing, fixation and preparation of preparations for chromosome analysis
 - c. Coloring techniques: routine and tape
3. Technique for preparation of preparations for X sex chromatin
2. Microscopy of preparations for chromosome analysis and X sex chromatin.
3. Work with karyograms and karyotyping.
4. Cytogenetic diagnosis in normal and abnormal karyotype. Philadelphia chromosome.
5. Forensic examination by chromosome markers.

№ 3 - 3 hours: Autosomal chromosomal diseases

1. Consideration of a case of a family with a child with a common form of Down syndrome (trisomy 21) and medical-genetic consultation. Discuss the age of the parents as a risk factor.
2. Consideration of a case of a family with a child with a congenital translocation form of Down syndrome and medical-genetic consultation.
3. Consideration of a case of a family with a child with a hereditary translocation form of Down syndrome and medical-genetic consultation.
4. Consideration of a case of a family with a child with a mosaic form of Down syndrome and medical-genetic consultation.
5. Prenatal biochemical screening - types; discussion of results.

№ 4 - 3 hours: Autosomal chromosomal diseases - continuation

1. Consideration of a case of a family with a child with Patau's syndrome (trisomy 13) and medical-genetic consultation
2. Consideration of a case of a family with a child with Edwards syndrome (trisomy 18) and medical-genetic counseling
3. Consideration of a case of a family with a child with Rethore syndrome (partial trisomy 9p) and medical-genetic consultation
4. Consideration of a case of a family with a child with "cri du chat" syndrome (partial monosomy 5p) and medical-genetic consultation

№ 5 - 3 hours: Gonosomal chromosomal diseases (numerical and structural)

1. Consideration of a case of a family with a child with Turner's syndrome (total monosomy X) and medical-genetic consultation
2. Consideration of a case of Turner syndrome with other cytogenetic variants and medical-genetic consultation
3. Consideration of a case with Triple X syndrome and medical-genetic consultation
4. Consideration of a case with Klinefelter's syndrome and medical-genetic consultation

5. Consideration of a case with "supermen" syndrome and medical-genetic consultation
6. Prenatal biochemical screening - discussion of results.

№ 6 - 3 hours: Summary exercise on chromosomal diseases and colloquium

1. Chromosomal diseases
2. Cytogenetic methods
3. Test

№ 7 - 3 hours: Autosomal recessive diseases

1. Consideration of a case of a family with a child with cystic fibrosis and medical-genetic consultation. DNA analysis techniques: Southern blot hybridization, PCR amplification.
2. Consideration of a case of a family with a child with phenylketonuria and medical-genetic consultation. Guthrie test.
3. Consideration of a case of a family with a child with Werdnig-Hoffmann disease and medical-genetic consultation.
4. Consideration of a case of a family with a child with adrenogenital syndrome and medical genetic counseling.
5. Consideration of a case of a family with a child with thalassemia and medical-genetic consultation.

№ 8 - 3 hours: Metabolic diseases

1. Consideration of a case of a family with a child with glycogenosis and medical-genetic consultation.
2. Consideration of a case of a family with a child with Hurley's disease and medical-genetic consultation.
3. 3.Consideration of a case of a family with a child with Wilson-Konovalov disease and medical-genetic consultation

№ 9 - 3 hours: Autosomal dominant diseases. Examples

1. Consideration of a case of a family with a child with Huntington's disease and medical-genetic consultation.
2. Consideration of a case of a family with a child with achondroplasia and medical-genetic consultation.
3. Consideration of a case of a family with a child with myotonic dystrophy and medical-genetic consultation.
4. Consideration of a case of a family with a child with Neurofibromatosis and medical-genetic consultation.

№ 10 - 3 hours: Heterogeneous diseases

1. Consideration of a case of a family with a child with Osteogenesis imperfecta and autosomal recessive type of inheritance and medical-genetic consultation.
2. Consideration of a case of a family with a child with Osteogenesis imperfecta and autosomal dominant type of inheritance and medical-genetic consultation.
3. Consideration of a case of a family with a child with Polycystosis renis and autosomal recessive type of inheritance and medical-genetic consultation.
4. Consideration of a case of a family with a child with Polycystosis renis and autosomal dominant type of inheritance and medical-genetic consultation.

5. Commentary on families with deafblindness, albinism, etc.

№ 11 - 3 hours: X - recessive diseases

1. Consideration of a case of a family with a boy with Duchene muscular dystrophy and medical-genetic consultation.
2. Consideration of a case of a family with a boy with hemophilia and medical-genetic consultation.
3. Consideration of a case of a family with a boy with Wiscott-Aldrich and medical-genetic consultation.
4. Consideration of a case of a family with a boy with G6FD and medical-genetic consultation.
5. Consideration of a case of a family with "Fragile X" syndrome and medical-genetic consultation.

№ 12 - 3 hours: X-dominant type of inheritance. Examples. Non-Mendelian type of inheritance. Examples

1. Clinical-genetic criteria of X - dominant type of inheritance
2. Diseases inherited as XD type .
3. Consideration of a case of a family with incontinentia pigmenti and medical-genetic consultation.
4. Uniparental disomy. Genomic imprinting.
5. Mosaicism.
6. Mitochondrial type of inheritance.
7. Consideration of a case of a family with Prader-Willi syndrome and medical-genetic consultation

№ 13 - 3 hours: Multifactorial defects. Screening for open neural tube defects.

1. Consideration of a case of a family with a previous child with anencephaly and medical-genetic consultation.
2. Consideration of a case of a family with a previous child with spina bifida and medical-genetic consultation.
3. Consideration of a case of a family with a previous child with a cleft palate and medical-genetic consultation.
4. Consideration of a case of a family with a child with heart malformation and medical-genetic consultation.
5. Ultrasound screening - interpretation and comment of results.
6. Prenatal biochemical screening for open fetal defects.

№ 14 - 3 hours: Summary exercise on monogenic and multifactorial diseases, screening tests and colloquium.

1. DNA research methods in monogenic diseases.
2. Types of inheritance in monogenic diseases and differential diagnosis.
3. Multifactorial defects and diseases.
4. Screening.
5. Test.

№ 15 - 3 hours: Genetics of cancer

1. Consideration of a case of a family with breast cancer.
2. Consideration of a case of a family with ovarian cancer.
3. Consideration of a case of a family with colorectal cancer and endometrial cancer.

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Basic

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2. Strachan T. Human Molecular Genetics, Garland Publishing Inc, 2010
3. Read A. New Clinical Genetics, Scion Publishing LTD, 2010
4. Turnpenny P. D. Emery's Elements of Medical Genetics, Churchill Livingstone, 2011
5. Gardner R.J.M., Chromosome Abnormalities and Genetic counseling. Oxford University Press Inc, 2011
6. Francis R. C. Epigenetics. WW Norton & Co, 2012

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<http://www.geneticalliance.org/>

<http://www.ncbi.nlm.nih.gov/Omim/allresources.html>

<http://archive.uwcm.ac.uk/uwcm/mg/hgmd0.html>

<http://www.ncbi.nlm.nih.gov/Omim/allresources.html#LocusSpecific>

<http://www.ncbi.nlm.nih.gov/Omim/allresources.html#ModelOrganisms>

<http://www.mitomap.org/>

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<http://www.ncbi.nlm.nih.gov/ncicgap/>

<http://www.ncbi.nlm.nih.gov/Homology/Davis/>

<http://www.gene.ucl.ac.uk/nomenclature/>

<http://www.ncbi.nlm.nih.gov/disease/>

<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?CMD=search&DB=omim>

<http://www.docnmail.com/learnmore/medical/genetics.htm>

<http://www.who.int/genomics/public/geneticdiseases/en/index1.html>

<http://www.wellcome.ac.uk/en/genome/genesandbody/hg06b010.html>

CONSPECTUS FOR SEMESTRIAL EXAM

1. Material bases of heredity. Nucleic acids. Proteins. Gene - structure and function, mechanisms of gene regulation. Genetic code.
2. Molecular and subcellular organization of human chromosomes. Karyotype.
3. Gene mutations. Mutagenic factors. Significance of mutagenesis. Genetic monitoring.
4. Basic disorders of the karyotype. Mechanisms of chromosomal aberration, designation.
5. Chromosomal diagnostics - methods (direct and indirect). Tape techniques - diagnostic capabilities. Chromosomal polymorphism. Heterochromatin markers. Sex chromatin - essence, diagnostic value.
6. DNA analysis. PCR. Southern blot. Mutation analysis. DNA sequencing and cloning. Human genomic project. Gene mapping and identification strategies. Human gene map.
7. Chromosomal pathology. Chromosomal diseases associated with numerous aberrations of autosomes, complete and mosaic forms. Genetic counseling.
8. Chromosomal pathology. Chromosomal diseases associated with structural aberrations of autosomes. Partial monosomies and trisomies. Microdeletion syndromes. Subtelomeric aberrations. Molecular cytogenetics.
9. Chromosomal pathology. Chromosomal diseases associated with gonosome aberrations. Genetic counseling.
10. Gender determination and differentiation. Male and female pseudohermaphroditism, true hermaphroditism. Examples. Genetic counseling
11. Autosomal dominant type of inheritance - clinical and genetic patterns, examples. Genetic

12. Autosomal recessive type of inheritance - clinical and genetic patterns. Examples. Genetic counseling.
13. Sex-related type of inheritance (X-recessive and X-dominant). Clinical and genetic patterns, examples, genetic counseling. Gender-dependent scars.
14. Heterogeneous diseases - nature, examples, clinical-genetic polymorphism.
15. Multifactorial type of inheritance - clinical and genetic patterns, examples, genetic counseling. Diseases with hereditary predisposition.
16. Non-Mendelian type of inheritance - species. Dynamic mutations. Expansion of triplet repetitions - nature, examples, clinical and genetic characteristics. Genetic counseling.
17. Non-Mendelian type of inheritance - species. Genetic imprinting - essence, examples, clinical-genetic characteristics. Genetic counseling.
18. Mitochondrial genome. Mitochondrial type of inheritance - nature, examples, clinical and genetic characteristics. Genetic counseling.
19. Cystic fibrosis - clinical and genetic characteristics, Genetic counseling.
20. Phenylketonuria - clinical and genetic characteristics, treatment, genetic counseling. Other hereditary aminoaciduria. Mass screening for hereditary diseases in newborns.
21. Hemophilia - types, clinical and genetic characteristics, Genetic counseling.
22. Muscular dystrophy type Duchenne and type Becker. Clinical and genetic characteristics, Genetic counseling.
23. Enzymopathies and lysosomal diseases of accumulation - lipidosis, mucopolysaccharidosis, glycogenosis. Clinical-genetic characteristics, genetic counseling.
24. Hereditary diseases of lipid metabolism. Hyperlipidemia. Kinds. Clinical-genetic characteristics, genetic counseling.
25. Defects of purine metabolism, clinical and genetic characteristics, genetic counseling.
26. Polycystic kidney disease - types, clinical and genetic characteristics, genetic counseling.
27. Hereditary diseases of collagen - examples, clinical and genetic characteristics, genetic counseling.
28. Hemoglobin. Hemoglobinopathies and hemoglobinosis - clinical and genetic characteristics, genetic counseling.

29. Hereditary diseases of metals. Hemochromatosis. Wilson-Konovalov disease. Clinical-genetic characteristics, genetic counseling.
30. Immunogenetics. Gene regulation of immunity. Hereditary immunodeficiency conditions. Clinical-genetic characteristics, genetic counseling. Complement system - genetic disorders and diseases. Genetic counseling.
31. Pharmacogenetics. Pharmacogenetic defects and pharmacogenetic polymorphism. Glucose-6-PDN. Clinical-genetic characteristics, genetic counseling.
32. Oncogenetics. Oncogenes and tumor suppressor genes. Chromosomal markers in leukemias, lymphomas and myelodysplastic conditions. Diagnosis. Prognostic significance, attitude to therapeutic behavior.
33. Leukemia - molecular genetic studies, diagnostic and prognostic significance.
34. Prevention and therapy of hereditary pathology - basic approaches. Genetic counseling. Prenatal diagnosis.
35. Screening of hereditary diseases and defects: mass and selective, prenatal and postnatal. Biochemical screening in pregnant women.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
PATHOPHYSIOLOGY

Approved by the Department Council № 5 on 11.07.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

**Pathophysiology
Syllabus**

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			3rd year	
Pathophysiology	VI							V	VI
		105	45	60	3.5	1.5	5.0	2/2	1/2

DISCIPLINE:

Pathophysiology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Required.

LEVEL OF QUALIFICATION: Master (M).

FORMS OF TRAINING: Lecture course. Practicals. Colloquiums and MCQ testing methods. Consultations. Participation in measurements conducted at the department functional laboratories. Homework, using textbooks and manuals recommended by the department.

YEAR OF TRAINING: 3rd year

DURATION OF TRAINING: Two semesters.

ACADEMIC HOURS: 45 hours of lectures and 60 hours of seminar practicals.

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Presentations, seminar practicals, discussions, reports by the students

FORMS OF EVALUATION: Preliminary assessment of progress: oral and written examination, colloquiums, MCQs.

EVALUATION CRITERIA: Each semester notes are summarized

ASPECTS OF EVALUATION CRITERIA: Discussion participation, MCQs

SEMESTER EXAM: Final evaluation: MCQ test of the final examination. Written exam topics drawn from the syllabus on the day of the final exam. Oral examination.

STATE EXAM: Negative

LECTURER: Lecturer with an academic degree from the Department of pathophysiology

DEPARTMENT: Pathophysiology

ANNOTATION

Lectures and practicals in Pathophysiology are based on the general understanding of etiology and pathogenetic theories; reactivity and resistance; basic metabolism; main dysbalance in human body functions and main pathologic processes.

Special pathophysiology lectures are based on the leading pathogenic factors and mechanisms underlying the disorders of different systems – cardiovascular, respiratory, gastrointestinal, endocrine, nervous and other systems; as well etiology and pathogenesis of leading diseases like atherosclerosis, CAD, carcinomas, obesity, diabetes mellitus, AIDS and many others.

BASIC AIMS OF THE DISCIPLINE

Pathophysiology is a fundamental - applied discipline. The aim is to study the causes and mechanisms of disturbed functions in a sick person.

Based on this principle, the main goals of the training in pathophysiology at MU-Plovdiv are:

- Studying the causes, conditions and mechanisms for occurrence and development of pathological processes and diseases in human, based on the contemporary level of scientific knowledge.
- Animal modeling of pathological processes and diseases for the purpose of dynamic tracking of major units of etiology and pathogenesis. Acquisition of practical habits for experimentation and observation of laboratory animals considered with medical ethics requirements.
- Implementation of the Pathogenesis Approach in Clinical Thinking of the student to the patient through training compliant with the needs of the clinical practice.
- Clarification of the mechanisms of extreme conditions – impact of environment, stress and over-information, urbanization, etc. on the psycho-somatic behavior and the biological development of human and the study of etiology and pathogenesis of socially significant diseases. Further development of disease concepts, using advances in scientific and technical progress and molecular biology, genetic engineering, immunology and others.

The aim is consistent with:

- Mission and conceptions of Medical University of Plovdiv
- Scopes and credit rating of the discipline Pathophysiology (ECTS system),
- Qualification characteristics of the specialty pathophysiology

The aim is adapted to the significance and chronology of the discipline in the curriculum of medical students.

EXPECTED RESULTS

Theoretical skills

Knowledge about:

- ✓ Main types of pathologic processes – inflammation; fever; hypoxia; disorders of metabolism;
- ✓ To be able to recognize symptoms and syndromes; pathologic condition, pathologic process and disease
- ✓ The leading causes and conditions in main diseases;

Practical skills

- ✓ Basic skills in understanding the acid base dysbalance and main groups of acidosis and alkalosis; to understand the main spirometric disorders in respiratory diseases

LECTURES

LECTURE № 1

HEALTH AND DISEASE

1. Basic concept of pathophysiology
2. Health.
3. Disease. Definition.
4. Periods of disease
5. Clinical and biological death
6. Aging – an universal phenomenon. Aging changes.

LECTURE № 2

PATHOPHYSIOLOGY OF CARBOHYDRATES METABOLISM

1. Carbohydrates and insulin. Regulation
2. Hyperglycemia and hypoglycemia, types.
3. Diabetes mellitus. Definition. Classification.
4. Etiology and pathogenesis of main types of diabetes.
5. Clinical presentation and complications. Pathogenesis.

LECTURE № 3

PATHOPHYSIOLOGY OF LIPID METABOLISM

1. Disorders in digestion and absorption of lipids
2. Lipoproteins. Types, metabolism, types of hyperlipidemia
3. Atherosclerosis – pathogenesis.
4. Obesity. Pathogenetic classification. Characteristics.
5. Metabolic syndrome .

LECTURE № 4

DISORDERS IN WATER BALANCE. DISORDERS OF THERMOREGULATION.

1. Body water balance.
2. Dehydration and hyperhydration. Types. Factors.

3. Edema. Definition. Types. Pathogenic factors.
4. Thermoregulation. – characteristics.
5. Hyperthermia – central hyperthermia.
6. Fever. Etiology, pathogenesis.
7. Phases and clinical presentation of fever .

LECTURE № 5

PATHOPHYSIOLOGY OF ACID BASE BALANCE

1. General pathogenesis and classification of acid base disorders.
2. Parameters. Compensations and mechanisms.
3. Main disorders of acid base balance. Characteristics.
4. Clinical presentations of acid base disorders.

LECTURE № 6

PATHOPHYSIOLOGY OF CALCIUM AND PHOSPHORUS METABOLISM

1. Calcium and phosphorus – main characteristics.
2. Hypocalcemia.
3. Hypercalcemia – causes, complications, pathogenesis
4. Osteomalacia. Osteolysis.
5. Osteoporosis
6. Rickets. Characteristics.
7. Hypophosphatemia. Hyperphosphatemia. Causes, complications, pathogenesis

LECTURE № 7

HYPOXIA

1. Oxygen cascade – stages, parameters.
2. Hypoxia – definition, basic understanding.
3. Classification. Types of hypoxia. Characteristics.
4. Tissue hypoxia. Stages, characteristics
5. Metabolic changes and adaptations in hypoxia.

LECTURE № 8

REACTIVITY AND RESISTANCE. ALLERGY.

1. Reactivity and resistance – definition, basic understanding.
2. Factors influencing the reactivity and resistance - types, characteristics
3. Allergy. Definition, basic understanding.
4. Allergy of humoral and cell-mediated types. Characteristics.

LECTURE № 9

INFLAMMATION

1. Definition, basic understanding and biological importance of inflammation.
2. Classification.
3. Local clinical signs.
4. Etiology and pathogenesis of inflammation
5. Mediators and modulators of inflammation.
6. Changes in the metabolism and clinical outcome of inflammation.

LECTURE № 10

PATHOGENESIS OF IMPAIRED CELL GROWTH. CARCINOMAS.

1. Neoplasia.
2. Main characteristics.
3. Etiology.
4. Basic understanding and stages.
5. Growth and development of carcinomas.

LECTURE № 11

PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM

1. Nonrespiratory functions of the lungs.
2. Basic mechanisms, disturbing pulmonary functions: restrictive disorders; airway obstruction
3. Disturbed breathing control.
4. Mechanisms, responsible for disturbances in pulmonary gas exchange:
 - altered ventilation/perfusion ratio
 - disturbed alveolo-capillary gas transfer
 - alveolar hypoventilation

LECTURE № 12

PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM

1. Respiratory failure – essence, types, pathogenesis.
2. Acute respiratory failure. Etiology, pathogenesis.
3. Chronic respiratory failure. Etiology, pathogenesis. Compensations.

LECTURE № 13

PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM

1. Quantitative and qualitative alterations in breathing. Dyspnea.
2. Definition. Types.
3. Sleep apnea syndrome – definition, pathogenesis, types.

LECTURE № 14

PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM

1. Heart failure – definition;
2. Types – etiology and pathogenesis
3. Compensatory mechanisms of the heart.

LECTURE № 15

CORONARY ARTERY DISEASE. ARTERIAL HYPERTENSION

1. Coronary artery disease
2. Definition
3. Classification
4. Etiology and pathogenesis
5. Essential hypertension. Etiology and pathogenesis.
6. Secondary hypertension. Types. Pathogenesis.
7. Arterial hypertension and metabolic syndrome

LECTURE № 16

PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. ACUTE CIRCULATORY INSUFFICIENCY. PATHOPHYSIOLOGY OF BLOOD DISORDERS. HAEMORRHAGIC DIATHESSES.

1. Shock - definition;
2. Types, etiology, pathogenesis ;
3. Coagulation cascade. General characteristics.
4. Etiology and pathogenesis of blood coagulation disorders – coagulopathy, vasopathy, disorders in platelets count and function.

LECTURE № 17

PATHOPHYSIOLOGY OF BLOOD DISORDERS. ANEMIAS. LEUKEMIAS.

1. Anemias – definition, essence, types.
2. Pathogenetic classification.
3. Etiology and pathogenesis of different types of anemias.
4. Leukemias. Definition.
5. Classification.
6. Etiology and pathogenesis of leukemias.

LECTURE № 18

PATHOPHYSIOLOGY OF THE LIVER DISORDERS

1. Etiology and pathogenesis of liver disorders.
2. Hepatitis – etiology and pathogenesis.
3. Liver cirrhosis – etiology and pathogenesis.
4. Functional manifestations in liver disorders:
5. Jaundice – types and characteristics.
6. Portal hypertension. Ascites.
7. Hepatic encephalopathy - pathogenesis.

LECTURE № 19

PATHOPHYSIOLOGY OF THE DIGESTIVE SYSTEM

1. Gastritis and ulcers.
2. Etiology and pathogenesis
3. Pancreatitis.
4. Etiology and pathogenesis
5. Ileus and gastro-intestinal autointoxication.

LECTURE № 20

PATHOPHYSIOLOGY OF THE URINARY SYSTEM

1. Etiology and pathogenesis of kidney disorders– glomerular and tubulo-interstitial.
2. Pathogenesis of the functional syndromes in kidney diseases.
3. Acute and chronic renal failure – etiology and pathogenesis.

LECTURE № 21

PATHOPHYSIOLOGY OF THE ENDOCRINE SYSTEM

1. Characteristics of endocrine disorders.
2. Hypothalamo-pituitary system disturbances.
3. Disturbances in adrenal glands function. Etiology and pathogenesis
4. Disturbances in thyroid gland function. Etiology and pathogenesis

LECTURE № 22

PATHOPHYSIOLOGY OF THE NERVOUS SYSTEM

1. Etiology and pathogenesis of nervous system disorders.
2. Disturbances in sensory and motor functions of the nervous system.
3. Pain.
4. Etiology and pathogenesis

PRACTICES

PRACTICAL № 1

DISORDERS OF PERIFERAL CIRCULATION.

1. Arterial and venous hyperemia – causes, mechanism,
2. Thrombosis. Etiology and pathogenesis
3. Molecular mechanisms of thrombosis – consequences.
4. Stasis.
5. Ischemia. Infarctus. Causes, mechanism.
6. Embolism. Types.

PRACTICAL № 2

PATHOPHYSIOLOGY OF CARBOHYDRATES METABOLISM

1. Impaired digestion and absorption of carbohydrates in gastrointestinal system. Hyperglycemia and hypoglycemia, types.
2. Carbohydrates and insulin. Regulation.
3. Diabetes mellitus. Definition. Classification.
4. Etiology and pathogenesis of main types of diabetes.
5. Clinical presentation and complications. Pathogenesis.

PRACTICAL № 3

PATHOPHYSIOLOGY OF LIPID METABOLISM

1. Impaired digestion and absorption of lipids in gastrointestinal system. Disorders in transport of lipids
2. types of hyperlipidemia
3. Obesity. Pathogenetic classification. Characteristics.
4. Metabolic syndrome .
5. Lipoproteins. Types, metabolism, types of hyperlipidemia
6. Atherosclerosis – pathogenesis.

PRACTICAL № 4

PATHOPHYSIOLOGY OF PROTEIN METABOLISM

1. Impaired digestion and absorption of proteins in gastrointestinal system. Disorders in the blood proteins.
2. Disorders of end stage protein metabolism – ammonia metabolism.
3. Disorders of purine metabolism – gout, etiology, pathogenesis.

PRACTICAL №5

DISORDERS IN WATER BALANCE.

1. Body water balance.
2. Dehydration and hyperhydration. Types. Factors.
3. Edema. Definition. Types. Pathogenic factors.

PRACTICAL № 6

PATHOPHYSIOLOGY OF CALCIUM AND PHOSPHORUS METABOLISM

1. Calcium and phosphorus – main characteristics.
2. Hypocalcemia.
3. Hypercalcemia – causes, complications, pathogenesis

4. Osteomalacia. Osteolysis.
5. Osteoporosis
6. Rickets. Characteristics.
7. Hypophosphatemia. Hyperphosphatemia. Causes, complications, pathogenesis

PRACTICAL № 7

COLLOQUIUM

Disorders in body metabolism (carbohydrates, lipids, proteins, water balance and calcium and phosphorus metabolism).

PRACTICAL № 8

PATHOPHYSIOLOGY OF ACID BASE BALANCE

1. General pathogenesis and classification of acid base disorders.
2. Parameters. Compensations and mechanisms.
3. Main disorders of acid base balance. Characteristics.
4. Clinical presentations of acid base disorders.
5. Diagnostic algorithms

PRACTICAL №9

HYPOXIA

1. Oxygen cascade – stages, parameters.
2. Hypoxia – definition, basic understanding.
3. Classification. Types of hypoxia. Characteristics.
4. Tissue hypoxia. Stages, characteristics
5. Metabolic changes and adaptations in hypoxia.

PRACTICAL № 10

INFLAMMATION

1. Definition, basic understanding and biological importance of inflammation.
2. Classification.
3. Local clinical signs.
4. Etiology and pathogenesis of inflammation
5. Mediators and modulators of inflammation.
6. Changes in the metabolism and clinical outcome of inflammation.

PRACTICAL №11

DISORDERS OF THERMOREGULATION.

1. Thermoregulation. – characteristics.
2. Hyperthermia – central hyperthermia.
3. Fever. Etiology, pathogenesis.
4. Phases and clinical presentation of fever .

PRACTICAL № 12

PATHOGENESIS OF IMPAIRED CELL GROWTH. CARCINOMAS.

1. Neoplasia.
2. Main characteristics.
3. Etiology.
4. Basic understanding and stages.
5. Growth and development of carcinomas.

PRACTICAL № 13

COLLOQUIUM

Main types of pathologic processes – disorders of acid-base balance, hypoxia, inflammation, fever and carcinomas).

PRACTICAL № 14

REACTIVITY AND RESISTANCE. ALLERGY.

1. Reactivity and resistance – definition, basic understanding.
2. Factors influencing the reactivity and resistance - types, characteristics
3. Allergy. Definition, basic understanding.
4. Allergy of humoral and cell-mediated types. Characteristics
5. Autoimmune response – mechanisms.
6. Immunodeficiency – types, AIDS.

PRACTICAL № 15

DISCUSSION AND MCQ ON METABOLIC DISORDERS AND MAIN TYPES OF PATHOLOGIC PROCESSES

1. Case presentation and discussion – diabetes mellitus, gout, metabolic syndrome
2. MCQ's on acid-base balance disorders.

PRACTICAL № 16

PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM (PART I). FUNCTIONAL SYNDROMES OF PULMONARY DYSFUNCTION.

1. Quantitative and qualitative alterations in breathing. Dyspnea.
2. Definition. Types.
3. Sleep apnea syndrome – definition, pathogenesis, types.
4. Pathogenetic findings in respiratory diseases – arterial hypoxia, hypercapnia, pulmonary hypertension).

PRACTICAL №17

PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM (PART II). BASIC MECHANISMS, DISTURBING PULMONARY FUNCTIONS AND GAS EXCHANGE

1. Basic mechanisms, disturbing pulmonary functions: restrictive disorders; airway obstruction
2. Pulmonary hypertension.
5. Mechanisms, responsible for disturbances in pulmonary gas exchange:
 - altered ventilation/perfusion ratio
 - disturbed alveolo-capillary gas transfer
 - alveolar hypoventilation
3. Performing and discussing a spirometry measurement of lung functions.

PRACTICAL № 18

PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM (PART III). RESPIRATORY FAILURE

1. Disorders in breathing control
2. Pulmonary edema – types, pathogenesis. Белодробен оток. Видове. Патогенеза.
3. Respiratory failure – essence, types, pathogenesis.
4. Acute respiratory failure. Etiology, pathogenesis.
5. Chronic respiratory failure. Etiology, pathogenesis. Compensations

PRACTICAL № 19

PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. CORONARY ARTERY DISEASE. HEART FAILURE.

1. Compensatory mechanisms of the heart.
2. Coronary artery disease - definition
3. Classification
4. Etiology and pathogenesis
5. Heart failure – definition;
6. Types – etiology and pathogenesis

PRACTICAL №20

PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. ARTERIAL HYPERTENSION

1. Essential hypertension. Etiology and pathogenesis.
2. Secondary hypertension. Types. Pathogenesis.
3. Arterial hypertension and metabolic syndrome

PRACTICAL №21

PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. ACUTE CIRCULATORY INSUFFICIENCY.

1. Hypotension - definition.
2. Types.
3. Shock - definition;
4. Types, etiology, pathogenesis of different types of shock;

PRACTICAL № 22

PATHOPHYSIOLOGY OF BLOOD DISORDERS. ANEMIAS.

1. Anemias – definition, essence, types.
2. Pathogenetic classification.
3. Etiology and pathogenesis of different types of anemias.

PRACTICAL № 23

PATHOPHYSIOLOGY OF BLOOD DISORDERS. DISORDERS OF WHITE BLOOD CELLS. DISORDERS IN COAGULATION.

1. Leukemias. Definition.
2. Classification.
3. Etiology and pathogenesis of leukemias.
4. Disorders in coagulation cascade.
5. Coagulopathy. Vasopathy.

PRACTICAL №24

COLLOQUIUM – RESPIRATORY, CARDIOVASCULAR AND BLOOD DISORDERS

PRACTICAL № 25

PATHOPHYSIOLOGY OF THE DIGESTIVE SYSTEM

1. Disorders in digestion and absorption in stomach.
2. Gastritis and ulcers.
3. Etiology and pathogenesis
4. Pancreatitis.
5. Etiology and pathogenesis
6. Ileus and gastro-intestinal autointoxication.

PRACTICAL №26

PATHOPHYSIOLOGY OF THE LIVER DISORDERS

1. Etiology and pathogenesis of liver disorders.
2. Hepatitis – etiology and pathogenesis.
3. Liver cirrhosis – etiology and pathogenesis.
4. Functional manifestations in liver disorders:
5. Jaundice – types and characteristics.
6. Portal hypertension. Ascites.
7. Hepatic encephalopathy - pathogenesis.

PRACTICAL №27

PATHOPHYSIOLOGY OF THE URINARY SYSTEM

1. Etiology and pathogenesis of kidney disorders– glomerular
2. Etiology and pathogenesis of kidney disorders–tubulo-interstitial.
3. Pathogenesis of the functional syndromes in kidney diseases.
 - edema
 - anemias
 - renal hypertension
 - urinary syndrome
 - renal osteodystrophy
4. Akute kidney injury – etiology, pathogenesis.
5. Chronic renal failure – etiology and pathogenesis.

PRACTICAL № 28

PATHOPHYSIOLOGY OF THE ENDOCRINE SYSTEM

1. Characteristics of endocrine disorders.
2. Hypothalamo-pituitary system disturbances.
3. Disturbances in adrenal glands function. Etiology and pathogenesis
4. Disturbances in thyroid gland function. Etiology and pathogenesis

PRACTICAL № 29

PATHOPHYSIOLOGY OF THE NERVOUS SYSTEM

1. Etiology and pathogenesis of nervous system disorders.
2. Disturbances in sensory and motor functions of the nervous system.
3. Pain.
4. Etiology and pathogenesis

PRACTICAL № 30

DISCUSSION AND MCQ ON DIGESTIVE AND URINARY SYSTEMS

1. Case presentation and discussion – peptic ulcer disease, gastritis, liver cirrhosis
2. MCQ's on digestive and urinary systems

Bibliography

1. Color Atlas of Pathophysiology by Stefan Silbernag & Florian Lang; Thieme Verlag 2016
2. Handbook of Pathophysiology – Ramona Browder Lazenby, 2011 (4th edition)
3. Pathophysiology of Disease – Stephen J. McPhee, Gary D. Hammer, 2010 (6th edition), ISBN 978-0-07-162167-0
4. Essentials of Pathophysiology: Concepts of Altered Health States by Carol Mattson Porth. Lippincott Williams & Wilkins, 2006

Conspectus

1. Health and disease, contemporary view of disease. Pathologic reactions, processes and conditions. General etiology and pathogenesis.
2. Reactivity and resistance. Factors, influencing reactivity and resistance. Types of reactivity and resistance.
3. Hypersensitivity reactions – types, pathogenesis. Allergies.
4. Autoimmune diseases and immunodeficient states.
5. Disturbances in peripheral circulation – arterial and venous hyperemia, ischaemia, infraction.
6. Disturbances in peripheral circulation – thrombosis and embolism.
7. Changes in blood glucose levels – hyperglycemias and hypoglycemias.
8. Diabetes mellitus – etiology, pathogenesis.
9. Diabetes mellitus – pathobiochemistry and complications.
10. Dyslipidemias – types. Atherosclerosis – risk factors, etiology, pathogenesis, consequences and complications.
11. Obesity – definition, types, pathogenesis. Metabolic syndrome.
12. Changes in the plasma proteins. Disturbances in aminoacid metabolism.
13. Disturbances in the end-stage protein metabolism – hyperazotemias.
14. Disturbances in purine metabolism – gout.
15. Disturbances in water-electrolyte balance – dehydration and hyperhydration.
16. Edemas – definition, factors for development. Types of edemas.
17. Disturbances in mineral metabolism (Ca, P, Mg). Osteoporosis and osteomalacia.
18. Disturbances in acid-base balance – general characteristics, parameters, compensations.
19. Characteristics of the main types of acid-base disorders.
20. Hypoxia – definition, parameters. Hyperoxias.
21. Pathogenetic classification of hypoxias. Characteristics of the different types.

22. Systemic, organ and cellular adaptations to hypoxia.
23. Inflammation – definition and biological meaning. Classification and outcome of inflammation. Cardinal signs of inflammation.
24. Inflammation – phases. Mediators. Vascular changes. Cellular response. Changes in metabolism.
25. Disturbances in body temperature regulation – hypo- and hypertermia.
26. Fever – definition, etiology and pathogenesis. Significance of fever. Stages of fever. Changes in metabolism in fever. Changes in the function of organs and systems.
27. Neoplasms – general characteristic and etiology. Definition and stages of carcinogenesis.
28. Neoplasms – tumor/organism interactions. Paraneoplastic syndromes.
29. Functional pulmonary diagnostics – spirometry, diffusion capacity, lung volumes, bodyplethysmography, cardio-pulmonary exercise tests.
30. Basic mechanisms disturbing lung function – obstruction of the airflow in the airways – types.
31. Obstructive disorders. Pulmonary hyperinflation. Disturbed functional capacity. Reduced functional capacity (by CPET).
32. Basic mechanisms disturbing lung function – types of restrictive ventilatory disorders.
33. Restrictive disorders. Etiology and pathogenesis of pulmonary edema and pneumothorax.
34. Mechanisms responsible for disturbed gas exchange. Changes in the V/Q ratio, disturbed diffusion of gases through the alveolo-capillary barrier, alveolar hypoventilation syndrome, disturbances in respiratory control.
35. Acute respiratory failure – etiology, pathogenesis, types.
36. Chronic respiratory failure – etiology, pathogenesis, types.
37. Coronary artery disease – definition, types, pathogenesis.
38. Rhythm-conductive disorders. Pathogenesis.
39. Arterial hypertension – essential hypertension. Etiology, pathogenesis.
40. Secondary (symptomatic) hypertension. Hypotensions, collapse and syncope.
41. Acute insufficiency of hemodynamics – shock – definition, types, etiology, pathogenesis.
42. Heart failure - definition, etiology, pathogenesis and types. Compensatory mechanisms.
43. Functional signs of heart failure.
44. Pathogenesis of some complex symptoms. Dyspnea and fatigue.
45. Anemias – definition and classification. Posthemorrhagic anemias.
46. Anemias due to disturbed hemopoiesis. Anemias due to increased hemolysis.
47. Leukemias – definition, etiology, pathogenesis, types.

48. Disorders of hemostasis (hemorrhagic diatheses).
49. Disorders of hemostasis (thrombotic diatheses). DIC – syndrome.
50. Disorders in the gastrointestinal system. Gastritis – etiology and pathogenesis.
51. Disorders in the gastrointestinal system. Peptic ulcer – etiology and pathogenesis.
52. Pancreatitis – types, etiology, pathogenesis, complications.
53. Disorders in the gastrointestinal system: ileus, gastro-intestinal autointoxication.
- Disorders in the intestinal microbiome.
54. Basic etiology and pathogenesis of liver diseases. Hepatitis.
55. Functional signs of liver damage – jaundice, portal hypertension, ascites, hepato-renal and hepato-pulmonary syndromes.
56. Pathogenesis of liver cirrhosis. Hepatic encephalopathy.
57. Basic etiology and pathogenesis of renal disorders. Functional syndromes.
58. Etiology and pathogenesis of acute renal failure.
59. Etiology and pathogenesis of chronic renal failure.
60. Basic etiology and pathogenesis of endocrine disorders.
61. Disturbances in the functions of the pituitary gland.
62. Disturbances in the functions of the thyroid gland.
63. Disturbances in the functions of the suprarenal glands.
64. Disturbances in the functions of the gonads.
65. Basic etiology and pathogenesis of the diseases of the nervous system.
66. Degenerative diseases of the nervous system.
67. Disorders in sleep and wakefulness – hypersomnia and insomnia.
68. Disorders in sleep and wakefulness – central and obstructive sleep apnea.
69. Pain – definition, pathogenesis, types.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
P H A R M A C O L O G Y

Approved by the Department Council - Protocol №94/25.03.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

PHARMACOLOGY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								3 rd and 4 th year	
Pharmacology	7 th semester	Total	Lectures	Practices	ECTS	2.2	6.7	VI	VII
		135	60	75	4.5			2/2	2/3

DISCIPLINE: Pharmacology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: Mandatory

LEVEL OF QUALIFICATION: Master's degree /M/

FORMS OF TRAINING: Lecture courses, practical courses.

YEAR OF TRAINING: 3rd and 4th year

DURATION OF TRAINING: 2 semesters

ACADEMIC HOURS: 60 hours of lecture courses, 75 hours of practical courses

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: audiovisual equipment, tools and technical devices for illustration of mechanisms of action, pharmacological effects and adverse drug reactions of studied drugs, test books.

FORMS OF EVALUATION: Ongoing evaluation – weekly tests, oral examinations, colloquia on different syllabus sections.
Final evaluation – entry test, written essays, oral examination.

EVALUATION CRITERIA: The final exam grade is formed and calculated as the mean result of the written essays, oral examination and the year mark of the student's on-going assessment.

ASPECTS OF EVALUATION CRITERIA: Participation in discussions, solving tests, practical skills on prescribing drugs

SEMESTER EXAM: Yes (Entry test; written examination; oral examination).

STATE EXAM: No

LECTURER: Professors and Associated Professors from the Department of Pharmacology and Clinical Pharmacology

DEPARTMENT: Pharmacology and Clinical Pharmacology

ANNOTATION

The discipline Pharmacology allows students to acquire knowledge and skills in the following basic pharmacological concepts:

- *General Pharmacology* – pharmacokinetics and pharmacodynamics of drugs, drug interactions, adverse drug reactions, repeated drug administration, factors affecting drug action, drug administration in pregnancy, children and the elderly, patients with renal and liver failure; pharmacogenetics and chronopharmacology.
- *Special Pharmacology* – pharmacological characteristics of drug groups e.g. drugs affecting CNS, ANS, cardiovascular system, respiratory system, gastrointestinal system, urogenital tract; pharmacology of antimicrobials; vitamins and anticancer drugs, endocrine pharmacology, autacoids.

BASIC AIMS OF THE DISCIPLINE

The objective of the pharmacology course is to develop:

- ✓ Skills to characterize a group of drugs – pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, therapeutic uses, contraindications and application of this knowledge in clinical practice;
- ✓ Skills to use scientific literature concerning pharmacotherapy;
- ✓ Skills to prescribe drugs.

EXPECTED RESULTS

Theoretical knowledge – A thorough working knowledge of the pharmacokinetic and pharmacodynamic properties of drugs from different pharmacological groups.

Practical skills – The ability to prescribe drugs; knowledge of different methods employed in experimental pharmacology e.g. acute and chronic toxicity, analgesic activity, etc.

LECTURES

LECTURE 1 – 2 hours

INTRODUCTION IN PHARMACOLOGY

1. Subject and tasks of pharmacology.
2. Role of pharmacology.
3. Short history of pharmacology.
4. Branches of pharmacology.
5. Drug definition. Phases of drug discovery.

LECTURE 2 – 2 hours

GENERAL PHARMACOLOGY. PHARMACOKINETICS.

1. Routes of drug administration. Clinical aspects.
2. Absorption, transmembrane transport and distribution of the drugs in the body. Binding to plasma proteins. Barrier systems.
3. Drug metabolism.

LECTURE 3 – 2 hours

GENERAL PHARMACOLOGY. PHARMACOKINETICS (CONT). PHARMACODYNAMICS.

1. Elimination (routes of excretion). Clinical aspects
2. Mechanism of action and drug effects. Types of action. Drug receptors.

LECTURE 4 – 2 hours

GENERAL PHARMACOLOGY. FACTORS, AFFECTING DRUGS PHARMACOKINETICS AND PHARMACODYNAMICS.

1. Factors of the drug– dose, physical and chemical properties, chemical structure, etc.
2. Factors of the patient - age, gender, physiological conditions, genetic factors etc.

LECTURE 5 – 2 hours

GENERAL PHARMACOLOGY. REPEATED DRUG ADMINISTRATION. DRUG INTERACTIONS.

1. Drug interactions – synergy, potentiation, antagonism.
2. Repeated drug administration – tolerance, drug dependence, allergy, accumulation.

LECTURE 6 – 2 hours

CNS STIMULANTS

1. Psychostimulants – classification, mechanism of action, pharmacokinetics, pharmacodynamics, drug interactions, adverse drug reactions.
2. Antidepressants - classification, mechanism of action, pharmacokinetics, pharmacodynamics, drug interactions, adverse drug reactions.

3. Nootropic drugs - mechanism of action, pharmacokinetics, pharmacodynamics, drug interactions, adverse drug reactions.

LECTURE 7 – 2 hours

CNS DEPRESSANTS

1. Neuroleptics (antipsychotics) – definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions.
2. Anxiolytics - definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions.
3. Antiparkinsonian drugs - definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions.

LECTURE 8 – 2 hours

CNS DEPRESSANTS – HYPNOTICS AND SEDATIVE DRUGS. ANTIEPILEPTIC DRUGS.

1. Sleep structure and sleep disorders.
2. Hypnotics - definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions.
3. Sedatives - definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions.
4. Antiepileptic drugs - classification, pharmacological effects, mechanism of action, adverse drug reactions, drug interactions.

LECTURE 9 – 2 hours

OPIOID ANALGESICS. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS. ANALGESICS-ANTIPYRETICS

1. Opioid analgesics - definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions. Toxicity of opioids.
2. NSAIDs - definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions.
3. Analgesics-antipyretics - definition, classification, mechanism of action, pharmacokinetics, pharmacological effects, adverse drug reactions, drug interactions.

LECTURE 10 – 2 hours

LOCAL ANESTHETICS. AUTACOIDS AND THEIR ANTAGONISTS

1. Histamin – types of histamine receptors, pharmacological effects of histamine.
2. Histamine antagonists - classification, mechanism of action, pharmacokinetics, pharmacodynamics, drug interactions, adverse drug reactions.
3. Serotonergic mediation, serotonin agonists and antagonists.
4. Eicosanoids (prostaglandins and leukotrienes) – physiological effects, clinical application of PGs, leukotriene antagonists and drugs, inhibiting PG synthesis
5. Drugs affecting the renin-angiotensin-aldosterone system.
6. Types of local anesthesia.
7. Local anesthetics - classification, mechanism of action, pharmacokinetics, pharmacodynamics, drug interactions, adverse drug reactions.

LECTURE 11 – 2 hours

CORTICOSTEROIDS. INSULIN AND ORAL ANTIDIABETIC DRUGS.

1. Corticosteroids - classification, pharmacokinetics, mechanism of action, pharmacodynamics, adverse drug reactions, drug interactions.

2. Insulin and oral antidiabetic drugs - classification, pharmacokinetics, mechanism of action, pharmacodynamics, adverse drug reactions, drug interactions.

LECTURE 12 – 2 hours

SEX HORMONES. DRUGS AFFECTING THE THYROID.

1. Sex hormones - classification, pharmacokinetics, mechanism of action, pharmacodynamics, adverse drug reactions, drug interactions.
2. Drugs affecting the thyroid - classification, pharmacokinetics, mechanism of action, pharmacodynamics, adverse drug reactions, drug interactions.

LECTURE 13 - 2 hours

VITAMINS

1. Fat-soluble vitamins - classification, pharmacokinetics, mechanism of action, pharmacodynamics, adverse drug reactions, drug interactions.
2. Water-soluble vitamins - classification, pharmacokinetics, mechanism of action, pharmacodynamics, adverse drug reactions, drug interactions.

LECTURE 14 – 2 hours

ANTICANCER DRUGS

1. Classification.
2. Mechanism of action of anticancer drugs.
3. Adverse drug reactions of anticancer drugs.

LECTURE 15 – 2 hours

ANTISEPTICS AND DISINFECTANTS

1. Definition of antiseptics and disinfection.
2. Classification of antiseptics and disinfectants.
3. Oxidants, halogens, detergents – mechanism of action, application, toxicity, drug preparations.
4. Phenols, aldehydes, alcohols - mechanism of action, application, toxicity, drug preparations.
5. Dyes, essential oils, phytopreparations, salts of heavy metals and acids - mechanism of action, application, toxicity, drug preparations.

LECTURE 16 - 2 hours

PRINCIPLES OF TREATMENT WITH ANTIMICROBIAL DRUGS. SULFONAMIDES AND TRIMETHOPRIM. QUINOLONES. ANTIFUNGAL AGENTS. ANTIVIRAL AGENTS. ANTIMYCOBACTERIAL DRUGS.

1. Principles of treatment with antibiotics and chemotherapeutics.
2. Sulfonamides and trimethoprim – classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.
3. Quinolones – classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.
4. Antiviral agents – classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions.
5. Antifungal agents – classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions.
6. Antimycobacterial drugs – classification, mechanism of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions.

LECTURE 17 - 2 hours**BACTERICIDAL ANTIBIOTICS.**

1. β - lactam antibiotics - penicillins. Classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.
2. β - lactam antibiotics - cephalosporins. Classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.
3. Carbapenems, monobactams and glycopeptides - classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.
4. Aminoglycoside antibiotics - classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.

LECTURE 18 - 2 hours**BACTERIOSTATIC ANTIBIOTICS.**

1. Tetracyclines – classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions.
2. Macrolides – classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.
3. Chloramphenicol. Lincosamides – classification, mechanism of action, spectrum and type of action, resistance, pharmacokinetics, adverse drug reactions, drug interactions, dosing in children and adults.

LECTURE 19 - 2 hours**CHOLINOTROPIC DRUGS.**

1. Cholinergic mediation. Types and localization of cholinergic receptors. Classification of cholinergic drugs.
2. Cholinomimetics with direct and indirect action. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
3. Antimuscarinic drugs. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
4. Neuromuscular blocking drugs (Skeletal muscle relaxants). Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 20 - 2 hours**ADRENOMIMETICS.**

1. Adrenergic mediation. Types and localization of adrenergic receptors.
2. Classification of adrenergic drugs.
3. Sympathomimetics with direct and indirect action. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 21 - 2 hours**ADRENOLYTICS.**

1. Agonists of presynaptic α_2 adrenergic receptors. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Adrenergic antagonists (alpha and beta blockers). Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 22 - 2 hours

CARDIOVASCULAR DRUGS. CARDIAC GLYCOSIDES. ANTIARRHYTHMICS.

1. Cardiac glycosides. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Antiarrhythmics. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 23 - 2 hours

CARDIOVASCULAR DRUGS. ANTIANGINAL DRUGS. ANTIHYPERTENSIVE DRUGS.

1. Antihypertensive drugs. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Antianginal drugs. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 24 - 2 hours

CARDIOVASCULAR DRUGS. PERIPHERAL VASODILATORS. ANTIDYSLIPIDEMIC DRUGS.

1. Peripheral vasodilators. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Antidyslipidemic drugs. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 25 - 2 hours

DRUGS AFFECTING HEMOPOESIS.

1. Agents used in anemias. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Hematopoietic growth factors. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 26 - 2 hours

DRUGS AFFECTING COAGULATION.

1. Haemostatics with local and systemic action. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Fibrinolytic inhibitors. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
3. Oral and injectable anticoagulants; Fibrinolytic agents; Antiplatelet drugs. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

LECTURE 27 - 2 hours

DRUGS AFFECTING THE GASTROINTESTINAL SYSTEM.

1. Drugs affecting appetite – stimulants and suppressors. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, contraindications.
2. Antiemetics. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, contraindications.
3. Drugs used in acid-peptic diseases. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
4. Hepatoprotective drugs. Mechanism of action, adverse drug reactions.

5. Pancreatic enzyme supplements.
6. Laxatives and antidiarrheal agents. Classification, mechanism of action, adverse drug reactions, contraindications.

LECTURE 28 - 2 hours

DRUGS AFFECTING THE RESPIRATORY SYSTEM:

1. Antitussive agents. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Drugs affecting the bronchial secretion. Mucolytics. Classification, mechanism of action, adverse drug reactions, indications and contraindications.
3. Drugs used in bronchial asthma. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, contraindications.

LECTURE 29 - 2 hours

DRUGS AFFECTING THE URINARY TRACT.

1. Diuretics – Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Drugs used in urinary bladder dysfunction. Classification, mechanism of action, adverse drug reactions.

LECTURE 30 - 2 hours

DRUGS AFFECTING THE FUNCTIONS OF THE UTERINE MUSCLE.

1. Uterokinetic drugs. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.
2. Uterotonics and uterine muscle relaxing drugs. Classification, mechanism of action, pharmacokinetics, adverse drug reactions, drug interactions, indications and contraindications.

PRACTICES

PRACTICAL 1 – 2 hours

PRESCRIPTION

1. Drug definition.
2. Drug sources.
3. Prescription - parts of the prescription, units of measurement.

SOLID DOSAGE FORMS

1. Powders.
2. Tablets.
3. Lozenges.
4. Capsules.
5. Prescription rules of solid dosage forms.

PRACTICAL 2 – 2 hours

LIQUID DOSAGE FORMS

1. Solution and mixture.
2. Emulsions and suspensions.
3. Liquid drug forms for parenteral administration.
5. Prescription rules of liquid dosage forms.

PRACTICAL 3 – 2 hours

SEMI-SOLID DOSAGE FORMS. GASEOUS DOSAGE FORMS.

1. Ointments and pastes.
2. Plasters.
3. Gels and creams.
3. Rectal suppositories and vaginal pessaries.
4. Prescription rules of semi-solid dosage forms.
5. Gaseous dosage forms.

PRACTICAL 4 – 2 hours**GENERAL PHARMACOLOGY**

1. Test.
2. Discussion on routes of administration, absorption, transmembrane transport, drug distribution, metabolism, excretion.

PRACTICAL 5 – 2hours**GENERAL PHARMACOLOGY PART 2**

1. Test.
2. Discussion on pharmacodynamics, factors affecting drug effect, repeated drug administration, drug interactions.

PRACTICAL 6 – 2 hours**COLLOQUIUM ON PRESCRIPTION AND GENERAL PHARMACOLOGY**

1. Prescriptions.
2. Written examination.

PRACTICAL 7 – 2 hours**CNS STIMULANTS**

1. Test.
2. Discussion on psychostimulants, antidepressants and nootropic drugs.
3. Prescriptions.

PRACTICAL 8 – 2 hours**NEUROLEPTICS AND ANXIOLYTICS. ANTIPARKINSONIAN DRUGS.**

1. Test.
2. Discussion on neuroleptics, anxiolytics and antiparkinsonian drugs.
3. Prescriptions.

PRACTICAL 9 -2 hours**HYPNOTICS AND SEDATIVE DRUGS. ANTIEPILEPTIC DRUGS.**

1. Test.
2. Discussion on hypnotics, sedatives and antiepileptic drugs.
3. Prescriptions.

PRACTICAL 10 – 2 hours**OPIOID ANALGESICS. ANALGESICS-ANTIPYRETICS. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS**

1. Test.
2. Discussion on opioid analgesics, analgesics-antipyretics and NSAIDs.
3. Prescriptions.

PRACTICAL 11 – 2 hours

COLLOQUIUM ON DRUGS, AFFECTING THE CNS

1. Prescriptions.
2. Written examination.

PRACTICAL 12 – 2 hours

LOCAL ANESTHETICS. AUTACOIDS.

1. Test.
2. Discussion on local anesthetics and autacoids.
3. Prescriptions.

PRACTICAL 13 – 2 hours

HORMONES – INSULIN, ORAL ANTIDIABETIC DRUGS, CORTICOSTEROIDS

1. Test.
2. Discussion on insulin, oral antidiabetic drugs and corticosteroids.
3. Prescriptions.

PRACTICAL 14 – 2 hours

SEX HORMONES

1. Test.
2. Discussion on sex hormones.
3. Prescriptions.

PRACTICAL 15 – 2 hours

VITAMINS

1. Test.
2. Discussion.
3. Prescriptions.

PRACTICAL 16 - 3 hours

DRUG FORMS – REVISION.

1. Prescriptions of solid drug forms.
2. Prescriptions of liquid drug forms.
3. Prescriptions of semi-solid and gaseous drug forms.

PRACTICAL 17 - 3 hours

ANTISEPTICS AND DISINFECTANTS. SULFONAMIDES AND TRIMETHOPRIM.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 18 - 3 hours

CHEMOTHERAPEUTICS. QUINOLONES. ANTIFUNGAL AGENTS. ANTIVIRAL AGENTS. ANTIMYCOBACTERIAL DRUGS.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 19 - 3 hours

BACTERICIDAL ANTIBIOTICS. BACTERIOSTATIC ANTIBIOTICS.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 20 - 3 hours
COLLOQUIUM ON ANTIMICROBIAL AGENTS

1. Prescriptions.
2. Written examination.

PRACTICAL 21 - 3 hours
CHOLINOTROPIC DRUGS.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 22 - 3 hours
ADRENOTROPIC DRUGS.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 23 - 3 hours
COLLOQUIUM ON AUTONOMIC NERVOUS SYSTEM.

1. Prescriptions.
2. Written examination.

PRACTICAL 24 - 3 hours
CARDIAC GLYCOSIDES. ANTIARRHYTHMICS. ANTIANGINAL DRUGS.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 25 - 3 hours
ANTIHYPERTENSIVE DRUGS. PERIPHERAL VASODILATORS.
ANTIDYSLIPIDEMIC DRUGS.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 26 - 3 hours
COLLOQUIUM ON DRUGS, AFFECTING THE CVS

1. Prescriptions.
2. Written examination.

PRACTICAL 27 - 3 hours
DRUGS AFFECTING HEMOPOESIS AND COAGULATION.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 28 - 3 hours

DRUGS AFFECTING THE GASTROINTESTINAL SYSTEM.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 29 - 3 hours

DRUGS AFFECTING THE RESPIRATORY SYSTEM.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

PRACTICAL 30 - 3 hours

DRUGS AFFECTING THE URINARY TRACT.

1. Test.
2. Discussion on the topic.
3. Prescriptions.

BIBLIOGRAPHY

1. Pharmacology handbook for medical and dental students. Eds. Assoc. Prof. Kostadinov and Assoc. Prof. Delev, Plovdiv, 2018.
2. Basic and Clinical Pharmacology 12th edition (LANGE Basic Science) by Katzung, Masters and Trevor, 2011.
3. Pharmacology (Lippincott's Illustrated Reviews Series) by Harvey, Clark, Finkel and Rey, BCPP, 2011.
4. Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th edition by Brunton, Chabner and Knollman, 2010.
5. Color Atlas of Pharmacology by Albrecht Ziegler, Mohr, Bieger and Lullmann, 2000.

**CONSPECTUS
PHARMACOLOGY EXAM**

I. General pharmacology:

1. Routes of drug administration.
2. Absorption and transmembrane transport of drugs.
3. Drug biotransformation (metabolism) – organs, types and drug interactions.
4. Drug distribution. Plasma protein binding. Barrier systems. Examples.
5. Drug excretion - organs and drug examples.
6. Pharmacodynamics. Non-receptor and receptor mechanisms of action.
7. Levels and mechanism of drug interactions.

8. Factors of the drug affecting drug action – chemical structure, physical and chemical properties, physical state, dose, dosage form.
9. Dose - definition. Types of doses. Therapeutic window and therapeutic index.
10. Factors of the patient that affect drug action – drugs in pregnancy, breast-feeding, children, elderly, liver and kidney diseases. Genetic abnormalities and drug action.
11. Multiple drug administration phenomena: drug tolerance, tachyphylaxis; substances causing dependence and abuse; accumulation; drug allergy.
12. Antiseptics and disinfectants. Definition. Mechanism of action.
13. Antiseptics and disinfectants. Dyes and detergents.
14. Antiseptics and disinfectants. Salts of heavy metals. Phenol and phenolic derivatives.
15. Oxidants. Formaldehyde and alcohols. Essential oils.
16. Male sex hormones and their antagonists. Anabolic agents.
17. Female sex hormones and their antagonists. Contraceptive preparations.
18. Pharmacological effects of fat - soluble vitamins (Vitamins A, D, E and K).
19. Pharmacological effects of water – soluble vitamins (Vitamins of group B and C).
20. Drugs affecting the functions of the uterine muscle: uterokinetic, uterotonic and tocolytic agents.
21. Thyroid and antithyroid drugs.

II. Special systems pharmacology:

1. Hypnotics. Sedatives.
2. Antiepileptic drugs.
3. Antiparkinsonian drugs.
4. Opioid analgesics.
5. Analgesics-antipyretics.
6. Non-steroidal anti-inflammatory drugs (NSAIDs).
7. Neuroleptics.
8. Anxiolytic agents. Central muscle relaxants.
9. Psychostimulants. Nootropic drugs.
10. Antidepressants and antimanic drugs.
11. Cholinergic drugs. Neuromuscular blocking drugs (Skeletal muscle relaxants).
12. Adrenergic drugs.
13. Histamine and histamine antagonists.
14. Serotonin, angiotensin, prostaglandins, leukotrienes and their antagonists.
15. Local anaesthetics.
16. Cardiac glycosides.

17. Peripheral vasodilators.
18. Angioprotectors and venotonic agents. Antidyslipidemic drugs.
19. Antiarrhythmic drugs.
20. Antianginal drugs.
21. Antihypertensive drugs.
22. Agents used in anemias; hematopoietic growth factors.
23. Drugs affecting coagulation.
24. Antitussive agents. Drugs affecting the bronchial secretion. Mucolytics.
25. Drugs used in bronchial asthma.
26. Drugs affecting appetite – stimulants and suppressors. Antiemetics.
27. Drugs used to treat peptic ulcer disease.
28. Hepatoprotective drugs. Pancreatic enzyme supplements. Choleretic and cholekinetic agents.
29. Laxatives and antidiarrheal agents. Carminative agents.
30. Insulin and oral antidiabetics.
31. Adrenocorticosteroids.
32. Anticancer drugs.
33. Principles of treatment with antimicrobial drugs. Sulfonamides. Antifungal agents.
34. Quinolones. Antiviral agents.
35. Tetracyclines. Macrolides. Carbapenems and monobactams.
36. Chloramphenicol. Lincosamides. Antimycobacterial agents.
37. β -lactam antibiotics - penicillins.
38. β -lactam antibiotics - cephalosporins. Glycopeptides. Aminoglycoside antibiotics.
39. Diuretics.

MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

PATHOANATOMY AND CYTOPATHOLOGY

Approved by the Department Council - Protocol № 3 / 12.07.2022

Confirmed by the Faculty Council - Protocol № 7/ 13.07.2022

GENERAL AND CLINICAL PATHOLOGY

Training Course: Year 3 and 4

Semesters of study: **V - General Pathology**, VI and VII - Clinical Pathology

Exam:

after semester V - General Pathology

after VII semester - Clinical Pathology

Workload of the auditorium sessions: 210 hours

Lecturer: associate professor

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters		
								3 rd – 4 th year		
		Total	Lectures	Practices	ECTS			V	VI	VII
Pathoanatomy and Cytopathology	V, VII	210	90	120	7.0	4.0	11.0	2/4	2/2	2/2

SUMMARY: intracellular accumulation of lipids, proteins and pigments; adaptative processes accumulation of fibrinoid, hyaline, amyloid, calcium salts and sodium urate in the intercellular matrix, necrosis, disturbances in blood circulation, inflammation, immunity pathology, tumors. Pathology of the cardiovascular system, respiratory pathology, pathology of the haematopoietic system, pathology of the digestive system. Pathology of the urinary system, reproductive system pathology, endocrine pathology, pathology of the nervous system, musculoskeletal pathology, infectious diseases.

PURPOSE OF COURSE: Study of basic pathological processes and structural changes in each nosological units.

Acquisition of detailed morphological knowledge of all sections of the clinical pathology which allow construction of high medical knowledge.

OBJECTIVES OF THE COURSE:

Acquisition of detailed morphological knowledge of the basic pathological processes in all sections of clinical pathology.

Learning in detail the theoretical basis of emergence, growth and development of tumors.

Use the terminology of precancerous, benign and malignant tumors.

Use the principles of making biopsy, completing forms and learn skills for objective correlation with the clinical findings.

Development of high medical knowledge.

Teaching methods: lectures, seminars, workshops.

TECHNICAL TOOLS AND EQUIPMENT FOR THE PURPOSE IN TEACHING: microscopes, permanent microscopic slides, gross preparations, audiovisual equipment, exercise books.

MONITORING AND EVALUATION:

Current control - oral examination, tests sections, colloquia, final test on macroscopic and microscopic preparations preceding the semester exams.

Final test - entry microscopic test, entry written test, written examination, oral examination (interview).

METHODS OF CONTROL OF KNOWLEDGE: tests in all sections.

REQUIRED SKILLS:

Theoretical knowledge - acquiring and discussions:

– general pathological processes: inflammation, degeneration, disturbances in blood circulation, adaptative processes.

- tumor pathology - etiology, pathogenesis, classification of neoplastic diseases.
- etiology, pathogenesis and morphological changes in individual nosological units of all organs and systems.
- formulating and organizing the clinical and pathological - anatomical diagnosis, pathogenetic basis and according to WHO requirements.

Ability to:

- Work with a light microscope.
- correctly making materials for cytological examination and biopsy.
- introduction to how to fix the materials according to the pathological processes and organ localization.
- correctly and completely fill slips for cytological examination and biopsy.
- acquiring knowledge of the organization, operation and capabilities of the pathology department.
- to read and interpret appropriate patho-anatomical responses.

COURSE PROGRAMME (V semester)

LECTURE № 1 - 2 hours: Introduction to Pathology. Cell pathology.
Reversible cell damage (cell edema accumulation of proteins and carbohydrates).

LECTURE № 2 - 2 hours: Disorders of lipid metabolism. Tumorismoses.

LECTURE № 3 - 2 hours: Disorders of exchanges of pigments.

LECTURE № 4 - 2 hours: Pathology of connective tissue.
Disturbances in the amount of collagen and elastin. Accumulation of inorganic substances. Deposition of fibrinoid. Hyaline. Amyloidosis.

LECTURE № 5 - 2 hours. Cell death. Adaptive processes
Apoptosis and necrosis. Atrophy, hypertrophy and hyperplasia, metaplasia, dysplasia.

LECTURE № 6 - 2 hours: Disturbances in blood circulation.
Arterial hyperemia. Venous plethora. Bleeding and hemorrhage. Hemorrhage.

LECTURE № 7 - 2 hours: Disturbances in blood circulation.
Rheological disturbances. Thrombosis. Disseminated intravascular coagulation (DIC syndrome).

LECTURE № 8 - 2 hours: Disturbances in blood circulation.
Embolism. Shock. Lymph circulation disorders. Changes in the amount of fluid.

LECTURE № 9 - 2 hours: Inflammation.
Definition. Etiology. Phases. Morphogenesis and pathogenesis of inflammation. Exudative inflammation.

LECTURE № 10 - 2 hours: Productive inflammation.
Morphological characteristics of diffuse interstitial and granulomatous inflammation productive.

LECTURE № 11 - 2 hours: Regeneration. Pathology of immunity.

LECTURE № 12 - 2 hours: Tumors.
Definition and nature of tumor growth. Carcinogenesis. Biological manifestations of benign and

malignant tumors. Terminology.

LECTURE № 13 - 2 hours: Tumors.
Cell Biology. Morphological characteristics. Diagnostics.

LECTURE № 14 - 2 hours: Tumors.
Classification. Tumors of epithelial origin.

LECTURE № 15 - 2 hours: Tumors.
Soft tissue tumors. Pigmented tumors. Teratoma.

PROGRAM OF PRACTICALS (V semester)

EXERCISE № 1-2 hours: Scope, objectives and methods of pathology.
Biopsy method: indications, types (intraoperative frozen section, excision, puncture, operational, punching (punch) biopsy, Pap smears) – technology, fixation and processing. Use and limitations.

EXERCISE № 2-2 hours: Review of normal histology: brain, liver, lung, spleen, lymph node, kidney, heart, skin and colon.

EXERCISE № 3-2 hours: Acute reversible cell damage: cell swelling, accumulation of carbohydrates and proteins.

I. Histological samples: Balloon degeneration of hepatocytes (Hepatitis viralis). Protein accumulation in the epithelium of the renal tubules - H-E.

II. Macroscopic samples: Diabetic glomerulosclerosis.

EXERCISE № 4-2 hours: Accumulation of lipids. Accumulation of exogenous pigments.

I. Histological samples: Steatotic liver - fat accumulation in hepatocytes - H-E. Steatotic liver - Sudan III. Coal dust in lungs.

II. Macroscopic samples: Fatty degeneration of the liver. "Tiger" heart. Lipomatosis of the heart. Lipomatosis of the pancreas. Coal dust in lungs. Tattoos.

EXERCISE № 5-2 hours: Intracellular accumulation. Accumulation of endogenous pigments.

I. Histological samples: Haemosiderosis in lungs (brown induration of lungs) - H-E. Haemosiderosis in lungs – PERLS reaction Jaundice in liver - H-E. Jaundice in kidney - H-E. Naevus - H-E.

II. Macroscopic samples: Livers in Cooley's anemia. Cholangiohepatitis - jaundice. Pancreas - haemosiderosis. Pancreas & thyroid & liver with metastatic melanoma.

EXERCISE № 6-2 hours: Injuries of the intercellular matrix. Accumulation of fibrinoid and hyaline.

I. Histological samples: Rheumatic valve- H-E, toluidine blue. Corpus albicans in ovary - H-E. Arteriosclerotic nephrosclerosis - HE. Benign hypertension (brain) - N-E.

II. Macroscopic samples Rheumatic heart disease: mitral stenosis. Arteriosclerotic nephrosclerosis. Glazed spleen. Pinpoint hemorrhages in the brain.

EXERCISE № 7-2 hours: Intercellular matrix. Accumulation of amyloid, calcium salts and sodium uric acids.

I. Histological samples: Amyloidosis in kidney - CONGO RED. Amyloidosis in spleen - sago - H-E. Amyloidosis in liver - H-E. Calcification of aorta - H-E. Uric acid tophi - H-E.

II. Macroscopic samples of Amyloidosis: spleen - sago and lardaceous; kidney - a big white kidney. Amyloid sclerosis of kidney. Atherosclerosis of the aorta with calcification. Uric acid infarction of the kidney.

EXERCISE № 8 - 2 hours: Cell death: apoptosis and necrosis

I. Histological samples: Necrosis in spleen (anemic infarction of spleen) - N-E. Necrosis in brain (anemic infarction of brain) - H-E. Steatonecrosis in pancreas (necrotic pancreatitis) - H-E. Caseous necrosis in lymph nodes in tuberculosis (TBC in lymph nodes) - H-E.

II. Macroscopic samples - Anemic infarction of the spleen. Anemic infarction of the kidney. Anemic infarction of the brain. Brain pseudocyst. Lymph node with tuberculosis. Gangrene of the toe. Acute necrotizing pancreatitis.

EXERCISE № 9 - 2 hours: Compensatory-adaptive processes: atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia.

I. Histological samples: Hypertrophy of myocardium- HE. Hyperplasia of uterine mucosa - HE. Hyperplasia of prostate - H-E. Atrophy of liver- H-E. Atrophy of myocardium - H-E.

II. Macroscopic samples: Tongue in acromegaly. Dilatation of the left ventricle in chronic myocarditis. Hypertensive heart. Hypertrophy of the prostate with bladder stones. Atrophy of the myocardium. Internal hydrocephalus.

EXERCISE № 10 - 2 hours: REVISION OF CELL INJURY AND ADAPTIVE PROCESSES

EXERCISE № 11 - 2 hours: **MCQ AND PRACTICAL TEST №1:**
ON TOPICS FROM CELL INJURY AND ADAPTIVE PROCESSES

EXERCISE № 12 - 2 hours: Disturbances of blood flow: hyperemia, edema, and hemorrhage.

I. Histological samples: Cyanotic liver - HE. Nutmeg liver - H-E. Pin point hemorrhages in brain - H-E. Oedema of skin - H-E. Oedema in lungs - H-E.

II. Macroscopic samples Nutmeg liver. Cardiac liver fibrosis. Bleeding in the brain. 4. Brown induration of lung.

EXERCISE № 13 - 2 hours: Circulatory disorders: ischemia, thrombosis, embolism, heart attack.

I. Histological preparations: Mixed thrombus - H-E. Anemic infarction of kidney - H-E. Hemorrhagic infarction of the lungs - H-E. Fat embolism in lungs - Sudan III.

II. Macroscopic samples: Recent myocardial infarction. Anemic infarction of kidney. Infarct of the spleen. Ischemic infarction of the brain. Thrombus in aorta. Round thrombus in the left ventricle. Pulmonary thromboembolism. Hemorrhagic infarction of the lung. Mesenteric thrombosis.

EXERCISE № 14 - 2 hours: **Colloquium : Cell injury and Hemodynamic disorders**
(MCQ and written part)

EXERCISE № 15 - 2 hours: Inflammation: Basic morphological changes. Mediators of inflammation. Classification. Types of exudative inflammation.

I. Histological samples: Fibrinous pericarditis - H-E. Purulent leptomeningitis - H-E. Phlegmonous appendicitis - H-E. Acute absceding myocarditis - H-E.

II. Macroscopic samples fibrinous pericarditis. "Armoured" heart. Purulent leptomeningitis. Phlegmonous appendicitis.

EXERCISE № 16 - 2 hours: Productive inflammation.

I. Histological samples: Granulation tissue - H-E. Nasal polyp - H-E. "foreign body" type granuloma - H-E. Hydatid cyst - H-E. Giant cell epulis - H-E.

II. Macroscopic samples Hydatid cyst of the spleen. Hydatid cyst in liver. Trichinella. Nasal polyp.

EXERCISE № 17 - 2 hours: Granulomatous inflammation.

I. Histological preparations: Necrosis caseosa lymphonodi (Lymphadenitis tuberculosa caseosa).

Mesaortitis luetica - H-E. Gumi luetici - H-E. Actinomycosis - H-E.

II. Macroscopic swamples Cavity of the lung. Miliary tuberculosis of the lung. Tuberculous leptomenigitis. Lymph node tuberculosis. Tuberculosis of the kidney. Luetic aneurysm of the aorta.

EXERCISE № 18 - 2 hours: Regeneration. Pathology of immunity.

I. Histological samples: Regeneration of bone marrow - H-E. Granulation - H-E. Scarring of myocardium - H-E; Van Gieson. Hashimoto diseases. Rheumatoid arthritis. Nodosal polyarteritis - toluidine blue.

II. Macroscopic samples: Regeneration of bone marrow. Heart- postinfarction scarring, chronic aneurysm with superimposed thrombus. Lymphomatous goiter (Hashimoto). Rheumatoid arthritis.

EXERCISE № 19 - 2 hours: REVISION of hemodynamic disorders, inflammation and immunity

EXERCISE № 20 - 2 hours: **MCQ : Inflammation. Pathology of immunity.**

PRACTICAL TEST № 2: Inflammation. Pathology of immunity. Hemodynamic disorders.

EXERCISE № 21 - 2 hours: Dissection.

EXERCISE № 22 - 2 hours: Tumors. Benign and malignant tumors of the surface epithelium.

I. Histological samples: Papiloma in oral cavity. Basal cell carcinoma . Squamos cell carcinoma. Urothelial carcinoma.

II. Macroscopic samples: basal cell carcinoma. Lung cancer. Bladder cancer. Breast cancer. Cancer of the cervix.

EXERCISE № 23 - 2 hours: Benign and malignant tumors of glandular epithelium.

I. Histological preparations: Pleomorhic adenoma of parotis (tumor "mixtus"). Gastric adenocarcinoma. 'Gelatinous' adenocarcinoma.

II. Macroscopic preparations fibroadenoma of the breast. Breast cancer. Stomach Cancer: ulcerative, excavative types. Cancer of the colon. Endometrial cancer.

EXERCISE № 24 - 2 hours: Tumors. Benign and malignant soft tissue tumors.

I. Histological samples: Lipoma - H-E. Cavernous haemangioma of liver - H-E. Capillary haemangioma of skin - H-E. Leiomyoma in uterus - H-E, Van Gieson. Leiomyosarcoma - H-E.

II. Macroscopic samples: 1. Lipomas. 2. Hibernoma. 3. Cavernous haemangioma of the liver. 4. Adrenal adenoma. 5. Uterine leiomyomas.

EXERCISE № 25 - 2 hours: Pigment tumors. Teratoma.

I. Histological samples: Naevus. Melanoma malignum. Mature teratoma

II. Macroscopic samples: Malignant melanoma - skin. Metastases from malignant melanoma in the liver, brai, etc. Mature teratoma (dermoid cyst) of the ovary.

EXERCISE № 26 - 2 hours: REVISION - TUMORS

EXERCISE № 27 - 2 hours: **MCQ : TUMORS**

PRACTICAL TEST № 3: TUMORS

EXERCISE № 28 - 2 hours: Principles of setting a pathological diagnosis

EXERCISE № 29 - 2 hours: Dissection.

EXERCISE № 30-2 hours: Dissection.

PROGRAM COURSE (VI semester)

LECTURE № 1 - 2 hours: Pathology of the Cardiovascular System. Atherosclerosis.

LECTURE № 2 - 2 hours: A: Pathology of the Cardiovascular System. Hypertension. Ischemic heart disease. Chronic pulmonary heart.

LECTURE № 3 - 2 hours: Pathology of the Cardiovascular System
Rheumatism. Infectious and non infectious endocarditis.

LECTURE № 4 - 2 hours: Pathology of the Cardiovascular System
Myocarditis. Cardiomyopathies. Pericarditis. Congenital heart defects.

LECTURE № 5 - 2 hours: Connective tissue disease
Systemic lupus. Rheumatoid arthritis. Systemic vasculitis.

LECTURE № 6 - 2 hours: Pathology of the respiratory system
Diseases of the nose, paranasal sinuses, pharynx and larynx. Bronchitis. Bronchiectatic disease.

LECTURE № 7 - 2 hours: Pathology of the respiratory system
Pneumonia. Abscess and gangrene of the lung. Allergic diseases of the lung.

LECTURE № 8 - 2 hours: Pathology of hemopoetic system
Anemia. Erythremia. Thrombocytopenias. Agranulocytosis. Acute and chronic leukemia.

LECTURE № 9 - 2 hours: Pathology of hemopoetic system
Multiple myeloma. Malignant lymphomas.

LECTURE № 10 - 2 hours: Pathology of the digestive system
Pathology of the oral cavity and esophagus.

LECTURE № 11 - 2 hours: Pathology of the digestive system
Pathology of the stomach and duodenum.

LECTURE № 12 - 2 hours: Pathology of the digestive system
Enteritis and enterocolitis. Appendicitis. Mesenteric thrombosis. Colonic tumors. Bowel obstruction.

LECTURE № 13 - 2 hours: Pathology of liver.
Hepatitis

LECTURE № 14 - 2 hours: Pathology of liver
Liver cirrhosis. Liver Cancer.

LECTURE № 15 - 2 hours: Pathology of the bile ducts and pancreas.

PROGRAM OF PRACTICAL EXERCISES (VI semester)

EXERCISE № 1 - 2 hours: CLINICO-MORPHOLOGICAL OBSERVATION

EXERCISE № 2-2 hours: Diseases of the cardiovascular system: atherosclerosis, hypertension.

I. Histological samples: Atherosclerosis of aortae - HE, Sudan III. Benign hypertension in brain. Arteriolosclerotic nephrosclerosis. Pin point haemorrhages in brain.

II. Macroscopic samples: 1. Arteriosclerotic nephrosclerosis . 2. Hypertensive heart. 3. Arteriolosclerotic nephrosclerosis. 4. Obturative thrombus in the abdominal aorta. 5. Pinpoint bleeding in the brain white. 6. Large hematoma in the cerebral hemisphere. 7. 'White softening' of brain. 8. Pseudocyst of the brain.

EXERCISE № 3 - 2 hours: Diseases of the cardiovascular system. Myocardial infarction.

Miokardiofibrosis. Cardiomyopathies.

I. Histological samples: Hypertrophy of myocardium. Recent myocardial infarction. Scarring of myocardium- H-E, Van Gieson. Anemic infarction of brain.

II. Macroscopic samples: 1. Recent myocardial infarction. 2. Hypertrophy of the left ventricle. 3. Hypertrophy and dilatation of the left ventricle. 4. White softening of brain. 5. Coronary artery bypass.

EXERCISE № 4 - 2 hours: Diseases of the cardiovascular system. Endocarditis. Myocarditis.

Pericarditis. Systemic connective tissue diseases.

I. Histological preparations: 1. Endocarditis fibrosa. 2. Myocarditis rheumatica. 3. Pericarditis fibrinosa. 4. Polyarteriitis nodosa - H-E.

II. Macroscopic preparations: 1. Fibrinous pericarditis. 2. Fibrotic mitral valve endocarditis. 3. Stenosis and mitral insufficiency with round left atrial thrombus. 4. Ulcero-polypotic endocarditis. 5. Kidney – nodosal polyarteriitis.

EXERCISE № 5-2 hours: **REVISION and PRACTICAL TEST № 1:**
Pathology of Cardiovascular System

EXERCISE № 6-2 hours: **Colloquium №1 : Pathology of Cardiovascular System**
(MCQ and written part)

EXERCISE № 7-2 hours: Diseases of the respiratory system. Inflammatory diseases of the lung and pleura. Emphysema. Pleurisy.

I. Histological preparations: Acute and chronic bronchitis. Emphysema.

II. Macroscopic samples: 1. Chronic bronchitis. 2. Pulmonary emphysema. 3. Pleural fibrosis.

EXERCISE № 8-2 hours: Diseases of the respiratory system. Pneumonia.

I. Histological preparations: Bronchopneumonia acuta abscedens. Bronchopneumonia acuta mycotica. Pneumonia crouposa. Interstitial pneumonia.

II. Macroscopic samples: 1. Absceding pneumonia. 2. Pneumonia in the stage of gray hepatisation.

EXERCISE № 9-2 hours: Diseases of the respiratory system. Pneumoconiosis. Neoplasms.

I. Histological samples: Silicosis pulmonis (nodular form). Squamous carcinoma of the lung. Undifferentiated, small cell carcinoma of the lungs. Bronchioloalveolar cancer.

II. Macroscopic samples: 1. Carbon duct in lungs. 2. Silicosis of the lung. 3. Lung cancer.

EXERCISE № 10 - 2 hours: **REVISION. MCQ and PRACTICAL TEST № 2 :**

Pathology of the respiratory system.

EXERCISE № 11 - 2 hours: Diseases of the haematopoietic system. Anemia. Leukemia. Diseases of the lymph nodes. Lymphomas.

I. Histological samples: 1. Regeneration of bone marrow - H-E. 2. Chronic lympholeucemic infiltrates in liver- H-E. 3. Myeloleucemic infiltrates in liver - H-E. 4. Hodgkin's disease - HE. 5. Non Hodgkin's lymphoma - H-E. 6. Plasmocytoma - H-E

II. Macroscopic samples. . 1. Chronic lympholeucemic infiltrates in liver 2. Myeloleucemic infiltrates in liver.

EXERCISE № 12 - 2 hours: Diseases of the oral cavity.

I. Histological samples: 1. Leucoplakia - H-E. 2. Giant cell epulis - H-E. 3. Adamantinoma - H-E. 4. Pleomorphic adenoma of parotid - H-E. 5. Chronic tonsillitis - H-E.

II. Macroscopic samples: Pleomorphic adenoma of salivary gland – mixed tumor.

EXERCISE № 13 - 2 hours: Diseases of the gastrointestinal tract: stomach, small and large intestines. Ulcer of stomach and duodenum. Complications. Benign and malignant tumors of the stomach.

Chronic ulcers, hemorrhagic colitis (CUHK). Tumors of the intestines.

I. Histological samples: 1. Gastritis chr. atrophicans - H-E. 2. Ulcus chronicum ventriculi exacerbata - N. F. 3. Gastric adenocarcinoma - H-E. 4. Duodenal ulcer - H-E. 5. Appendicitis phlegmonosa - H-E.

II. Macroscopic samples: 1. Hypertrophic gastritis. 2. Acute ulcers of the stomach. 3. Chronic gastric ulcer perforation. 4. Chronic ulcers of the stomach and duodenum 5. Gastric cancer - polypoid, ulcerated, scirrhus. 6. Phlegmonous appendicitis. 7. Diverticulum of the esophagus.

EXERCISE № 14 - 2 hours: Diseases of the liver, gallbladder and pancreas.

Acute toxic liver dystrophy. Acute and chronic hepatitis. Liver cirrhosis. Diseases of the gallbladder and bile ducts. Acute pancreatitis and pancreatic cancer.

I. Histological samples: 1. Acute toxic necrosis of liver - H-E. 2. Micronodular cirrhosis - H-E. 3. Chronic cholecystitis - H-E. 4. Steatonecrosis pancreatis (pancreatitis ac. necroticans) - N-E.

II. Macroscopic samples: 1. Micronodular cirrhosis of liver 2. Cholelithiasis. 3. Gangrenous cholecystitis. 4. Acute pancreatic necrosis.

EXERCISE № 15 - 2 hours: **REVISION. MCQ and PRACTICAL TEST №3:**

Pathology of Hematopoietic System. Pathology of Digestive system.

PROGRAM COURSE (VII semester)

LECTURE № 1-2 hours: Pathology of the urinary system

Anatomy and physiology of urinary system. Primary glomerulopathies.

LECTURE № 2-2 hours: Pathology of the urinary system

Tubulo-interstitial disease.

LECTURE № 3-2 hours: Pathology of the urinary system

Acute and chronic renal failure. Nephrosclerotic kidney. Nephrolithiasis. Pathology of the bladder.

LECTURE № 4-2 hours: Pathology of the female reproductive system

Diseases of the vagina, cervix and uterine body.

LECTURE № 5-2 hours: Pathology of the female reproductive system

Ovarian tumors. Pathology of pregnancy. Diseases of the breast.

LECTURE № 6-2 hours: Pathology of the male reproductive system

LECTURE № 7-2 hours: Pathology of the endocrine system
Diseases of the pituitary and adrenal.

LECTURE № 8-2 hours: Pathology of the endocrine system
Diseases of thyroid and endocrine pancreas.

LECTURE № 9-2 hours: Pathology of the nervous system
Inflammatory diseases of the nervous system.

LECTURE № 10 - 2 hours: Pathology of the nervous system
Tumors of neuroepithelial tissue of nerve sheaths, the meninges and their kindred fabrics.

LECTURE № 11 - 2 hours: Pathology of bones and joints.
Osteoporosis. Osteomalacia. Metabolic and inflammatory bone diseases. Arthritis. Arthrosis.

LECTURE № 12 - 2 hours: Infectious diseases. Sepsis. AIDS.

LECTURE № 13 - 2 hours: Infectious diseases. TB

LECTURE № 14 - 2 hours: Infectious diseases. Lues

LECTURE № 15 - 2 hours: PRINCIPLES OF CONSTRUCTION AND COMPARISON OF
CLINICAL AND PATHOLOGICAL DIAGNOSIS.

PROGRAM OF PRACTICALS (VII semester)

EXERCISE № 1-2 hours: Clinical and morphological observation

EXERCISE № 2-2 hours: Glomerulonephritis.

Definition, etiology and pathogenesis. Classification. Morphological changes in the basic types of glomerulonephritis.

I. Histological samples: 1. Crescentic glomerulonephritis (subacute). 2. Mesangiocapillary glomerulonephritis. 3. Glomerulonephritic nephrosclerosis.

II. Macroscopic samples: acute glomerulonephritis. Subacute glomerulonephritis. Nephrosclerosis. Minimal change disease.

EXERCISE № 3-2 hours: Pyelonephritis. Nephrosclerotic kidney. Tumors of the kidneys and bladder.

I. Histological samples: Acute pyelonephritis (absceding). Chronic pyelonephritis. Carcinoma of kidney. Bladder cancer.

II. Macroscopic samples: 1. Nephrosclerotic kidney. 2. Diabetic glomerulosclerosis. 3. Amyloid nephrosclerosis and a big white kidney. 4. Calculi in pyonephrosis. 5. Carcinoma of the kidney. 6. Wilm's tumor. 7. Polycystic kidney. 8. Bilateral hydronephrosis.

EXERCISE № 4-2 hours: **REVISION and PRACTICAL TEST № 4:**
Pathology of urinary system

EXERCISE № 5-2 hours: Pathology of pregnancy. Diseases of the female reproductive system.

A. Benign and malignant tumors of the cervix and uterine body. 2. Abortion, glandular hyperplasia of the endometrium.

I. Histological samples: Abortion - H-E. Mola hydatidosa - H-E. Chorionepithelioma (choriocarcinoma). CA planocellularae coli uteri - H-E. Adenocarcinoma corporis uteri - H-E.
II. Macroscopic samples: 1. Uterus with fetus. 2. Abortion. 3. Ectopic pregnancy. 4. Hydatidiform mole. 5. Choriocarcinoma. 6. Uterine polyp. 7. Uterus with fibroids. 8. Polyp of the cervix. 9. Endometrial carcinoma. 10. Sarcoma of the uterus.

EXERCISE № 6-2 hours: Tumors of the ovary. Diseases of the breast.

I. Histological samples: 1. Papillary cystadenoma of ovary - H-E. 2. Mucinous cystadenocarcinoma of ovary. 3. Dysplasia of breast - H-E. 4. Fibroadenoma of breast - H-E. 5. Ductal carcinoma (invasive) - H-E. 6. Scirrhous carcinoma of breast - H-E.
II. Macroscopic samples: Breast cancer. Fibroadenoma of the breast. Cystadenoma of the ovary. Krukenberg's metastases in the ovaries.

EXERCISE № 7-2 hours: Diseases of the male reproductive system.

Prostatic hyperplasia. Tumors of the testis.

I. Histological samples: Hyperplasia of prostate. Adenocarcinoma of prostate. Seminoma testis. Teratoma.

II. Macroscopic samples: hypertrophy of the prostate. Prostate cancer. Seminoma of the testis. Mature teratoma - (ovary).

EXERCISE № 8-2 hours: **REVISION and PRACTICAL TEST № 5**

Pathology of female reproductive system. Pathology of male reproductive system.

EXERCISE № 9-2 hours: **Colloquium № 2: "Urinary and reproductive systems"**

EXERCISE № 10-2 hours: Diseases of the endocrine system. Diseases of the thyroid gland. Diabetes.

I. Histological samples: Struma colloidosa - H-E. Struma basedowiana (Struma toxica). Thyreoiditis chronica (struma lymphomatosa - Hashimoto) - H-E. Glomerulosclerosis diabetica - H-E. Adenoma gl. hypophyseae (eosinophilic).

II. Macroscopic samples Nodular colloid goiter. Graves' goiter. Acromegaly - language. Pituitary adenoma. Diabetic glomerulosclerosis. Adrenal adenoma.

EXERCISE № 11 -2 hours: Inflammatory diseases of the nervous system.

I. Histological samples: Leptomeningitis purulenta - H-E. Polioencephalitis acuta - H-E. Poliomyelitis anterior acuta - H-E. Leptomeningitis tuberculosa - H-E.

II. Macroscopic samples: Purulent leptomeningitis. T.B.Leptomeningitis. Internal hydrocephalus.

EXERCISE № 12 - 2 hours: Tumors of the central nervous system, the sheaths of peripheral nerves and soft tissues.

I. Histological samples: Astrocytoma. Glioblastoma multiforme. Schwannoma (neurinoma). Meningioma.

II. Macroscopic samples: 1. Glioma of the brain. 2. Glioblastoma multiforme. 3. Neurinoma of n. statoacusticus. 4. Meningioma.

EXERCISE № 13 - 2 hours: Infectious diseases. Tuberculosis. Lues. Sepsis.

I. Histological samples: Millitary tuberculosis. Caseous necrosis in lymph nodes. Gummi luetici. Cytomegalovirus nephritis.

II. Macroscopic samples: 1. Tuberculosis of t kidney. 2. Cavity in lung. 3. Acinus tuberculosis. 4. Lymph node-caseous necrosis. 5. Luetic mesaortitis (aneurysm).

EXERCISE № 14 - 2 hours: ***REVISION and PRACTICAL TEST № 6:***
Pathology of endocrine system. Pathology of nervous system. Infectious diseases.

EXERCISE № 15 - 2 hours: **CLINICAL AND MORPHOLOGICAL OBSERVATION**

BIBLIOGRAPHY:

1. Robbins basic pathology, 10th edition. Authors: Vinay Kumar; Abul K Abbas; Jon C Aster. Elsevier, 2018.
2. Textbook of Pathology, 8th edition. Author: Harsh Mohan. Publisher: Jaypee Brothers Medical Publishers, 2018.
3. Workbook with training CD "Practicals in general pathology" edited by Prof. Benjamin Anavi, Department of General and Clinical Pathology, Medical University Plovdiv, 2018
4. Workbook with training CD "Practicals in clinical pathology" edited by Prof. Benjamin Anavi, Department of General and Clinical Pathology, Medical University Plovdiv, 2019
5. Lecture Course in General Pathology for medical students, first edition
prof. Elend Poryazova, MD, PhD; Publishing house "LAX BOOK" Ltd., tel.: 0899/190200
6. Lecture Course in Clinical Pathology for medical students, first edition
prof. Elend Poryazova, MD, PhD; Publishing house "LAX BOOK" Ltd., tel.: 0899/190200

Syllabus of general pathology

1. Subject, tasks and methods of pathology.
2. Health and disease. Main categories in pathology (etiology, pathogenesis, Morphogenesis, sanogenesis, tanatogenesis).
3. Death: Clinical and biological. Signs of biological death.
4. Cell injury. Definition. Categories of cellular injury. Causal factors. Pathogenetic and morphogenetic mechanisms.
5. Cellular injury. Types of degeneration. Acute reversible cellular damage (cellular swelling). Hydropic degeneration.
6. Abnormal accumulation of substances in the cell. Mechanisms. Accumulation of protein (hyaline-drop degeneration, Lewy and Mallory bodies; Russel bodies) and carbohydrates. Methods of proof.
7. Disorders of the metabolism of lipids. Types of adipose degeneration. Accumulation of cholesterol and cholesterol esters. Methods of proof. Total obesity. Lipomatosis. Cachexia.
8. Lysosomal diseases (tesaurismoses) - features. Lipidoses (Gaucher disease, Niemann-Pick disease, Tay-Sacks, disease, Hand-Schuller-Christian) and glycogenoses.
9. Disturbances in the metabolism of the pigments. Classification. Accumulation of exogenous pigments.
10. Accumulations of iron-containing pigments (hemoglobinogenic).
11. Accumulation of iron-free hemoglobinogenic pigments. Jaundice.
12. Disturbances in the metabolism and accumulation of proteinogenic (tyrosine, tryptophan) and lipidogenic native pigments.
13. Abnormal accumulation of substances in the extracellular matrix Muroid edema. Fibrinoid. Hialinosis - types. Accumulation of fibrillary substances in the interstitium: scarring, fibrosis (sclerosis) and cirrhosis.
14. Amyloidosis. Common physical and chemical characteristics. Classification. Types according to their composition. Methods of proof.
15. Types of amyloidosis depending on cause and spread of the process. Organ deposits.

Diagnosis.

16. Disturbances in the metabolism of calcium and copper. Abnormal accumulation of salts of the uric acid.
17. Cell death. Necrobiosis. Necrosis: definition, types (coagulation and kaseous; liquefactive), nuclear and cytoplasmic morphological changes.
18. Clinical and anatomical forms of necrosis (infarction, gangrene, decubitus, sequesters, mutilation, steatonecrosis, fibrinoid necrosis, 'noma'). Evolution and complications.
19. Apoptosis. Definition, differences between apoptosis and necrosis. Role of apoptosis.
20. Hemodynamic disorders: an overview, local and general hemodynamic disorders. Changes in the amount of blood. Arterial hyperemia.
21. Venous plethora (congestion). Acute and chronic left heart failure - morphological changes.
22. Venous plethora. Acute and chronic right heart failure - morphological changes. Local venous plethora.
23. Ischemia: definition, types, complications.
24. Bleeding and bleeding disorders. Plasmorrhagia. Terminology, mechanisms, outcome.
25. Rheological disorders: prestasis, stasis, 'sludge'-phenomenon.
26. Thrombosis. Order and Morphogenesis. Structure of thrombi. Difference between the thrombus and post-mortem blood clot.
27. Thrombosis. Types of blood clots, complications and evolution. Disseminated intravascular coagulopathy (DIC syndrome).
28. Embolism. Definition. Types of embolism by the way of their distribution: venous and arterial, orthograde, retrograde and paradoxical embolism.
29. Pulmonary thromboembolism: cause, proof, complications and outcomes.
30. Types of embolism, according to the substrate: air, gas, fat, amnial, bacterial, parasitic, tumor cell. Comparison between embolism and metastasis.
31. Infarction. Definition. Types. Morphological characteristics of anemic infarction.
32. Infarction. Definition. Types. Morphogenesis of hemorrhagic infarctions. Types of hemorrhagic infarctions.
33. Shock. Definition, pathogenetic types and organ morphological changes.
34. Disorders of lymph circulation: terminology and complications. Quantitative changes of tissue fluid. Oedema: definition, types. Pulmonary and cerebral edema. Dehydration.
35. Inflammation. Definition. Terminology. Main features. Etiologic factors.
36. Inflammation. Phases of inflammatory reaction. Pathogenesis and morphogenesis of inflammation. Plasma and cellular mediators.
37. Morphogenesis of acute (exudative) inflammation. Hemodynamic changes in microcirculation. Leukocyte migration and phagocytosis.
38. Cell types in the outbreak of acute and chronic inflammation.
39. Exudative inflammation. Morphology, complications and outcomes.
40. Productive inflammation: forms and morphological characteristics of diffuse productive inflammation.
41. Nonspecific and specific productive – 'granulomatous' inflammation. Morphology of foreign body granuloma, tubercle, luetic 'gumma', granulomas in leprosy and sarcoidosis, cat-scratch disease, toxoplasmosis, rhinoscleroma.
42. Pathology of immunity. Hypersensitivity reactions. Anaphylactic cytotoxic type immune reactions (first and second type reactions).
43. Pathology of immunity. Hypersensitivity reactions. Immune complexes reactions. Delayed type hypersensitivity (third and fourth type reactions).
44. Pathology of immunity - types. Autoimmune diseases. Congenital syndromes and acquired immune deficiency.

45. Adaptive processes: hypertrophy and hyperplasia, atrophy - definition, types, morphological characteristics.
46. Metaplasia - definition, types, morphological characteristics, complications.
47. Regeneration. Restitution and substitution. Factors affecting recovery processes. Wound healing. Regeneration of bone tissue.
48. Tumors: definition, incidence and prevalence. Biology of tumor growth (irreversibility, relative autonomy, tumor impact on the whole body).
49. Tumors: Terminology. Classification. Tumor structure.
50. Etiology of tumors. Chemical, physical, genetic and viral carcinogenesis. Role of growth factors.
51. Morphogenesis of tumors. Monocentric and multicentric theories for their emergence. Proliferating and non-proliferating tumor fractions. Biological basis of invasion of malignant tumors. Metastasis.
52. Morphological characteristics of tumors. Differences between benign and malignant tumors. Tissue and cellular atypia.
53. Precancerous. Dysplasia. Carcinoma in situ.
54. Metastasis of tumors.
55. Degree of differentiation and staging in the development of tumors. TNM-system.
56. Structure and shape of tumors - macroscopic and microscopic characteristics. Role of immunohistochemistry for the diagnosis of tumors.
57. Benign tumors of epithelial origin.
58. Malignant tumors of epithelial origin.
59. Benign soft tissue tumors.
60. Malignant soft tissue tumors.
61. Tumors of the central nervous system - general features, classification, basic representatives.
62. Tumors of the nerve sheath. Tumors of the meninges.
63. Tumors and tumor-like entities of melanocytes. Teratomas.

SYLLABUS FOR EXAMINATION OF CLINICAL PATHOLOGY

1. Atherosclerosis. Risk factors. Pathogenesis and Morphogenesis.
2. Atherosclerosis. Stages. Organ damage.
3. Hypertension: types, etiology and pathogenesis.
4. Morphogenesis of vascular lesions in benign and malignant hypertension, organ damage.
5. Pulmonary hypertension - primary and secondary. Acute and chronic pulmonary heart.
6. Ischemic heart disease. Morphogenesis, classification, forms of angina. Sudden cardiac death.
7. Myocardial infarction. Risk factors. Species. Evolution and complications.
8. Systemic connective tissue disease - a common feature. Rheumatism: definition, etiology and pathogenesis, major events.
9. Rheumatic heart disease. Rheumatic endocarditis, morphological stages. Rheumatic myocarditis and pericarditis.
10. Rheumatic valvular defects: morphological characteristics, hemodynamic disorders and organ complications.
11. Infective endocarditis - acute and subacute: etiology, pathogenesis, morphology and complications.
12. Non-infectious endocarditis: Libman-Sachs endocarditis, mitral valve prolapse, degenerative calcification of aortic valve endocarditis, marantic type. Cardiomyopathy: dilated, hypertrophic and restrictive.
13. Myocarditis - infectious and noninfectious.
14. Diseases of the pericardium: pericarditis and pericardial effusion.

15. Congenital heart defects: septal defects and inter - ventricular septa, persistent ductus Botali, coarctation of the aorta Congenital transposition of the trunk vessels.
16. Systemic lupus erythematosus: definition, etiology and pathogenesis, morphological amendments.
17. Rheumatoid arthritis: definition, pathogenesis, Morphogenesis of articular lesions skin and vascular changes, clinical course.
18. Systemic sclerosis. Dermatomyositis. Polymyositis. Sjogren syndrome.
19. Vasculitis. Temporal arteritis. Arteritis Takayasu. Polyarteritis nodosa.
20. Local vasculitis: infectious arteritis, Raynaud (trombangiitis obliterans) syndrome.
21. Aneurysms. Dissection of the aorta. Varices, phlebotrombosis and thrombophlebitis.
22. Inflammatory diseases and tumors of the nose and paranasal sinuses. Tumors of larynx.
23. Inflammatory diseases of the trachea and bronchi: acute tracheitis, bronchitis and bronchiolitis. Chronic bronchitis. Bronchiectasis.
24. Pneumonia: definition and overview. Lobar pneumonia: definition etiology, Morphogenesis, morphological stages, complications and outcomes.
25. Focal pneumonia: definition, etiology, pathogenesis, morphological features. Interstitial, and chronic viral pneumonia.
26. Abscess and gangrene of the lung. Atelectasis.
27. Chronic obstructive pulmonary disease. Pulmonary emphysema: a definition Classification, complications.
28. Bronchial asthma. Idiopathic pulmonary haemosiderosis.
29. Pneumoconiosis - an overview. Silicosis: forms and complications.
30. Lung cancer: incidence and prevalence, etiology, Morphogenesis, morphology. Metastasis. Complications.
31. Pleurisy and tumors of the pleura.
32. Inflammatory diseases of the oral cavity. Stomatitis, glossitis and angina: Complications of streptococcal infections.
33. Diseases of teeth and soft tissue apparatus: caries, pulpitis, periodontitis, radicular cyst, periodontal disease.
34. Tumors of the jaw bone and tumor-like processes of the soft tissues of oral cavity. Epulis.
35. Sialoadenitis and tumors of salivary glands.
36. Diseases of the esophagus:-hiatus hernia, diverticula, esophagitis, gastroesophageal reflux, Barrett's esophagus.
37. Tumors of the esophagus.
38. Acute and chronic gastritis. Etiology, Morphogenesis, clinical and morphological forms complications.
39. Acute and chronic ulcers of the stomach and duodenum. Definition etiology, pathogenesis and Morphogenesis. Morphological picture.
40. Chronic ulcers of the stomach and duodenum. Complications.
41. Benign tumors of the stomach - epithelial and mesenchymal. Early cancer stomach - morphology.
42. Malignant tumors of the stomach. Etiology, pathogenesis, classification, morphological characteristics, metastasis.
43. Inflammatory bowel disease: acute and chronic enteritis. Acute and chronic non-specific colitis. Ulcerative colitis. Crohn's disease.
44. Benign and malignant tumors of the colon.
45. Bowel obstruction. Peritonitis.
46. Acute appendicitis - morphology and complications. Tumors of the appendix.
47. Acute viral hepatitis: etiology, pathogenesis, morphological and biological features of hepatitis A, B and C.
48. Chronic hepatitis: etiology, classification, clinical and morphological forms of evolution.
49. Toxic hepatitis. Acute toxic degeneration of the liver.
50. Liver cirrhosis: definition, etiology, classification. Morphogenesis.
51. Liver cirrhosis: basic morphological types. Complications.

52. Cholecystitis: etiology, types, morphological characteristics, complications. Cholelithiasis.
53. Tumors of the liver, bile duct and gallbladder.
54. Inflammatory diseases and tumors of the exocrine pancreas.
55. Anemia: definition, etiology, classification. Acute and chronic posthemorrhagic anemia.
56. Pernicious, folate deficiency, and iron deficiency anemia. Aplastic anemia. Idiopathic thrombocytopenia.
57. Myelogenous malignancies. Acute myelogenous leukemia (leukemia). Chronic myelogenous leukemia.
58. Hyperplastic and inflammatory processes in the lymph nodes: chronic nonspecific and granulomatous lymphadenitis.
59. Malignancy of lymphoid tissue. Acute lymphoblastic leukemia / lymphoma. Chronic lymphocytic leukemia (small lymphocytic lymphoma).
60. Myeloma disease. Solitary myeloma (plasmacytoma).
61. General characteristics and classification approach for Non-Hodgkin's malignant lymphomas.
62. Hodgkin's disease: etiology and pathogenesis, classification, prognosis.
63. Primary glomerulopathy (glomerulonephritis). Pathogenesis and Morphogenesis. Diagnostic approach.
64. Glomerulonephritis occurring with nephritic syndrome: diffuse endocapillary proliferative glomerulonephritis. Rapidly progressive ('crescentic') glomerulonephritis. Goodpasture pulmonary-renal syndrome.
65. Glomerulonephritis occurring with nephrotic syndrome: minimal disease changes, focal segmental glomerulosclerosis, mesangiocapillary glomerulonephritis.
66. Glomerulonephritis occurring with nephrotic syndrome: IgA-nephropathy and Membranous nephropathy. Diffuse sclerosing glomerulonephritis.
67. Acute and chronic pyelonephritis: etiology, pathogenesis, morphology, complications.
68. Acute renal failure. Ischemic and nephrotoxic acute tubular necrosis.
69. Nephrolithiasis. Etiology. Types of concretion. Complications. Polycystic kidney.
70. Nephrosclerosis: classification approach macroscopic characteristic. Morphology chronic renal failure.
71. Tumors of the kidney and bladder.
72. Diseases of the cervix. Precancerous conditions (CPC). Carcinoma in situ. Microinvasive, invasive squamous and adeno-carcinoma. Morphological diagnosis. Prognosis.
73. Chronic endometritis, endometriosis, endometrial hyperplasia, etiology, morphology.
74. Benign and malignant tumors of the uterine body.
75. Ovarian tumors: classification, key representatives biological characteristics. Metastatic ovarian tumors.
76. Abortion and ectopic pregnancy: cause, morphology, complications.
77. Molar pregnancy and choriocarcinoma. Postnatal sepsis.
78. Inflammatory and fibrotic cystic changes of the breast.
79. Benign and malignant breast tumors: morphology and staging.
80. Tumors of the testis and epididymis.
81. Hyperplasia and tumors of the prostate gland. Complications.
82. Tumors of the anterior pituitary. *Hyperpituitarism*: Acromegaly. Gigantism. Cushing disease. *Hypopituitarism*: dwarfism. Sheehan syndrome Adiposo-genital dystrophy. Diabetes insipidus. Craniopharyngeoma.
83. Hyperplastic thyroid disease. Hyper- and hypothyroidism.
84. Hashimoto: etiology, pathogenesis, morphological characteristics.
85. Tumors of the thyroid gland.
86. Diseases of parathyroid glands. Hyper- and hypoparathyroidism.
87. Diseases of the adrenal gland: chronic and acute adrenal failure. Adrenal tumors.
88. Diabetes mellitus. Tumors of the endocrine pancreas.

89. Serous viral meningitis. Viral polioencephalitis. Demyelinating encephalomyelitis and neuropathy.
90. Bacterial meningitis and meningoencephalitis: epidemic cerebrospinal meningitis, purulent non-meningococcal leptomeningitis, tuberculous meningitis and meningoencephalitis.
91. Astroglial tumors - types. Glioblastoma multiforme. Morphological and biological characteristic.
92. Tumors of ependymal glia and plexus chorioideus. Medulloblastoma. Morphological and biological characteristic.
93. Tumors of the meninges and shwan cells. Types. Morphological and biological characteristic.
94. Hydrocephaly: definition, etiology, pathogenesis, classification.
95. Tuberculosis: general characteristics and classification. Primary tuberculosis.
96. Hematogenic tuberculosis. Secondary tuberculosis. Types. Complications.
97. Acquired syphilis: epidemiology, etiology, pathogenesis. Primary, secondary and tertiary lues. Neurosyphilis. Congenital syphilis.
98. Sepsis.
99. AIDS.
100. Principles of construction and comparison of clinical and pathological diagnosis: diagnostic categories

MEDICAL UNIVERSITY OF PLOVDIV
MEDICAL FACULTY

SYLLABUS
IN
PROPEDEUTICS OF INTERNAL MEDICINE

Approved by Department council on 28.04.2022

Approved by Faculty council by Protocol №6/15.06.2022

Propedeutics of Internal Medicine

Curriculum

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			III year	
Propedeutics of Internal Medicine	VI							V	VI
		240	60	180	8.0	6.0	14.0	2/6	2/6

DISCIPLINE: „Propedeutics of internal medicine”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS: 240 Mandatory

LEVEL OF QUALIFICATION: Master /M/

FORMS OF TRAINING: Lectures, Practical classes, Self-training

YEAR OF TRAINING: III course

DURATION OF TRAINING: One study year (two semesters)

ACADEMIC HOURS: 60 hours lectures, 180 hours practical classes

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: study books, Self-training materials, Test book:

Books

1. Propedeutics of Internal medicine, author P. Solakov and St. Kuzmanova, Medical publishing house „Raykov“, Plovdiv, 2000.

2. Textbook of propedeutics of internal disease, Edited by Assoc. Prof. Anastas Batalov, Plovdiv 2013

3. Test of Propedeutics of internal medicine, edited by prof. Batalov – English and Bulgarian test book, Plovdiv, 2013.

4. Hutchinson’s Clinic Methods, M. Swash, 12 ed, WB Saunders, London, 1999.

5. Davidson’s Principles and Practice of Medicine, 11 ed, C Livingstone, 1999

6. Руководство по диагностике и лечению внутренних болезней, В. П. Померанцев и др., „Медицина”, 1997.

Self-Training and extracurricular work of the medical student

The independent work is managed by the assistant, who guides the student both in the literary sources and in the methods of their mastering. They also provide training tests, incl. on line, for independent work and exercises of students.

Cooperation between teachers and students, which is expressed in:

- Commitment of the teacher to the student and his preliminary preparation, current difficulties in mastering the material and opportunities with an individual learning program to achieve more knowledge.
- Use of consultation hours.
- Involvement of students in teams for research tasks, research, projects, etc.

FORMS OF EVALUATION:

Grading through the semesters, provided for in the curriculum of the discipline, are given for:

- a. The student's results in seminars, course and individual assignments, the student's work with the lecturer on research and projects, etc .;
- b. Tests or student work.

The exam of Propedeutics of Internal Medicine is held in the sixth session and consists of several components - assessment of a practical exam, test, written answer to two questions, oral examination.

EVALUATION CRITERIA:

The grade is one and is a result of the average value of all components of the exam - grade from a practical exam, test, written answer to two questions, oral examination, provided that none of them the student has received a poor grade.

The final grade determines the extent to which the student has achieved the learning goal set at the beginning. It is multicomponent and includes a colloquium assessment in the fifth and sixth semesters, a written final exam, an oral final exam assessment, a practical exam and the assessments from the current control.

The components involved in the formation of the assessment and the coefficients of significance of the discipline are determined by the Academic Council with the adoption of this academic standard of the discipline.

ASPECTS OF EVALUATION CRITERIA:

Clear standards for evaluation have been developed. An average grade is formed from each semester, the conducted colloquia, from the written theoretical exam (after a successful entrance test with a limit of 65%) and the practical exam.

- Weak (2) receives a student with scarce knowledge that cannot serve as a basis for the next levels of education in other clinical disciplines.
- Intermediate (3) is given to a student who reproduces the knowledge in a "ready-made scheme", as there are no main points from the developed topic; there is no readiness for independent use of the acquired knowledge and professional competencies; the terminology is not mastered satisfactorily, the presentation is characterized by poor language; only some basic practical skills have been mastered.

- Good (4) receives a student who develops the topic descriptively, reproductively, has limited independence in using the acquired knowledge and acquired professional competencies, in the presentation, although there is a good language culture, inaccuracies in the concepts used; who has mastered basic practical skills but not to the full and has some gaps.
- Very good (5) gets a student who develops the topic independently productively, non-standard, looking for a new algorithm and analysis of the used literature data; makes an attempt to present and substantiate his thesis; adequately uses the concepts from the scientific field of the studied discipline, has a good language culture; handles very well practically to the bed of the patient with small gaps.
- Excellent (6) is awarded to a student who independently, logically, with the presence of a creative element brings out the topic; reasonably and originally uses and interprets the literature related to the revealed issue; is well informed and ready to use the acquired knowledge and professional competencies; has the accuracy and rich linguistic culture of the exhibition, practically handles perfectly to the patient's bed. At the beginning of the academic year of the lectures and exercises the students get acquainted with the assessment standards, the procedures for conducting current control and the opportunities for receiving feedback on their progress during the semester.

SEMESTER EXAM:

Yes /Test, written theoretical exam and practical exam/

STATE EXAM:

No

LECTURER:

Habilitated lecturer from the Department of Propedeutics of Internal Medicine

DEPARTMENT:

Propedeutics of internal medicine

ANNOTATION

BASIC AIMS OF THE DISCIPLINE

The main goal of the training in Propedeutics of Internal Medicine is theoretical and practical training of future physicians for comprehensive patient care, including thorough history taking, proper use of the four basic physical methods of examination - examination, palpation, percussion and auscultation, acquaintance with the basic instrumental methods for research and acquisition of skills for assessing the need for specialized counseling.

The goal is coordinated with:

- the mission and the concept for the Medical University, Plovdiv
- the volume and the credit rating of the course (according to the ECTS system), visible from the curriculum; • the qualification characteristics of the specialty;

The goal is consistent with the place of the discipline in importance and chronology in the curriculum of medical students.

Course content of the course

The content of the topics for lectures and exercises is arranged chronologically so that each subsequent lecture and related exercises use already studied material and concepts. The exercises are held twice a week during the fifth and sixth semesters and last for three hours (45 minutes).

Assumptions

Before starting the course in Propedeutics of internal medicine, the student must have basic knowledge of Anatomy, Physiology, Pathophysiology and Pathoanatomy of the human body.

Academic resources

The academic staff of the Department of Propedeutics of Internal medicine includes
3 habilitated lecturers,
5 non-habilitated lecturers with the scientific degree "Doctor"

18 non-habilitated lecturers.

From the teachers:

11 specialize in Internal medicine and Rheumatology

7 have a specialty in Rheumatology

1 with a specialty in Cardiology

1 with a degree in Nephrology

2 with a degree in Endocrinology

4 are residents in Rheumatology, Endocrinology, Nephrology.

Lectures on Propedeutics of Internal Medicine are given by a habilitated lecturer (professor or associate professor) with an acquired scientific degree (doctor) in the respective doctoral program. The lectures are held every week during the fifth and sixth semesters and last 2 teaching hours (45 minutes each). Up to 10% of the lectures are assigned to non-habilitated lecturers with a scientific degree in the respective doctoral program. The practical exercises are led by habilitated and non-habilitated lecturers (associate professor, chief assistant, assistant). The non-habilitated lecturers have a master's degree in medicine and are appointed after a competition. 5. Material resources The exercises in Propedeutics of Internal Medicine are conducted in two bases - Kaspela University Hospital - 85% of the students and St. George University Hospital - 15% of the students. The main part of the exercises are held in the Clinics of Rheumatology - University Hospital "Kaspela" and University Hospital "St. George" and according to the topics are visited Clinics of Pulmonology, Cardiology, Gastroenterology, Endocrinology and Nephrology, where students are shown suitable for the topic. exercise sick. For training of students and doctoral students are used 2 seminar rooms, one in the University Hospital "Kaspela" and the University Hospital "St. George". Each of the halls is provided with equipment for multimedia presentation. The technical means applied in the training include - video films, multimedia presentations, collections of ECG recordings, imaging studies, joint ultrasound.

Lecture training. The lectures are prepared and delivered in the form of multimedia presentations. The volume and format of the lectures are the choice of the individual lecturers.

Practical exercises Conducted in groups. The topics of the exercises are announced at the beginning of each semester in a prominent place in the Clinics of Rheumatology of the University Hospital "Kaspela" and the University Hospital "St. George".

Methodical instructions are provided for the exercises. Each student is given individual tasks. The following is checked: - acquired knowledge and skills from previous exercises - the student's self-preparation on the topic of the present exercise - the results (acquired knowledge and skills) from the specific exercise. As a methodological form, preference is given to the independent work of each student. Discussions are held with groups of students, before which the reporting student substantiates his thesis on specific clinical cases. The main part of the exercise time is in the rooms of the patients, as the student has the opportunity to practice what he has learned directly on the patients. The teachers have a plan of the developed lectures and exercises in the discipline, and upon request from the students they provide other study materials. At the beginning of each school year, the list of the main recommended literature in the discipline is updated. Lecturers and assistants in the course of the educational process also recommend Internet resources, from which appropriate materials can be found for the preparation of the student.

MAIN GOAL OF THE CURRICULUM

The main tasks of the training in Propedeutics of Internal Medicine are related to the purpose of training - acquiring theoretical and practical training of future physicians for comprehensive patient care, including thorough history taking, proper use of the four basic physical methods of examination - examination, palpation, percussion and auscultation, acquaintance with the main instrumental methods for research and acquisition of skills for assessing the need for specialized counseling. After getting acquainted with the basic physical methods of examination of the patient, students are introduced to basic nosological units in the field of pulmonology, cardiology, gastroenterology, nephrology, hematology, endocrinology and rheumatology. At the end of the course in Propedeutics of Internal Medicine, the student can not only successfully examine the patient, but also be aware of the need to appoint clinical-laboratory and instrumental tests for diagnosis.

EXPECTED RESULTS

The main results of the training in Propedeutics of Internal Medicine are related to the purpose and objectives of the training - acquiring theoretical and practical training of future physicians for comprehensive patient care, including thorough history taking, proper use of the four basic physical research methods - examination, palpation, percussion and auscultation, acquaintance with the main instrumental methods for research and acquisition of skills for assessing the need for specialized counseling.

LECTURES

III COURSE, V TERM

№	Dates	Topic
1	16-22.09.2019	History. Inspection. Palpation.
2	23-29.09.2019	Percussion. Auscultation – basic principles.
3	30.09-06.10.19	Anamnesis of patients with respiratory diseases. Inspection of chest.
4	7-13.10.2019	Palpation and percussion of lungs.
5	14-20.10.2019	Lungs auscultation.
6	21-27.10.2019	Bronchitis. Pulmonary emphysema. Bronchial asthma.
7	28.10-03.11.2019	Pneumonias.
8	04.10-10.11.2019	Bronchiectasis. Pulmonary abscessus. Pulmonary carcinoma.

9	11-17.11.2019	Pleuritis.
10	18-24.11.2019	Cardiovascular diseases. Anamnesis of a cardiac patient.
11	25-31.11.2019	Inspection and palpation of cardiac apex. Percussion of heart borders.
12	02-08.12.2019	Auscultation of heart. Heart sounds, rhythm, murmurs.
13	09-15.12.2019	Auscultation of heart – murmurs.
14	16-22.12.2019	Rheumatism.
15	23-27.12.2019	Arterial hypertension.

PROGRAMME LECTURES

III COURSE, VI TERM

№	Topic	Hours	DATES
1.	Myocarditis and cardiomyopathies. Pericarditis	2 h.	11-17. II.2020
2.	Major symptoms of gastrointestinal system Physical examination of abdomen	2 h.	18-24 .II.2020
3.	Acute and chronic gastritis, Ulcer disease. Complications, Stomach carcinoma	2 h.	25. II.2020-2 .III.2020
4.	Disease of Crhon, Ulcerative colitis, Cancer of the colon	2 h.	4-10. III.2020
5.	Physical examination of liver, Chronic hepatitis, Liver cirrhosis, Cholelithiasis. Cholecystitis	2h.	11-17. III.2020
6.	Physical examination of the spleen and pancreas	2 h.	18-24. III.2020
7.	Physical examination of kidneys Acute glomerulonephritis, Chronic glomerulonephritis	2 h.	25-31. III.2020
8.	Acute and chronic pyelonephritis Nephrolithiasis, HKF	2 h.	1-7 IV.2020
9.	Anemia - Iron defficiency anemia, Megaloblastic anemia, Hemolytic anemias	2 h.	8-14 IV.2020
10.	Acute/ blastic/ leukoses, Chronic myeloleukosis, Chronic lympholeukosis	2 h.	15-21 IV.2020
11.	Vacantion	2 h.	22-28 .IV.2020
12.	Haemorrhagic disorders	2 h.	29 IV.2020-5 V.2020

13.	Thyrotoxicosis. Graves' disease, Myxoedema, Acromegaly	2 h.	6-12 V.2020
14.	Diabetes mellitus. Etiology, pathogenesis, clinical picture. Complications: hypo and hyperglycemic coma	2 h.	13-19 V.2020
15.	Rheumatoid arthritis, SLE, Osteoarthritis Gout, Bechterev disease	2 h.	20-26 V.2020

PRACTICES

III COURSE, V TERM

№	Dates	Topic
1	16-22.09.2019	1. Acquaintance of the students to the Clinic. Taking history of a patient 2. Anamnesis vitae, anamnesis familiae.
2	23-29.09.2019	3. General assessment of the patient. Position in the bed, Gait, mental assessment 4. Examination of the skin and adnexes. Changes in the color of the then, Examination of nails, hair, etc.
3	30.09-06.10.19	5. Examination of the head and neck. Lymph nodes palpation, Examination of the thyroid gland. 6. Inspection and palpation of the chest. Vocal fremitus - interpretation
4	7-13.10.2019	7. Percussion of the chest. Technique of percussion. Basic sounds. 8. Percussion of lungs. Detection of Kroening spaces. Comparative percussion. Pathologic sounds and analysis.
5	14-20.10.2019	9. Auscultation of lungs. Basic breathing sounds. Vesicular and bronchial breathing. 10. Auscultation of lungs. Pathologic vesicular and bronchial breathing.
6	21-27.10.2019	11. Additive sounds: rhonchi, rales or crackles (crepitations), pleural friction or rub sound. 12. Respiratory diseases: Acute and chronic bronchitis, pulmonary emphysema, bronchial asthma.
7	28.10-03.11.2019	13. Respiratory diseases: pneumonias. 14. Respiratory diseases: Acute and chronic pleuritis
8	04.10-10.11.2019	15 Respiratory diseases: Bronchiectasis, pulmonary abscess and gangrene, lung cancer 16. Physical examination of respiratory system – EXAM.
9	11-17.11.2019	17. History of a cardiac patients. Inspection and palpation of the precordium 18. Percussion of the heart borders; relative and absolute heart borders
10	18-24.11.2019	19. Percussion of the heart borders; relative and absolute heart borders 20. Auscultation of heart – mechanism of formation of heart sounds. Main zones of auscultation.
11	25-31.11.2019	21. Changes in heart sounds. Additive heart sounds. Gallop rhythm. 22. Auscultation of heart – heart murmurs. Classification, Extracardial murmurs, pericardial friction rub.
12	02-08.12.2019	23. ECG – normal and pathological changes. 24. ECG – normal and pathological changes.
13	09-15.12.2019	25. Left and right heart failure.

		26. Arterial pulse examination. Taking of blood pressure: main rules. Qualities of arterial pulse. Examination of the veins. Veins diseases
14	16-22.12.2019	27. Rheumatic fever. Infectious endocarditis. 28. Acquired valve diseases Mitral stenosis and regurgitation
15	23-27.12.2019	29. Acquired valve diseases Aortic stenosis and regurgitation 30. Arterial hypertension.

PRACTICES

III COURSE, VI TERM

№	TOPIC	HOURS	DATES
1.	REUMATIC HEART DISEASES. RHYTHM AND CONDUCTION DISTURBANCES. CLINICAL MANIFESTATIONS. ECG IMAGES.	3h	11-17. II.2020
2.	ICHEMIC HEART DISEASES – ANGINA PECTORIS, MYOCARDIAL INFARTION	3h	
3.	COLOCVIUM -CVS	3h	18-24 .II.2020
4.	PHYSICAL EXAM OF ABDOMEN. SUPERFICIAL AND DEEP PALPATION. PALPATIKON OF ABDOMENAL ORGANS. DETECTION OF ASCITES	3h	
5.	PHYSICAL EXAM OF GIT. OESOPHAGEAL DISEASES. MAIN SYMPTOMS OF GASTROINTESTINAL DISEASES.	3h	25.II.2020 2 .III.2020
6.	GASTRITIS, ULCER DISEASE, STOMACH CARCINOMA	3h	
7.	DISEASE OF CRHON, ULCERATIVE COLITIS, CANCER OF THE COLON	3 h	4-10. III.2020
8.	PHYSICAL EXAMINATION OF LIVER AND GALL BLADDER. MECHANISMS OF JAUNDICE. PALPATION AND PERCUSSION OF LIVER. AUSCULTATION OF LIVE:R: PERIHEPATIC FRICTION RUB.	3h.	
9.	PHYSICAL EXAM OF PATIENTS WITH LIVER HEPATITIS, CIRRHOSIS AND CARCINOMA,	3h	11-17. III.20120

10.	LABORATORY, FUNCTIONAL AND INSTRUMENTAL EXAM OF BILE DUCTS. CHOLELITHIASIS, CHOLECYSTITIS	3h	
11.	PHYSICAL EXAM OF SPLEEN. SPLENOMEGALY	3h	18-24. III.2020
12.	PHYSICAL EXAM OF PANCREAS FUNCTIONAL AND INSTRUMENTAL INVESTIGATIONS. CHRONIC PANCREATITIS. CARCINOMA OF PANCREAS.	3h	
13.	PHYSICAL EXAMINATION OF KIDNEYS: INSPECTION, PALPATION, SUCCUSIO RENALIS.	3h	25-31. III.2010
14.	FUNCTIONAL INVESTIGATION OF KIDNEYS. RADIOGRAPHIC INVESTIGATIONS. ABDOMENAL ECHOGRAPHY.	3h	
15.	PHYSICAL EXAMINATIONS OF PATIENTS WITH GLOMERULONEPHRITIS, NEPHROTIC SYNDROME,	3h	1-7. IV.2020
16.	PYELONEPHRITIS, NEPHROLITHIASIS.	3h	
17.	PHYSICAL EXAM OF PATIENTS WITH RENAL FAILURE.: ACUTE AND CHRONIC.	3h	8-14. IV.2020
18.	PHYSICAL EXAM OF PATIENTS WITH RENAL CARCINOMA AND OTHER RENAL DISEASES	3h	
19.	PHYSICAL EXAMINATION OF PATIENTS WITH ANEMIA: IRON DEFICIENT, MEGALOBlastic, HEMOLYTIC	3h	15-21. IV.2020
20.	PHYSICAL EXAMINATION OF PATIENTS WITH: HEMOLYTIC ANEMIA	3h	
	VACANTION		22-28 .IV.2020
21.	PHYSICAL EXAMINATION OF PATIENTS WITH LEUCOSIS AND LYMPHOMAS	3h	29. IV.2020 -5 .V.2020
22.	PHYSICAL EXAMINATION OF PATIENTS WITH HEMORRHAGIC DIATHESIS: THROMBOCYTOPENIA, HEMOPHYLIA AND CAPILLAROTOXICOSIS.	3h	
23.	PHYSICAL AND FUNCTIONAL EXAM OF ENDOCRINE GLANDS ACROMEGALY, HYPOPHYSECTOMY, DIABETES INSIPIDUS	3h	6-12. V.2020
24.	PHYSICAL AND FUNCTIONAL EXAM OF PATIENTS WITH THYROID DISORDERS	3h	
25.	PHYSICAL AND FUNCTIONAL EXAM OF PATIENTS WITH DIABETES MELLITUS, ADDISON'S DISEASE, CUSHING'S DISEASE	3h	13-19. V.2020
26.	PHYSICAL EXAMINATION OF MUSCULOSKELETAL SYSTEM. BASIC SYMPTOMS. PHYSICAL EXAMINATION OF PATIENTS WITH RA, OA, AS, SLE.	3h	
27.	PERFORMING OF COMPLETE STATUS PRAESENS.	3h	20-26. V.2020

28.	RESPIRATORY AND CARDIOVASCULAR DISEASES – REVISION DISEASES – REVISION	3h	
29.		3h	
30.	GASTROINTESTINAL AND RENAL DISEASES – REVISION.	3h	

BIBLIOGRAPHY

1. Propedeutics of Internal medicine, author P. Solakov and St. Kuzmanova, Medical publishing house „Raykov“, Plovdiv, 2000.
2. Textbook of propedeutics of internal disease, Edited by Assoc. Prof. Anastas Batalov, Plovdiv 2013
3. Test of Propedeutics of internal medicine, edited by prof. Batalov – English and Bulgarian test book, Plovdiv, 2013.
4. Hutchinson’s Clinic Methods, M. Swash, 12 ed, WB Saunders, London, 1999.
5. Davidson’s Principles and Practice of Medicine, 11 ed, C Livingstone, 1999
6. Руководство по диагностике и лечению внутренних болезней, В. П. Померанцев и др., „Медицина“, 1997.

C O N S P E C T
PROPEDEUTICS OF INTERNAL DISEASES FOR MEDICAL STUDENTS

1. Anamnesis-structure.
2. General assessment of patient: mental status, skin and mucosal changes, nails, hair, lymph nodes, temperature, temperature curves
3. Examination of head, eyes and neck
4. Examination of respiratory system – inspection and palpation of chest.
5. Percussion of lungs.
6. Auscultation of lungs – normal sounds.
7. Added sounds – ronchi
8. Added sounds – crackles /crepitations/ and pleural friction rub
9. Acute and chronic bronchitis
10. Bronchial asthma
11. Pulmonary emphysema
12. Pneumonia – lobar pneumonia
13. Bronchopneumonia
14. Bronchiectasis
15. Lung abscess and gangrene.
16. Lung carcinoma. Early diagnosis
17. Pleuritis. Dry and exudative. Adhesive pleuritis
18. History / anamnesis / in cardiovascular diseases
19. Inspection and palpation of precordium
20. Percussion of heart borders: relative and absolute.
21. Auscultation. Heart sounds.
22. Heart murmurs. Mechanisms of formation. Classification
23. Organic heart murmurs
24. Functional / innocent/ heart murmurs
25. Pericardial friction rub. Extracardial murmurs
26. Examination of the peripheral arteries. Arterial pulse. Sphygmogram
27. Examination of venous pulse. Phlebogram
28. Normal ECG
29. Rhythm and conduction disturbances
30. Rheumatic fever. Rheumocarditis / etiology, pathogenesis, clinical picture/
31. Mitral valve stenosis
32. Mitral valve insufficiency / regurgitation/
33. Aortic stenosis
34. Aortic regurgitation
35. Infective endocarditis
36. Myocarditis. Cardiomyopathies
37. Idiopathic Arterial hypertension. Symptomatic arterial hypertension.
38. Ischemic heart disease. Classification. Angina pectoris
39. Myocardial infarction
40. Pericarditis
41. Acute heart failure Clinical equivalents.
42. Chronic heart failure
43. Rheumatoid arthritis
44. Osteoarthritis. Gout.
45. Systemic lupus erythematosus

46. Functional examination of kidneys
47. Acute renal failure. Chronic renal failure
48. Acute glomerulonephritis
49. Chronic glomerulonephritis.
50. Nephrotic syndrome
51. Acute and chronic pyelonephritis
52. Nephrolithiasis
53. Renal tumors
54. Major symptoms of gastrointestinal system
55. Inspection and palpation of abdomen – superficial and deep
56. Acute and chronic gastritis
57. Ulcer disease. Complications
58. Stomach carcinoma
59. Chronic ulcerative colitis
60. Physical examination of liver
61. Examination of the gall bladder and the bile ducts
62. Chronic hepatitis
63. Liver cirrhosis
64. Cholelithiasis. Cholecystitis
65. Tumors of liver and bile ducts
66. Acute hepatic failure. Hepatic coma
67. Physical examination of spleen
68. Physical examination of pancreas
69. Chronic pancreatitis
70. Carcinoma of pancreas and colon.
71. Iron deficiency anemia
72. Megaloblastic anemia
73. Hemolytic anemias
74. Acute/ blastic/ leukoses
75. Chronic myeloleukosis and Chronic lympholeukosis
76. Thrombocytopenia and Capillarotoxicosis.
77. Thyrotoxicosis. Graves' disease.
78. Myxoedema
79. Acromegaly
80. Hypercorticism. Cushing`s disease.
81. Hypocorticism. Adison's disease.
82. Hypoparathyroidism. Hyperparathyroidism
83. Diabetes mellitus. Etiology, pathogenesis, clinical picture, hypo and hyperglycemic coma

PRACTICAL EXAM

1. Thyroid gland palpation
2. Inspection and palpation of lung
3. Percussion of lung apex. Detection of Kroenig`s space
4. Comparative pulmonary percussion
5. Detecting of respiratory expansion
6. Lung auscultation
7. Inspection and palpation of precordium

8. Percussion of heart borders
9. Auscultation of heart – sounds and murmurs
10. Arterial pulse examination. Measurement of Blood pressure.
11. Inspection and palpation of kidney, Renal palpation. Pasternazki's symptom
12. Inspection , percussion and palpation of liver
13. Examination of gall bladder. Ascites
14. Examination of spleen
15. Palpation of pancreas
16. Examination of joints and vertebral column.
17. ECG normal and pathology

**MEDICAL UNIVERSITY - PLOVDIV
MEDICAL FACULTY**

**DEPARTMENT OF PROPEDEUTICS OF
SURGICAL DISEASES -
GENERAL SURGERY SECTION**



SYLLABUS

IN

GENERAL AND OPERATIVE SURGERY

Adopted by the Department Council - Protocol № 5/11.07.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

General and Operative Surgery Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTC non-auditorium classes	ECTS total	Academic hours in years and semester 3 rd year	
		Total	Lectures	Practices	ECTS			V	VI
General and operative surgery	VI	165	75	90	5.5	3.5	9.0	3/4	2/2

Course title : " General and Operative Surgery"

Type of course according to the uniform state requirements:

Mandatory

Level of training :

Master / **M** /

Forms of training:

Lectures and practicals

Training course : III year

Hours :

75 hours of lectures, 90 hours of exercises

Teaching aids : multimedia

Forms of assessment : current control and semester exam

Formation of the assessment : test, writing part, practical and oral exam

Aspects in the formation of the assessment: practical knowledge and skills

Semester exam: III course

State exam : after VI semester

Leading lecturer : Prof. Dr. P. Stefanova, MD, Prof . Dr. B. Sakakushev MD, Prof. Dr. A. Yonkov MD

Department : Propaedeutics of Surgical Diseases

ANNOTATION:

The course Propaedeutics of Surgical Diseases aims to acquaint students majoring in "medicine" with the theoretically applied achievements of modern science of surgical diseases - patterns and mechanisms of occurrence, development and manifestation, as well as the main methods of clinical research in surgical patients. In addition to studying the semiotics of surgical diseases, the aim of the training is to master the methodology of local examination of the surgical patient based on a detailed history, in-depth clinical examination, planning, performing and evaluating various paraclinical studies. The construction of the patient's surgical diagnosis is justified by the analysis of the established surgical symptoms and syndromes, combined with the most important clinical signs.

The main aspect in the training of students in surgical propaedeutics is the work at the patient's bedside - improvement of the methodology of communication with the patient, mastering the technique of physical examination methods to the extent of detecting pathological changes. In the course of training, the contemporary forms of education are also included - interactive training, problem-based training, work with models, models, videos, specialized software computer programs.

The analysis and evaluation of the results obtained from the course of training in surgical propagation is carried out by means of combined methods of current and final control - seminars, tests, written, practical and oral examination.

The aim of the training in propaedeutics of surgical diseases is based on the rational combination of traditional, proven teaching methods with modern ones to achieve optimal results - mastering and improving the methodology of local examination of the surgical patient, creating critical clinical thinking in students, which is a necessary prerequisite for therapeutic disciplines at the next stage of training.

PURPOSE OF THE COURSE: Mastering the physical clinical and paraclinical methods of examination in the surgical patients, acquiring basic knowledge of semiotics, of basic surgical operations and acquiring technical skills to perform basic surgical manipulations.

OBJECTIVES OF THE COURSE: Acquiring theoretical knowledge and clinical practice basic surgical skills on the content of the curriculum.

TRAINING METHODS :

- Lecture presentation
- Practical exercises
- Seminar discussions
- Test current semester test
- Role-playing games and exercise / training / of skills of models, models and real patients

TECHNICAL TOOLS AND TOOLS APPLIED IN THE TRAINING:

- Work with real patients and all specific surgical consumables and equipment related to their treatment in the hospital, operating room and manipulation rooms - needles, syringes, infusion systems, infusomats, aspiration systems, oxygen delivery systems, catheters, probes , drainages, dressings, test serums and blood transfusion aids, surgical instruments, operating equipment - tables, lamps, coagulators, etc.

- Modernly equipped classrooms with smart TVs, multimedia projector with folding presentation screen, laptop, digital video camera, computer hardware, overhead projector, specialized software computer programs, multimedia PowerPoint presentations for each exercise and videos on disk or flash drive, models, illustration boards, etc.

MONITORING AND EVALUATION :

Current control:

- entrance tests and examination by sections of the curriculum
- reporting and discussing clinical cases
- demonstrations of local methods of examination of the surgical patients
- demonstrations of mastered surgical manipulations

Final control:

- entrance test
- written exam on topics from the curriculum
- practical exam
- oral exam

METHODS FOR KNOWLEDGE CONTROL :

- tests
- discussion of cases
- demonstrations of acquired skills

COMPULSORY COMPETENCES

- Theoretical knowledge

- acquaintance with the methodology and specifics of examination of the surgical patients
- acquaintance with the achievements of modern science of surgical diseases - the patterns and mechanisms of their occurrence, development and manifestation, as well as the main methods of clinical research in surgery
- study of the semiotics of surgical diseases
- the development of the surgical diagnosis in the patient, based on the analysis of the established surgical symptoms and syndromes, combined with the most important clinical signs

- Practical skills

- mastering the methodology of the local physical examination of the surgical patient on the basis of a detailed anamnesis and in-depth clinical examination
- performing and evaluating various paraclinical studies
- mastering basic surgical manipulations - injections, catheterizations, placement of probes, bandages, determination of blood groups and others

LECTURE COURSE PROPEDEUTICS OF SURGICAL DISEASES Third-year medical students, first semester

1. Subject and History of surgery
2. Asepsis & Antisepsis
3. Arterial insufficiency. Gangrene
4. Venous and lymphatic insufficiency
5. Congenital diseases

6. Local and Regional Anesthesia
7. Hypovolemic shock
8. Blunt trauma. Classification
9. Penetrating trauma. Wounds
10. Chemical and physical injuries
11. Wound healing and management
12. Local surgical infection
13. General surgical infection. Sepsis
14. Anaerobic, gas and putrid infections
15. Tetanus. Etiology, Signs & Treatment
16. Actinomycosis and echinococcosis
17. Ulcers and fistulas
18. Hernias
19. Hemorrhage
20. Haemostasis
21. Acute Osteomyelitis
22. Haemotransfusion

LECTURE COURSE
PROPEDEUTICS OF SURGICAL DISEASES
Third-year medical students, second semester

1. Burns and Frosts
2. Principles of Surgical oncology
3. Tumor classifications, staging and grading
4. Tumor clinical manifestations
5. Preoperative check and preparation
6. Postoperative course and complications
7. Surgical operations
8. Surgical Operation. Types and indications
9. Surgical manipulations
10. Bandages and Dressings
11. Acute Abdomen
12. Organ and tissue transplantation
13. Surgical Endoscopy
14. Mini-invasive Surgery
15. Basic principles of surgical incisions and suturing

LECTURE № 1 - 2 hours. Subject and history of surgery

- Brief historical data on the development of surgery. Surgery in Bulgaria.

LECTURE № 2 - 2 hours. Asepsis & Antisepsis

- Asepsis. Historical data. Operating theatre structure.
- Antiseptics. Historical data. Means to achieve antiseptics.

LECTURE № 3 - 2 hours. Arterial insufficiency. Gangrene.

- acute and chronic arterial insufficiency, causes and symptoms.
- gangrene - types - arterial, venous, moist and dry.

LECTURE № 4 - 2 hours. Venous and lymphatic insufficiency.

- Acute superficial and deep thrombophlebitis.
- Postphlebitis syndrome. Varicose veins disease.
- Acute and chronic lymphedema. Lymphangitis. Lymphadenitis

LECTURE № 5 - 2 hours. Congenital diseases

- Teratogenic factors. Prenatal diagnosis.
- Basic principles of surgical treatment of congenital diseases.
- Congenital diseases of the head and neck.
- Congenital diseases of the digestive tract

LECTURE № 6 - 2 hours. Local and Regional anesthesia

- Types, drugs, indications
- Technique, complications.

LECTURE № 7 - 2 hours. Hypovolemic shock

- Symptoms, Stages, Causes, Diagnosis
- Treatment

LECTURE № 8 - 2 hours. Blunt trauma. Classification

- Definition of trauma and trauma. Types of injuries. Classification.
- Closed mechanical injuries. Contusion. Compression. Traumatic toxicosis (crash syndrome). Traumatic decolman
- Closed head injuries. Concussion, contusion, compression of the cerebrum
- Closed chest and abdominal injuries

LECTURE № 9 - 2 hours. Penetrating trauma. Wounds

- Injury and laceration - contusion wound
- Cut wound. Bite wound
- "A gunshot wound." A stab wound

LECTURE № 10 - 2 hours. Chemical and physical injuries

- Burn from acids, bases and other chemical agents, damage from electricity

LECTURE № 11 - 2 hours. Wound healing and management

- Wound healing - primary, secondary. Suture of wounds.
- Wound healing. Principles in wound healing
- Postoperative complications of the wound

LECTURE № 12 - 2 hours. Local Surgical Infection

- Abscess, phlegmon
- Acute purulent infection - chronic purulent infection.
- Purulent infections of the skin and its appendages - folliculitis, boils, carbuncles, hidradenitis.

LECTURE № 13 - 2 hours. General Surgical infection. Sepsis

- Classification,etiology and pathogenesis of surgical infection. Acute purulent infection - abscess. Acute purulent infection - phlegmon. Chronic purulent infection.
- Sepsis – causes and symptoms.

LECTURE № 14 - 2 hours. Anaerobic, gas and putrid infections

-etiology, pathogenesis, clinic and diagnosis

-local and general symptoms

LECTURE № 15 - 2 hours. Tetanus. Etiology, Signs & Treatment

- etiology, pathogenesis, clinic - symptoms and clinical forms, prevention.

LECTURE № 16 - 2 hours. Actinomycosis and echinococcosis

- actinomycosis - causative agents, clinical forms, main symptoms, main diagnostic methods

- echinococcosis - clinical forms, biological cycle, symptoms and diagnosis

LECTURE № 17 - 2 hours. Ulcers and fistulas

- Etiology. Classification

-types of ulcers and fistulas, clinical symptoms and diagnostic methods

LECTURE № 18 - 2 hours. Hernias.

- Definition, classification, Symptoms, Causes

- Surgical treatment & Prevention

LECTURE № 19 - 2 hours. Haemorrhage

- definition, classification, pathophysiology, clinical picture, stages, treatment.

LECTURE № 20 - 2 hours. Haemostasis

- Temporary and definitive hemostasis. Methods

LECTURE № 21 - 2 hours. Acute Osteomyelitis

-Symptoms, Causes, Treatment

LECTURE № 22 - 2 hours. Haemotransfusion

- history, ABO system and rhesus system / Rh /. Determination of blood groups. Blood transfusion procedure. Selection of donated blood for blood transfusion.

- indications and contraindications for blood transfusion. Clinical manifestations of immune and hemolytic reactions. Common mistakes and complications.

- action of transfused blood. Types of blood transfusion. Indications and contraindications for blood transfusion. Blood products

LECTURE COURSE - PROPEDEUTICS OF SURGICAL DISEASES

Third-year medical students, Second Semester

LECTURE № 1 - 2 hours. Burns and Frosts

- Definition, etiology, pathogenesis, degrees, surface determination, phases. General cooling

- Clinical evolution and types of treatment - conservative and operative, resuscitation

LECTURE № 2 - 2 hours. Principles of Surgical oncology

- Epidemiology of malignant neoplasms. Biology of malignant transformation.

- General Principles

LECTURE № 3 - 2 hours. Tumor classifications, staging and grading

- Clinical classification of malignant tumors. TNM - system. Basic blood and instrumental test. Morphological diagnosis. Tumor markers. Grading and staging of cancer.
- Benign and malignant neoplasms of epithelial origin.
 - Benign and malignant neoplasms of connective tissue.
 - Mixed tumors.

LECTURE № 4 - 2 hours. Tumor clinical manifestations

- Overview of the clinical features. Asymptomatic lesions.
- Early cancer signs. Paraneoplastic syndromes.
- Cancer clinical manifestation of different body systems.

LECTURE № 5 - 2 hours. Preoperative check and preparation

- Routine and specific examinations - hematological, endoscopic, imaging.
- Scales for assessment of anesthesiological and operative risk.
- Preparation for anesthesia and surgery

LECTURE № 6 - 2 hours. Postoperative course and complications

- Postoperative complications - surgical, pulmonary, cardiovascular, renal, digestive tract, liver, hepatorenal syndrome.

LECTURE № 7 - 2 hours. Surgical operations

- Classification. Types of operations according to the term of execution, complexity, location. One-stage, multi-stage. Hybrid operations.
- Indications, tactics, types

LECTURE № 8 - 2 hours. Surgical Operation. Types and indications

- Definition, types. Conventional & Laparoscopic approach. Main indications

LECTURE № 9 - 2 hours. Surgical manipulations

- Puncture - types, indications, technique. Puncture of vessels and anatomical cavities.
- Puncture of newly formed cavities - abscess (hot & cold) and hematoma. Drainage - types, indications, techniques.
- Tomia. Stomy. Incision. Excision. Trepanation.
- Anastomosis. Bypass. Resection. Ectomy. Amputation.

LECTURE № 10 - 2 hours. Bandages and Dressings

- Bandages - types, materials. Indications. Principles and methods of bandaging.
- Bandages of the head, neck and eyes
- Bandages of upper and lower limbs
- Bandages of the chest

LECTURE № 11- 2 hours. Acute abdomen

- Definition. Etiology. Clinical features - symptoms and physical examination.
- Clinical picture of abdominal inflammation, perforation and obstruction.
- Laboratory and instrumental tests.

LECTURE № 12- 2 hours. Organ and tissue transplantation.

- Transplantology - definition, terminology. Tissue transplantation.
- Organ transplantation - kidney, heart, liver, lungs, pancreas, etc.

LECTURE № 13 - 2 hours. Surgical Endoscopy.

- Indications. Contraindications. Upper and lower endoscopy of the GIT. Other types of endoscopic procedures - bronchoscopic, arthroscopic, etc.

LECTURE № 14 - 2 hours. Mini-invasive Surgery

-History, development, principles. Advantages and disadvantages. Necessary equipment and instruments. Types of laparoscopic operations.

LECTURE № 15 - 2 hours. Basic principles of surgical incisions and suturing

1. Basic principles and rules.
2. Technique of tissue separation - skin, fascia, muscles, peritoneum.
3. Tissue joining technique.

CURRICULUM FOR THE PRACTICAL EXERCISES PROPEDEUTICS OF SURGICAL DISEASES For 3rd year medical students

1. Anamnesis.
2. General physical examination.
3. Local physical examination.
4. Asepsis and types of sterilization.
5. Antisepsis
6. Examination of skin and soft tissues.
7. Examination of the arterial system.
8. Examination of the lymphatic-venous system.
9. Examination of the head and neck.
10. Examination of the breast.
11. Examination of the thorax.
12. Examination of the lungs and mediastinum.
13. Abdominal examination. Inspection. Borders and regions.
14. Examination of the abdomen. Palpation.
15. Examination of the abdomen. Percussion and auscultation.
16. Examination of abdominal organs.
17. Stomach tubes. Upper endoscopy.
18. Examination of the inguino-femoral region.
19. Examination of the perineum and anus.
20. Colon and Rectum examination
21. Urologic physical examination.
22. Urologic instruments.
23. Examination of a patient with hemorrhage.
24. Soft tissue and wound infection examination
25. Oncological patient examination. Local signs and symptoms of a tumor.
26. Paraclinical and histological verification of tumors. Staging.
27. Dressings.
28. Examination of fistula & ulcer.
29. Determination of blood groups.

30. Examination of a traumatic patient.
31. Examination of a patient with thermal trauma.
32. Basic surgical manipulations - injections, infusion systems, etc.
33. Preoperative preparation and examination.
34. Postoperative period and complications.
35. Wound management
36. Hemostasis
37. Tissue incisions and suturing.
38. Operations of the head, chest and limbs.
39. Operations of thorax
40. Abdominal operations.
41. Bandages, Dressings and Casts.
42. Desmurgy. Bandages of Head, Neck and thorax
43. Desmurgy. Bandages of extremities
44. Types of surgical instruments.
45. Specific instruments - staplers, laparoscopic instruments.

WEEK PROGRAM PRACTICAL CLASSES PROPEDEUTICS OF SURGICAL DISEASES FIRST SEMESTER

EXERCISE № 1 - 2 hours. Introduction to the clinical base. Anamnesis.

1. Introduction to the clinical base:
 - Inpatient - sectors / preoperative, postoperative / ICU / and coloproctology with septic /
 - Contingent of patients - planned - emergency, aseptic - septic, severely - slightly ill
 - Reception-consulting office - planned and urgent procedures
2. Anamnesis - types, sequence and methodology of taking a surgical anamnesis

EXERCISE № 2 - 2 hours. General physical examination of the patient.

1. General status - sex, age, height, weight, physique, nutrition, turgor, face, temperature, consciousness
2. Physical methods of examination - inspection, palpation, percussion, auscultation.

EXERCISE № 3 - 2 hours. Local physical examination of the patient.

1. Local surgical status - description of the surgical finding
2. Abnormal findings. Special tests.

EXERCISE № 4 - 2 hours. Asepsis and types of sterilization

1. Preparation and sterilization of surgical gowns & sheets, dressings, consumables, instruments.
2. Types of sterilizers and function modes
3. Rules for working in an aseptic environment.

EXERCISE № 5 - 2 hours. Antisepsis

1. Types of antiseptics. Mechanisms of action.
2. Principles and application of antisepsis in the operating room and for the surgical team

EXERCISE № 6 - 2 hours. Examination of skin and soft tissues

1. Examination of the skin - color, scars, rashes, swelling

2. Examination of mucous membranes - color, surface

EXERCISE № 7 - 2 hours. Examination of the arterial system

1. Acute and chronic arterial insufficiency
2. Examination of pulse - examination, palpation, auscultation
3. Non-invasive and invasive arterial diagnostic procedures.

EXERCISE № 8 - 2 hours. Examination of the venous and lymphatic system

1. Varicose veins, thrombophlebitis and chronic venous insufficiency
2. Local examination of the lower extremities - examination, palpation, static and dynamic examination of varicose veins and CVI.
3. Vascular Doppler and phlebography.
4. Examination of the lymphatic system - lymph node regions - examination, palpation, puncture.

EXERCISE № 9 - 2 hours. Examination of the head and neck

1. Boundaries, areas, shape, anatomical points and lines of the face and hairy part of the head.
2. Examination of cervical adenopathy - groups of lymph nodes
3. Examination of the parotid and thyroid glands, cysts, fistulas

EXERCISE № 10 - 2 hours Examination of the mammary gland

1. Lymph pools and nodes of the mammary gland
2. Examination of a breast tumor - examination, palpation, criteria - location, size, shape, surface, consistency, soreness, mobility
3. Modern imaging tests

EXERCISE № 11 - 2 hours. Examination of the thorax

1. Physical examination - boundaries, areas and lines
2. Examination for chest contusion and rib fracture
3. Imaging and invasive examinations of the chest

EXERCISE № 12 - 2 hours Examination of the lungs and mediastinum

1. Physical examination of the lungs - pathological phenomena in percussion and auscultation
2. Imaging and endoscopic examinations of the respiratory system and mediastinum

EXERCISE № 13 - 2 hours. Abdominal examination. Inspection. Borders and areas.

1. Examination of the abdomen - boundaries, areas
2. Examination of the abdomen - examination - static and dynamic examination

EXERCISE № 14 - 2 hours. Abdominal examination. Palpation.

1. Examination of the abdomen - palpation - types, superficial and deep, technique.
2. Principles and sequence of the abdominal palpation

EXERCISE № 15 - 2 hours. Abdominal examination. Percussion and auscultation.

1. Percussion of the abdomen - technique, sequence
2. Physiological and pathological auscultation phenomena
3. Abdominal auscultation - physiological and pathological intestinal peristalsis

EXERCISE № 16 - 2 hours. Examination of abdominal organs.

1. Projection of internal organs, peritoneal relations.

2. Painful points of various diseased abdominal organs.
3. Imaging, endoscopic and laparoscopic examinations and manipulations of the abdominal organs.
4. Diagnostic laparotomy - indications.

EXERCISE № 17 - 2 hours. Upper endoscopy.

1. Placement of a nasogastric tube and gastric lavage - indications, technique.
2. Placement and fixation of a nasogastric tube for prolonged gastric aspiration - indications, technique.
3. Indications and technique of placing Sengstaken – Blakemore tube
4. Fibrogastroscopy - preparation, basic indications and technique.

EXERCISE № 18 - 2 hours. Examination of the inguinal-femoral region.

1. Hernias - inguinal and femoral - elements - hernial sac, cervical neck, hernial contents.
2. Determining the size, shape and consistency of the hernia sac.
3. Determining the size of the hernial opening, reponibility of the hernial contents.
4. Complications of hernias.
5. Differential diagnosis of diseases in the inguinofemoral area - hernias, adenopathies, vascular diseases, etc.

EXERCISE № 19 - 2 hours. Examination of the perineum and anus.

1. Preparation of the patient for examination, position of the patient, examination, palpation.
2. Digital rectal exam - technique.
3. The most common manifestations and symptoms of anorectal diseases.

EXERCISE № 20 - 2 hours. Examinations and manipulations of the colon and rectum.

1. Anoscopy, rectomanoscopy, fibrocolonoscopy and biopsy. Irigography. Endorectal ultrasound.
2. Indications and technique of placing a gas pipe.
3. Enemas - types, indications, technique.

EXERCISE № 21 - 2 hours Physical examination of urological patient

1. Examination of the kidneys - palpation technique, costovertebral tenderness.
2. Examination of the bladder - palpation and percussion in urinary retention.
3. Examination of the external genitalia in men.
4. The most common subjective symptoms and clinical signs of urinary system diseases

EXERCISE № 22 - 2 hours. Urological instrumental examinations and manipulations.

1. Catheterization of the bladder - indications, technique, types of catheters.
2. Endoscopy of urinary system
A / Cystoscopy - indications, technique; cystoscopic finding and manipulations
B / Other endoscopic examinations.
3. Ultrasound and radiological methods of urinary system.
4. Kidney biopsy, bladder and prostate biopsy

EXERCISE № 23 - 2 hours. Examination of a patient with hemorrhage.

1. Determining the type of bleeding / capillary, venous, arterial /, the intensity of bleeding and the degree of blood loss.
2. Emergency measures in a patient with acute bleeding.
3. Types of artificial hemostasis - temporary hemostasis.

4. Basic principles, ways and techniques of temporary hemostasis - direct and indirect methods.

EXERCISE № 24 - 2 hours. Soft tissue and wound infection examination.

1. Main symptoms of the local inflammatory process. Types of abscesses.
2. Clinical features of the local examination of abscesses of the palm, fingers and feet.
3. Taking wound secretions for microbiological analysis, antibiogram.
4. Basic treatment principles of purulent processes of soft tissues

EXERCISE № 25 - 2 hours Oncological patient examination. Local tumor examination.

1. Basic criteria in the clinical examination of a patient with a tumor.

A / symptoms - duration of growth, pain, consumptive syndrome.

B / clinical signs - common - cachexia, anemia, jaundice.

- local - size, shape, surface, boundaries, mobility, consistency, soreness.

- regional adenopathy, metastases.

C / secondary changes - inflammatory, obstructive, bleeding, etc.

EXERCISE № 26 - 2 hours. Paraclinical and histological verification of tumors. Staging.

1. Basic paraclinical examinations - blood and urine, imaging examinations, endoscopic examinations
2. TNM - classification of tumors. Grading (G) and staging. Types of biopsies.
3. Types of tumors, according to tissue origin. Histological features.

EXERCISE № 27 - 2 hours Dressings

1. Principles of wound healing
2. Dressings for accidental, operative and septic wounds

EXERCISE № 28 - 2 hours. Examination of a patient with ulcer and fistula.

1. Examination of a patient with fistula - types, examination technique
2. Examination of a patient with an ulcer - types of ulcers - trophic, varicose

EXERCISE № 29 - 2 hours. Determination of blood groups.

1. Types of blood groups and principles of examination with test serums
2. Preparation and technique of blood group examination.
3. Identifying the results and determining the patient's blood type

EXERCISE № 30 - 2 hours. Examination of a traumatic patient.

1. Assessment of the approach in a patient with severe trauma.
2. Priorities in a patient with severe trauma - basic vital functions - breathing and circulation; spinal cord protection.
3. Initial assessment in a patient with severe trauma - history, general examination, imaging and other tests.
4. Peculiarities of the systematic examination of a traumatic patient - head and neck, chest, abdomen and limbs.

WEEK PROGRAM PRACTICAL CLASSES
PROPEDEUTICS OF SURGICAL DISEASES
SECOND SEMESTER

EXERCISE № 31 - 2 hours. Examination of a patient with thermal trauma.

1. Evaluation of a patient with burns – phases of the disease.
2. Methods for determining the percentage, stage and degree of combustion.
3. Basic treatment principles for a patient in thermal shock.
4. Surgical treatment of burns.

EXERCISE № 32 - 2 hours. Basic surgical manipulations - injections, inf. systems, enema

1. Types of injections - preparation and technique
2. Preparation and inclusion of infusion system - venipuncture, inclusion of system, dosing of the infusion
3. Types of enemas and indications

EXERCISE № 33 - 2 hours. Preoperative assessment and preparation.

1. Preoperative examinations - paraclinical minimum; extended outpatient and inpatient preoperative examinations.
2. Preoperative assessment of the patient according to the type and volume of the operation.
3. Suitability of the patient for surgery - anesthesiological and operative risk; groups of patients at high risk for perioperative complications.
4. General and specific preparation of the patient for surgery.

EXERCISE № 34 - 2 hours. Postoperative period and complications. SSI.

1. Types of postoperative complications.
A / anesthesiological - systemic - respiratory, cardiac, renal.
B / operative - early and late - bleeding and infection.
2. Diagnosis and behavior of the most common postoperative problems; pain, fever, tachycardia, dyspnea and tachypnea, collapse, nausea and vomiting, oliguria, jaundice, changes in consciousness. Surgical site infections.
3. Postoperative complications of the digestive tract: prolonged postoperative intestinal paresis, ileus, insufficiency of the anastomosis, abscess, peritonitis, fistula, acute intestinal ischemia, constipation, etc.

EXERCISE № 35 - 2 hours Wound management

1. Dressings for aseptic wounds, suture removal - terms and methods
2. Dressings for septic wounds - local application of antiseptics and antibiotics. Principles.

EXERCISE № 36 - 2 hours. Hemostasis.

1. Hemostasis - types - spontaneous and arterial; provisional and definitive
2. Methods for temporary and definitive hemostasis

EXERCISE № 37 - 2 hours. Tissue incisions and suturing.

1. Sequence in tissue separation, technique, instruments
2. Tissue suturing - sequence, methods, instruments

EXERCISE № 38 - 2 hours. Operations of head, neck and extremities.

1. Operations of the soft tissues of the head and face - plastic, reconstructive, aesthetic
2. Skull operations - punctures, trepanations

3. Operations of the limbs - fingers and palms - incisions of abscesses. Types of amputation
5. Operations of neck soft tissues.

EXERCISE № 39 - 2 hours. Operations of thorax.

1. Chest operations – types of thoracotomy, indications. Conventional approach. VATS.
2. Chest tube placement. Technique and indications
3. Operations of cardiovascular system, esophagus, mediastinum

EXERCISE № 40 - 2 hours. Abdominal operations.

1. Abdominal wall operations.
2. Operations of the peritoneum and abdominal organs - types of access.
3. Operations of the retroperitoneal space, urological operations.
4. Combined operations of the thoracic and abdominal cavities.

EXERCISE № 41 - 2 hours. Bandages, Dressings and Casts.

1. Types of bandages. Technique and basic principles.
2. Gypsum bandages & casts - preparation, general principles of technique and types of gypsum bandages / gypsum slings, circular gypsum bandages /.
3. Adhesive and plaster bandages.

EXERCISE № 42 - 2 hours. Bandages of head, neck and thorax.

1. Bandages - types, materials. Methods and rules of bandaging.
2. Bandages of the head – Hippocratic cap, Monoculus, Binoculus, Capistrum
2. Bandages of the chest - Suspensorium mame, Desault, Velpeau

EXERCISE № 43 - 2 hours. Desmurgy. Bandages of extremities

1. Bandages of the upper limb - spica, testudo, dolabra, involution.
2. Bandages of the lower limb - hip area, thigh, knee, lower leg, foot and toes.

EXERCISE № 44 - 2 hours. Conventional surgical instruments.

1. Tools for tissue separation - scalpel, scissors, amputation knife, osteotomes, electric knife, ultrasonic scalpel, etc.
2. Retractors - types, technique of placement and handling.
3. Grasping instruments
 - Hemostatic instruments - terrier, cocher, pean
 - Clamps - regular, soft
 - Forceps - surgical, anatomical
 - Needle holders
4. Miscellaneous - probes, dissectors, etc.

EXERCISE № 45 - 2 hours. Specific instruments – Staplers and instruments for mini-invasive surgery

1. Mechanical staplers - circular, linear
2. Instruments for minimally invasive surgery - gaspers, dissectors, coagulators, aspirators-insufflators

CONSPECTUS
PROPEDEUTICS OF SURGICAL DISEASES

Since 2000, after the completion of the TEMPUS Project SEP 12480-97 "Restructuring of surgery curricula and their harmonization with European requirements" together with the Universities of Medicine in Brussels, Belgium and Maastricht, the Netherlands, the oral exam and syllabi were replaced by a test and written exam on a thematic program.

**CONSPECTUS
PROPEDEUTICS OF SURGICAL DISEASES
III-rd year Medical students**

Prepared by: prof. Yonkov
Approved by: Prof. Stefanova
Protocol from the CC № /13.02.20

I. For the WRITTEN EXAM

1. History of Surgery. Surgery in Bulgaria.
2. Antiseptics. History. Antiseptic agents
3. Aseptics. History of Aseptics. An Operating room's structure and organization.
4. Basics of surgical treatment - organization and planning. Surgical instruments –types. Surgical Sutures and bandages.
5. Preoperative assessment of a surgical patient
6. Postoperative period. Postoperative complications – surgical, pulmonary, cardiovascular, gastrointestinal, renal, hepatic, hepatorenal syndrome
7. Preparation of the surgical team. Preparation of the operating field
8. Surgical operation. Types of operations.
9. Antibiotics in surgery. Indications and Complications.
10. Basic surgical manipulations in surgery. Puncture - types, indications, technique. Puncture of blood vessels and anatomical cavities.
11. Basic surgical manipulations - Puncture of abscess and hematoma. Tubes – types, indications and techniques.
12. Basic surgical procedures - Tomy. Stomy
13. Basic surgical procedures - Incision. Excision. Trepanation.
14. Basic surgical procedures - Anastomosis. Bypass
15. Basic surgical procedures - Resection. Ectomy. Amputation
16. Anesthesia – history. Definition. Types
17. Local anesthesia - types, agents, indications, technique, complications.
18. Shock – types, pathophysiology, basic principles of treatment
19. Clinical death – signs and symptoms. Principles of management
20. Congenital anomalies – teratogenic factors and prenatal diagnosis.
21. Congenital diseases - basic principles of surgical treatment.
22. Congenital anomalies of head and neck.
23. Congenital anomalies of the gastrointestinal tract.
24. Trauma. Definition. Types and Classification.
25. Blunt injuries. Bruises. Compressions. Crush syndrome. Traumatic decollement.
26. Blunt head injury. Commotion, Contusion, Cerebral compressions.

27. Blunt thoracic and abdominal injuries
28. Open trauma – Wounds
29. Contusion and lacero-contusion Wound.
30. Cut wounds. Bite wounds
31. Gunshot wounds. Puncture wounds
32. Primary and secondary wound healing. Suture of wounds. Types. Scars
33. Principles of wound treatment
34. Postoperative complications of wounds
35. Burns. Definition. Types. Classification. Principles of management- conservative and surgical.
36. Electrical Injuries – local and general. Chemical burns
37. Frost Injuries. Definition, types, stages, manifestation, treatment.
38. Hemorrhage – definition, classification, pathophysiology, clinical features, treatment.
39. Haemostasis - temporary and definitive. Spontaneous hemostasis. Blood Clotting Mechanism.
40. Blood transfusion – history, ABO and Rhesus system /Rh/. Blood groups
41. Blood transfusion – indications and contraindications. Errors and complications
42. Blood transfusion - indications and contraindications for blood transfusion. Blood products.
43. Transplantology. Definition. Terminology. Tissue transplantation.
44. Plastic and reconstructive surgery – Definition .
45. Tissue transplantation - Definition. Terminology. Organ transplantation - kidney, heart, liver, lungs, pancreas
46. Inflammation. Morphological changes. Pathophysiology of the inflammatory process. Local signs and symptoms.
47. Classification of surgical infections. Etiological agents. Acute pyogenic infection – abscess
48. Acute pyogenic infection – phlegmon. Chronic pyogenic infection.
49. Pyogenic skin infection – folliculitis, furuncle, carbuncle, hidradenitis.
50. Pyogenic lymphatic infection. Lymphangitis and lymphadenitis. Elephantiasis
51. General pyogenic infection /sepsis/ - classification, etiology, pathogenesis.
52. General pyogenic infection /sepsis/ - symptoms, diagnosis and treatment. Abdominal sepsis.
53. Anaerobic gas gangrene.
54. Tetanus – symptoms, treatment and prophylaxis.
55. Tuberculosis. Types of surgical tuberculosis. Actinomycosis.
56. Echinococcosis.
57. Acute arterial insufficiency – Embolism and thrombosis.
58. Chronic arterial insufficiency - Raynaud's syndrome and disease. Buerger's disease.
59. Obliterating atherosclerosis. Diabetic angiopathy.
60. Gangrenes. Types. Dry and wet gangrene.
61. Venous insufficiency. Varices – etiology, clinical features and complications.
62. Thrombophlebitis and Phlebothrombosis.
63. Aneurism – definition. Types. Clinical manifestation.
64. Ulcers and Fistulas. Etiology and classification.
65. Osteomyelitis. Etiology and types.
66. Surgical oncology - basics. Epidemiology of cancer. Biology of malignant transformation. Contemporary theories of carcinogenesis.
67. Neoplasm – definition, etiology, and pathogenesis. Genetic aspects.
68. Early diagnosis of malignant diseases- screening methods. Diagnostic tests

69. General principles for the management of neoplasms. Ablastic and antiblastic. Complex methods of treatment – radiotherapy, chemotherapy, hormonal therapy and immunotherapy.
70. Classification of neoplasms. Morphology and biology of tumors. Precancerosis. Paraneoplastic syndromes.
71. Clinical classification of malignant tumors. TNM – system. Basic apparatus and instrumental tests. Morphological diagnosis. Tumor markers.
72. Benign and malignant tumors of epithelial origin.
73. Benign and malignant tumors of connective tissues.
74. Heterogeneous tumors.
75. Surgical endoscopy – principles and indications. Fibrogastroscopy. Fibrocolonoscopy. Rectoromanoscopy.
76. Surgical endoscopy - principles. Laparoscopy - technique, indications, contraindications. Bronchoscopy. VATS..
77. Laparoscopic (mini-invasive) surgery - history, development, principles. Advantages and disadvantages. Instruments and equipment. Types of laparoscopic surgeries.
78. Laparocentesis. Thoracocentesis. Puncture biopsy.
79. Robot-assisted surgery. Telesurgery.

II. For the PRACTICAL EXAM

1. Anamnesis – patient history.
2. General physical examination of a patient.
3. Local physical examination - Inspection, Palpation, Percussion, Auscultation. Examination of acute inflammation.
4. Tumor examination.
5. Head and neck examination.
6. Chest examination.
7. Breast examination
8. Examination of the Abdomen.
9. Abdominal wall examination. Hernia.
10. Anorectal examination.
11. Urological patient examination.
12. Wound examination.
13. Temporary hemostasis.
14. Definitive hemostasis.
15. Blood transfusion - indications, technique, blood groups.
16. Bandages - head and chest.
17. Bandages - upper and lower limb.
18. Nasogastric tube – types and insertion. Sengstaken Blakemore tube.
19. Injections. Types and indications.
20. Enema. Types and indications.
21. Examination of abscess and phlegmon.
22. Aseptic and septic wound dressings.
23. Surgical instruments – types and applications.
24. Tissue incisions - skin, fascia, muscles, peritoneum.
25. Tissue suturing.
26. Primary surgical treatment of wound. Secondary wound closure.

LITERATURE

1. Schwartz's Principles of Surgery, 9 edition.
2. Short practice of surgery- Bailey & Love's

3. Essential Surgery: Problems, Diagnosis and Management
4. Fundamentals of Surgical Practice
5. Surgery – principles in general
6. Sabiston textbook of surgery – 20th edition

The exam is in 4 stages:

- I-st stage: Test – MCQ for 30 minutes. If passed successfully follows 2nd part:
II-nd stage: Written exam - one individual question
III-rd stage: Practical exam
IV-th stage: Oral exam

**CONSPECT FOR STATE EXAM OF MEDICAL STUDENTS
MEDICAL UNIVERSITY- PLOVDIV - 2019/2020**

Approved: Prof. Stefanova

Protocol from the CC № /13.02.20

I. GENERAL AND SPECIAL SURGERY.

1. Local and regional anaesthesia.
2. Wound Healing: Sanatio per Primam.
3. Wound Healing: Sanatio per Secundam. Sanatio sub crustam.
4. Thermal Trauma. Burns.
5. Thermal Trauma. Frost-bite.
6. Hemostasis.
7. Blood Transfusion. Complications.
8. Shok.
9. Surgical Infections. Necrotizing soft tissue infections.
10. Surgical Infections. Phlegmona. Abscess. Empyema.
11. Surgical Infections. Furunculus. Carbunculus.
12. Surgical Infections. Acute lymphangitis. Acute lymphadenitis.
13. Surgical Infections. Sepsis.
14. Femoropopliteal and Tibial acute occlusive Disease.
15. Femoropopliteal and Tibial chronic occlusive Disease.
16. Venous thromboembolism.
17. Blunt trauma. Penetrating trauma.
18. Osteomyelitis.
19. Panaritium.
20. Tetanus.
21. Cervical cysts and fistulas.
22. Thyrotoxicosis.
23. Non-toxic goitre. Hashimoto's disease. De Quervain's thyroiditis.
24. Carcinoma of the thyroid gland.
25. Benign breast tumors.
26. Acute mastitis.
27. Breast Cancer.
28. Chest Trauma. Rib Fractures. Flail Chest.

29. Chest Trauma. Traumatic Hemothorax.
30. Chest Trauma. Traumatic Pneumothorax.
31. Chest Trauma. Pulmonary Contusion. Tracheal Injury. Esophageal Injury. Cardiac tamponade.
32. Pleural Empyema.
33. Lung abscesses.
34. Lung Hydatid Disease.
35. Bronchiectatic disease.
36. Lung Cancer.
37. Esophageal Diverticula. Achalasia.
38. Esophageal Neoplasms.
39. Esophageal perforation. Mallory-Weiss syndrome.
40. Acute Mediastinitis.
41. Mediastinal Tumors and Cysts.
42. Abdominal Wall Hernias. Groin Hernia.
43. Abdominal Wall Hernias. Femoral Hernia.
44. Abdominal Wall Hernias. Umbilical Hernia. Epigastric Hernia.
45. Abdominal Wall Hernias. Incisional Hernia.
46. Paraesophageal hiatal hernia. Sliding type of hiatal hernia.
47. Abdominal Trauma. Penetrating Injury.
48. Abdominal Blunt Trauma.
49. Peptic ulcer. Complications. Pyloric Stenosis. Penetration.
50. Peptic ulcer. Complications. Perforation.
51. Acute Gastro-intestinal bleeding.
52. Stomach cancer.
53. Calculous Biliary Disease
54. Acute cholecystitis.
55. Obstructive Jaundice.
56. Liver Hydatid Disease.
57. Acute Pancreatitis.
58. Acute appendicitis. History. Physical findings.
59. Appendicitis in the elderly. Appendicitis in pregnancy.
60. Ileus and Bowel Obstruction. Pathogenesis. Clinical presentation.
61. Ileus and Bowel Obstruction. Intussusception.
62. Ileus and Bowel Obstruction. Volvulus.
63. Ileus and Bowel Obstruction. Paralytic Ileus.
64. Ileus and Bowel Obstruction. Hernial obstruction.
65. Exocrine Pancreatic Cancer. Endocrine Pancreatic Tumors.
66. Liver Cancer.
67. Pancreatic Pseudocyst.
68. Mesenteric Thrombosis.
69. Acute generalized peritonitis.
70. Intra-abdominal abscesses.
71. Ulcerative Colitis
72. Diverticular disease of the colon.
73. Colorectal Cancer.
74. Anorectal Abscesses.
75. Fistula-in-Ano. Anal Fissure.
76. Hemorrhoids.

II. UROLOGY

A. GENERAL UROLOGY

1. Symptomatology in urology- classification.
2. Urinary symptoms- classification.
3. Changes of voided urine
4. Haematuria.
5. Retention of urine.
6. Incontinence of urine.
7. Physical examination of the genitourinary tract.
8. Radiology of the urinary tract.
9. Urologic laboratory investigations. Sperm parameters.
10. Instrumental investigations in urology.
11. Biopsy in urology.
12. Ultrasound in urology.
13. Renal function tests.
14. Acute renal failure.
15. Hydronephrosis. Pyonephrosis.
16. Chronic renal failure.
17. Catheterization of the urinary bladder. Suprapubic drainage of urine (Cystofix).
18. Overactive bladder.
19. Percutaneous Endourology. Ureterrenoscopy.
20. Urinary Obstructions. Stasis.
21. Bacterial and specific infections of the Genitourinary tract. Sexually transmitted diseases. Urosepsis.
22. Mechanism of normal micturation, Neural circuits controlling storage and expulsion of urine.
23. Urodynamic studies.
24. Urinary Obstruction. Stasis of urine.
25. Renal transplantation- general aspects.

B. SPECIAL UROLOGY

26. Congenital anomalies of the kidney.
27. Congenital anomalies of the ureter.
28. Congenital anomalies of the bladder.
29. Congenital anomalies of the urethra.
30. Congenital anomalies of the testis.
31. Congenital anomalies of the penis.
32. Trauma to the kidney.
33. Injury to the ureter.
34. Injury to the bladder.
35. Injury to the urethra.
36. Trauma to the scrotum.
37. Trauma to the penis.
38. Renal parenchymal neoplasms.
39. Wilm's tumor (nephroblastoma).
40. Urothelial carcinoma: cancers of the bladder, ureter, renal pelvis,
41. Benign prostatic hyperplasia(BPH).
42. Prostate cancer.
43. Germ cell tumors of the testis.
44. Tumors of the penis.
45. Inflammation of the epididymis and testis.
46. Torsion of the testis (torsion of spermatic cord).

47. Hydrocele. Varicocele.
48. Male infertility.
49. Nephrolithiasis- epidemiology, types of stones, specific risk factors for stone formation, pathophysiology.
50. Nephrolithiasis- clinical features, diagnosis, complications (classification), management (minimally invasive procedures).
51. Inflammation of the bladder- acute and chronic cystitis.
52. Inflammation of the prostate (prostatitis).
53. Disorders of ejaculation.
54. Male sexual dysfunction- physiology of penile erection (inervation of the penis, anatomy and hemodynamics of penile erection, mechanism of penile erection). Erectile dysfunction.
55. Male reproductive system- organs involved in the production of semen. Path of sperm transport.

ORTHOPEDICS.

1. Torticollis
2. Paralysis obstetrica
3. Congenital dysplasia of the hip joint
4. Congenital dysplasia of the hip joint in walking children
5. Coxa vara. Epiphyseolysis adolescentia. Coxa valga
6. Deformities and diseases of the knee joint (genu varum, genu valgum, chondrodystrophia patellae, luxatio patellae)
7. Rachitis deformities
8. Pes equinovarus
9. Scoliosis. Kyphosis. Lordosis
10. Diseases of the muscles and their insertions due to fatigue
11. Diseases of the tendons.
12. Periarthritis of the shoulder joint
13. Pes planovalgus
14. Perte disease
15. Aseptic necroses
16. Osteochondritis dissecans of the knee joint
17. Bone tumors
18. Degenerative joint diseases (coxarthrosis and gonarthrosis)
19. Central paralysis. Peripheral paralysis
20. Fractures- in general
21. Pathological fractures
22. Spine fractures. Dislocation of the spine
23. Fractures of the pelvis
24. Pertrochanteric fractures
25. Fractures of the femoral neck
26. Supracondylar fracture of the femur
27. Patellar fractures
28. Intraarticular fractures of the knee joint
29. Diaphyseal fractures of the tibia and fibula
30. Fractures of the ankles
31. Fractures of the diaphysis of the humerus
32. Shoulder fractures
33. Surgical neck fractures of the humerus
34. Supracondylar fracture of the humerus
35. Fracture of the elbow (olecranon)

- 36. Fractures of the forearm
- 37. Colles fracture
- 38. Traumatic dislocations of the hip joint
- 39. Dislocation of the shoulder joint
- 40. Dislocation of the elbow joint
- 41. Soft tissue injuries of the knee joint
- 42. Fractures of the carpal, metacarpal bones and phalangeal fractures

11/07/2022

Prepared by:
/ prof. Dr. B. Sakakushev, MD /

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

“DISASTER MEDICINE”
for medical students

Approved by the Department Council – Protocol №10/17.06.2022

Confirmed by the Faculty Council – Protocol №7/13.07.2022

DISASTER MEDICINE

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								3 rd year	
Disaster medicine	V	Total	Lectures	Practices	ECTS	0.5	2.0	V	VI
		45	15	30	1.5			1/2	-

DISCIPLINE:

„Disaster Medicine”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master degree (M)

FORMS OF TRAINING:

Lectures and practical courses

YEAR OF TRAINING:

3rd year, 5th semester

DURATION OF TRAINING:

One semester

ACADEMIC HOURS:

15 hours lectures, 30 hours practical courses

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Models, visual boards, materials for conducting the discipline-specific classes (individual protective equipment, equipment for indication of harmful substances, video database). At the disposal of teachers and students there are two sets of audiovisual equipment, multifunctional device, two laptops, internet access.

FORMS OF EVALUATION:

Test and written exam

EVALUATION CRITERIA:

The following components (K) take part in the formation of the final grade:

1. Evaluation from the colloquiums (average grade from the two) (K1) with a coefficient of significance 0.2.
2. Evaluation from the final test (K2) with a coefficient of significance 0.3.
3. Evaluation from the final exam (K3) with a coefficient of significance 0.5.

Final score = (K1 X 0.2) + (K2 X 0.3) + (K3 X 0.5)

If one of the components of the final grade is poor (2), then the final grade is also poor (2).

ASPECTS OF EVALUATION CRITERIA:

Based on participation and involvement in the educational process (lectures, practical classes and discussions).

SEMESTER EXAM:

Yes

STATE EXAM:

No

LECTURER:

Professor with D.Sc. degree in Disaster Medicine

DEPARTMENT:

„Epidemiology and disaster medicine”

ANNOTATION

National and international research have presented constant increase both in number and severity of disastrous events during the recent years. The specific nature of these events is the reason for the establishment of a relatively new field in the public healthcare – Disaster Medicine. This medical specialty has interdisciplinary character and specific subject-matter, objectives, tasks and principles.

The focus is on organizational aspects – what healthcare system structure and operating procedures are required for prevention and prompt medical support to the affected population in case of disaster occurrence.

Solving the challenges that disasters create for the healthcare requires the acquisition of a certain level of knowledge and practical skills by the medical professionals that have to be acquired in the medical universities. This is the objective that all the contents of this course complies with.

BASIC AIMS OF THE DISCIPLINE

1. To discuss with students all the aspects of natural and anthropogenic disasters and their impact on the population health.

2. To analyze the relation between the disaster type and the specific features and treatment methods of the predicted injuries

3.To prepare students for effective and adequate disaster medical planning, organization and management.

4.To develop an user-friendly algorithm for prophylaxis of the damages, illnesses and epidemics, to be implemented by the medical professionals in case of disaster.

5.To conduct theoretical and practical disaster medicine education.

EXPECTED RESULTS

Theoretical knowledge – thorough understanding of:

- Disasters' damaging factors impact, characteristics of the damages, medical aid and treatment of disasters' casualties.

- Disaster medicine as general medical specialty, organization of medical and rescue operations in disasters.

- Disaster medical support as unity of medical intelligence, triage, stabilization, evacuation and treatment of the casualties. Standard operating procedures.

- Types of areas of damage and their unique considerations.

- Personal and collective protective equipment.

- Methods and means for prophylaxis and protection in order to decrease and eradicate the damaging factors impact on human health.

- Hygienic and anti-epidemic support to the affected population and area of damage.

Practical skills:

- To solve situational task on a given disaster;

- To work in small groups on a given task and to make independent decisions;

- Discuss on possible managerial solutions;

- To analyze and solve cases with gradual increase in the difficulty;

- To develop practical approach for fast and correct problem solving;

- To choose the most appropriate approach to the situation and to defend the choice.

LECTURES

LECTURE № 1 – 2 hours

Disasters and Disaster Medicine.

LECTURE № 2 – 2 hours

Disaster Medical Support Management, Planning for DMS.

LECTURE № 3 – 2 hours

Toxicology, classification of the chemical agents, chemical weapons, Area of Chemical Damage management.

LECTURE №4 – 2 hours

Radiation, ionizing radiation, dosimetry, Area of Radiological Damage management.

LECTURE № 5 – 2 hours

Acute radiation syndrome, radio-dermatitis.

LECTURE № 6 – 2 hours

Area of Biological Damage management., biological weapons, sanitary control.

LECTURE № 7 – 3 hours

**War and terrorism as disasters. Disaster medical support in case of war and terrorism.
Psychological disorders in disasters.**

PRACTICES

PRACTICAL CLASS № 1 – 2 hours

Area of damage.

PRACTICAL CLASS № 2 – 2 hours

Disaster Relief to population – organization, structure, actors. Crisis HQ.

PRACTICAL CLASS № 3 – 2 hours

Disaster Medical Support.

PRACTICAL CLASS № 4 – 2 hours

Medical intelligence. Triage.

PRACTICAL CLASS № 5 – 2 hours

First Aid and Medical Aid.

PRACTICAL CLASS № 6 – 2 hours

Evacuation. Medical teams. Tasks. Temporary medical station establishment.

PRACTICAL CLASS № 7 – 2 hours

Toxicology of Organophosphates, Chlorine and CO.

PRACTICAL CLASS № 8 – 2 hours

First aid.

PRACTICAL CLASS № 9 – 2 hours

Triage.

PRACTICAL CLASS № 10 – 2 hours

Toxicology of Cyanides and Ammonia.

PRACTICAL CLASS № 11 – 2 hours

Earthquakes.

PRACTICAL CLASS № 12 – 2 hours

Medical Management of Fires.

PRACTICAL CLASS № 13 – 2 hours

Mass Population Movement Medical Management.

PRACTICAL CLASS № 14 – 2 hours

Medical Management of Area of Mechanical Damage and Combined Area of Damage.

PRACTICAL CLASS № 15 – 2 hours

Seminar Medical Support to the Affected Population in Case of Disasters.

BIBLIOGRAPHY

1. Disaster Medicine - Comprehensive Principles and Practices. 2nd Edition. Kristi L. Koenig & Carl H. Schultz. 2016 - Cambridge University Press
2. Ciotto's Disaster Medicine (Second Edition); Edited by: Gregory R. Ciotto, Paul D Biddinger, Robert G. Darling, Saleh Fares, Mark e Keim, Michael S Molloy, Selim Suner ISBN: 978-0-323-28665-7
3. Oxford American Handbook of Disaster Medicine (Oxford American Handbooks of Medicine) 1st Edition; Edited by Robert A. Partridge, Lawrence Proano, David Marcozzi, Alexander G. Garza, Ira Nemeth, Kathryn Brinsfield, Eric S. Weinstein
4. Disaster Medicine Edited by: David E Hogan and Jonathan Burstein PDF READ on <https://sites.google.com/site/inemnaghtsrsoal/pdf-read-disaster-medicine-new-e-book---by-david-e-hogan>
5. Kostadinov R. 600 Simple Steps for Disaster Medicine Exam Success. ISBN: 978-954-8326-56-8 Mandatory
6. Kostadinov R. Disaster Medicine Sample Tests. VAP, Plovdiv, 2012
7. Kostadinov R. Disaster Medicine Highlights. LaxBook, Plovdiv, 2018 Mandatory

CONSPECTUS

1. Disasters – Definition, Classification, Principles
2. Disasters – Definition, Development Stages, Response Types
3. Disasters – Definition, Damaging Factors, Impact on Medical Support
4. Disaster Medicine – Definition, Objective, Tasks
5. Disaster Medicine – Definition, Principles, Terminology
6. Area of Damage – Definition, Types, Elements, Characteristics
7. Medical Losses - Definition, Classification
8. Disasters' Relief to population – Definition, Objective, Tasks
9. Disasters' Relief to population - Organization, Actors, Unified Rescue System, Crisis HQ
10. Disasters' Medical Support – Definition, Objective, Principles, Tasks
11. Disaster Medical Support - Organization, Stages, Levels, Actors
12. Medical Intelligence
13. Triage
14. First Aid
15. Medical First Aid
16. Medical Evacuation
17. Planning for Disaster Medical Support
18. Management of Disaster Medical Support
19. Medical Teams Tasks in Disaster Medical Support
20. Temporary Medical Station
21. Earthquake. Disaster Medical Support Management
22. Floods. Disaster Medical Support Management

23. Wars. Disaster Medical Support Management
24. Terrorism. Disaster Medical Support Management
25. Mass Humans Movement. Disaster Medical Support Management
26. Fires. Disaster Medical Support Management
27. Radiology. Radiation – Definition, Emissions' Types, Characteristics
28. Radiology. Ionizing radiation – Measurement, Units, Effects – Determinative, Stochastic
29. Radiology. Radiological Incident – Damaging Factors, Disaster Medical Support Management
30. Radiology. Nuclear Bomb Damaging Factors. Disaster Medical Support Management
31. Acute Radiation Syndrome - Definition, Stages, Clinical Features
32. Acute Radiation Syndrome - Treatment, Complications. Radio-dermatitis
33. Area of radiation damage management. Radiation injured patient management
34. Area of biological damage – Characteristics, Medical Activities for Localization and Eradication
35. Sanitary control
36. Area of Chemical Damage – Characteristics, Medical Activities for Localization and Eradication
37. Toxic Industrial Materials – Ammonia – Characteristics, Medical Activities
38. Toxic Industrial Materials – Chlorine – Toxicology, Characteristics, Medical Activities
39. Cyanides – Toxicology. Characteristics, Medical Activities
40. Organophosphorus compounds – Toxicology. Characteristics, Medical Activities
41. Carbon Monoxide – Characteristics, Toxicology, Medical Activities
42. Blistering Agents. Characteristics, Toxicology, Medical Activities
43. Riot Control Agents. Characteristics, Toxicology, Medical Activities
44. Disasters Psychological Disorders
45. Weapons of Mass Destruction. Types, Characteristics, Medical Activities if Implemented
46. Decontamination

**MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF MEDICINE**

SYLLABUS

IN

RADIOLOGY

(RADIATION ONCOLOGY AND NUCLEAR MEDICINE)

Approved by the Section Council on 26.05.2022/ Proceedings № 3

Confirmed by the Faculty Council on 15.06.2022/ Proceedings № 6

RADIOLOGY (RADIATION ONCOLOGY & NUCLEAR MEDICINE)

Syllabus

Discipline	Exam in Semester	Hours				Hours per academic year and semester	
						III	
RADIOLOGY	VI	Total	Lectures	Seminars	Credits	V	VI
		108	48	60	5.0	18/30	30/30

Course name:

Radiology (Radiation oncology & Nuclear medicine)

Type of discipline:

Mandatory

Level of education:

Master /M/

Forms of education:

Lectures, practical exercises

Course:

Course III

Duration of education:

Two semesters

Academic hours:

48h lectures, 60h exercises

Technical equipment applied in the training:

Multimedia presentations, radionuclide diagnostic, discussion and showing how to perform a radiotherapy plan and radiotherapy treatment

Form of evaluation:

Test, written and oral exam

Evaluation criteria:

An average current grade is formed for each semester

Aspects of evaluation criteria:

Participation in discussions, solving tests and practical diagnostic tasks

Semester exam:

Yes (entrance test, written question and interview; options for distance exam are also prepared)

State Exam:

No

Main teacher: Habilitated lecturer from Department “Clinical Oncology” and Department “Imaging Diagnostics”

Department:

Clinical Oncology

Semester exam:

Exam – test with open questions for medical radiology

Lecturer:

Habilitated professor from Chair “Clinical oncology”

Chair:

„Clinical oncology”

ANNOTATION

Radiation therapy (RT, radiation oncology) and Nuclear Medicine (NM) are among the most dynamically developing specialties of medicine due to the rapid progress of imaging diagnostic equipment and the application of new, more specific radiopharmaceuticals for diagnosis and therapy. Nowadays RT is an indispensable part of the complex therapy of malignant tumors. This is possible with the introduction of high-energy sources of ionizing radiation and various radionuclides, with the creation of a new generation of reliable, highly efficient radiotherapy equipment, methods that combine the vast clinical experience with the achievements of modern imaging and computer technology and achievements in the field of radiobiology. Getting acquainted with the general treatment tactics, methods and possibilities of modern RT are an integral part of modern medical education.

NM functional imaging allows not only qualitative but also quantitative assessment of both normal and pathologically altered organ function. The main advantage of NM methods over other imaging methods is the ability to visualize the change in the function of the studied organs and systems even before the appearance of structural changes and this leads to continuous expansion of its areas of application in modern medical practice.

COURSE OBJECTIVES

To provide medical student with theoretical knowledge and practical skills about the main principles, methods and indications of modern nuclear medicine and radiotherapy:

- types of ionizing radiation
- influence of ionizing radiation on human organism
- diagnostic and therapeutic application of radionuclides
- modern equipment for imaging nuclear medicine diagnostics
- methods and possibilities of the imaging nuclear medicine diagnostics

- main indications of nuclear medicine diagnosis
- main types and methods of radiotherapy
- indications and contraindication for radiotherapy
- role of radiotherapy in the treatment of non-malignant disorders
- specificity of clinical follow-up of the patients, undergoing radiotherapy.

EXPECTED RESULTS

After finishing the education the students are expected to have acquired the following theoretical knowledge and practical skills:

- to be aware of the influence of ionizing radiation on the human organism
- to know the modern devices for nuclear medicine diagnosis
- to know the main methods of nuclear medicine diagnosis
- to know the main indications for nuclear medicine diagnosis
- to interpret the results of nuclear medicine diagnostic studies
- to know the indications for radiotherapy
- to know the main types and methods of radiotherapy
- to know the main principles of planning and conducting the radiotherapy
- to know the most frequent oncologic diseases which require application of radiotherapy
- to be aware of the specificity of clinical follow-up of the patients, undergoing radiotherapy.

PROGRAM FOR LECTIIONS

III course, V semester

№	T O P I C	Hours 16 h	Date
1.	General principles of Nuclear medicine Radiopharmaceuticals. Devices - SPECT/CT; PET/CT; PET/MRT.	2 h	
2.	NM-Endocrinology. Metabolic and hybrid diagnostic of thyroid gland. Diagnostic of skeletal system.	2 h	
3.	NM-diagnostic of cardio-vascular, pulmonary, gastrointestinal, renal and central nervous systems.	2 h	
4.	NM diagnostic in clinical oncology. Metabolic radionuclide (brachy) therapy.	2 h	
5.	Biological Action of Ionizing Radiation. Radiotherapy – Main Principles and Methods. TNM classification	2 h	
6.	Radiotherapy of Breast Cancer and Lung Cancer	2 h	

7.	Radiotherapy of Cervical Cancer and Uterine Cancer	2 h	
8.	Radiotherapy of Rectal and Prostate cancer	2 h	

PROGRAM FOR PRACTICE
III course, V semester

№	T O P I C	Hours 16h	Date
1.	Nuclear Medicine – main principles and methods	2 h	
2.	Radionuclide Diagnosis (RND) of thyroid gland	2 h	
3.	Radionuclide Diagnosis (RND) of kidneys	2 h	
4.	RND of skeletal system. RND in oncology. PET	2 h	
5.	Classification of methods of Radiotherapy. TNM Classification of Malignant Tumours.	2 h	
6.	Radiotherapy of Breast Cancer and Lung Cancer	2 h	
7.	Radiotherapy of Cervical Cancer and Uterine Cancer.	2 h	
8.	Radiotherapy of Rectal and Prostate cancer	2 h	

LECTIONS – THESES

LECTION № 1 - 2 h

General principles of Nuclear medicine Radiopharmaceuticals. Devices- SPECT/CT; PET/CT; PET/MRT

1. Main principles of Nuclear Medicine (NM)
 - 1.1. diagnostic devices – Gamma camera, SPECT, PET
 - 1.2. diagnostic methods – in vivo, in vitro
 - 1.3. radionuclides, most frequently used in NM
 - 1.4. radio-immune-assay (RIA)

LECTION № 2 – 2 h

NM-Endocrinology. Metabolic and hybrid diagnostic of thyroid gland. Diagnostic of skeletal system.

1. History, types of RN studies
 - 1.1. Radio-Iodine Test
 - 1.2. RIA of thyroid hormones

2. Modern Gamma-camera imaging
 - 2.1. main principles
 - 2.2. indications for imaging with ^{99m}Tc
 - 2.3. indications for imaging with ^{131}I
3. Differentiated Thyroid Cancer
 - 3.1. brachy-therapy with ^{131}I
 - 3.2. follow-up of patients
4. RND of skeleton
 - 4.1. radiopharmaceuticals
 - 4.2. diagnostic methods
 - 4.3. application with primary and metastatic bone tumors

LECTION № 3 — 2 h

NM-diagnostic of cardio-vascular, pulmonary, gastrointestinal, renal and central nervous systems.

1. RND of **cardio-vascular, pulmonary, gastrointestinal, renal and central nervous systems.**
 - 1.1 radiopharmaceuticals
 - 1.2. diagnostic methods
 - 1.3. application

LECTION № 4 — 2 h

NM diagnostic in clinical oncology. Metabolic radionuclide (brachy) therapy.

1. Application of PET in oncology
 - 1.1. main principles
 - 1.2. radiopharmaceuticals for PET
2. Main indications for PET
 - 2.1. staging and re-staging of malignant tumors
 - 2.2. assessment of therapy
 - 2.3. detection of UPS
3. Metabolic radionuclide (brachy) therapy.
 - 3.1. radiopharmaceuticals

LECTION № 5 - 2 h

BIOLOGICAL ACTION OF IONIZING RADIATION. RADIOTHERAPY – MAIN PRINCIPLES AND METHODS

1. Biological action of ionizing radiation
 - 1.1. Radioactivity
 - 1.2. Dozimetry
2. Methods of Radiotherapy (RTh)
 - 2.1. external beam RTh
 - 2.2. intra-cavitary brachytherapy
 - 2.3. interstitial brachytherapy
 - 2.4. metabolic/ RN brachytherapy
3. Radiotherapy of malignant tumors
 - 3.1. main principles.
 - 3.2. treatment planning.
 - 3.3. Radiation reactions and complications

4. Modern radiation oncology - IMRT /intensity-modulated radiotherapy/, VMAT /volume-modulated radiotherapy/, IGRT /image-gated radiotherapy/, SRT /stereotactic radiation therapy/, SBRT /stereotactic body radiation therapy/

LECTION № 6 – 2 h

RADIOTHERAPY OF BREAST CANCER AND LUNG CANCER

1. Radiotherapy of Breast Cancer
 - 1.1. tactics of complex therapy
 - 1.2. place of RTh (examples)
 - 1.3. daily and total Doses
 - 1.4. side reactions; prognosis
2. Radiotherapy of Lung Cancer
 - 2.1. tactics of complex therapy
 - 2.2. place of RTh (examples)
 - 2.3. daily and total Doses
 - 2.4. side reactions; prognosis

LECTION № 7 – 2 h

RADIOTHERAPY OF CERVICAL CANCER AND UTERINE CANCER

1. Clinical characteristics; staging
2. External beam RTh.; volume definition
 - 2.1. treatment planning
 - 2.2. daily and total Doses
 - 2.3. Radiation reactions and complications
3. Intracavitary brachytherapy
 - 3.1. with initial External beam RTh
 - 3.2. with additional External beam RTh
4. Metastases; prognosis

LECTION № 8 – 2 h

RADIOTHERAPY OF RECTAL AND PROSTATE CANCER

1. Clinical characteristics; staging
2. Percutaneous radiotherapy - types
 - 2.1. Radiotherapy planning - volumes and doses
3. Radiation reactions and complications

PRACTICES - THESES

PRACTICE № 1 – 2 h

NUCLEAR MEDICINE – MAIN PRINCIPLES AND METHODS

1. Nuclear medicine (NM) and Radionuclide Diagnosis (RND) – definition
2. Radionuclides (RN) and Radiopharmaceuticals (RPh)
3. Ionizing radiations - Important physical entities and units
 - 3.1. Types of ionizing rays - Particulate and Electromagnetic/ photon rays
 - 3.2. Energy of radioactive rays
 - 3.3. Penetrating ability
 - 3.4. Activity and Physical half-life of RN
4. RN – main requirements for NM purposes
 - 4.1. Optimal for detection type of radioactive emission

- 4.2. Optimal for detection Energy of emission
- 4.3. Optimal Physical half-life (T/2)
- 4.4. Technetium-99m - the most frequently used RN in NM
5. RPh - main requirements for NM purposes
 - 5.1. Selective accumulation
 - 5.2. Simple preparation
6. Main advantages of RND
7. Production of RN
 - 7.1. Nuclear reactors
 - 7.2. Accelerators of charged particles (cyclotrons)
 - 7.3. RN Generators - Operating principle of RN Generator
 - 7.4. Molybdenum/ Technetium Generator – preparation of ^{99m}Tc RF
8. Modern devices for RN imaging
 - 8.1. The Gamma Camera System (GC)
 - 8.2. Structure of Scintillation Detector
9. Presentation of RND results
 - 9.1. Time/ Activity curves (TAC)
 - 9.2. % of uptake of the RF in the organ or region of interest (ROI)
 - 9.3. Scintigraphic images - scintigrams
10. Types of GC imaging studies
 - 10.1. Static scintigraphy
 - 10.2. Dynamic scintigraphy
 - 10.3. Whole-body scintigraphy
 - 10.4. SPECT – Single-photon/ Gamma-emission computer tomography
11. Positron emission tomography (PET) – metabolic/ molecular imaging
 - 11.1. positron emitting RN and RPh
 - 11.2. PET scanners
12. Hybrid diagnostic devices - PET/ CT; SPECT/ CT

SEMINARS № 2 – 2 h

RADIONUCLIDE DIAGNOSIS (RND) OF THYROID GLAND (TG)

1. Anatomy and Physiology of TG
 - 1.1. Regulation of Thyroid function
2. Functional RND of the TG (functional tests)
 - 2.1. Measurement of thyroid radioactive Iodine uptake (RAIU)
3. Functional-morphological RND of TG (GC scintigraphy of TG) - imaging and quantitative assessment of RF uptake in the TG
 - 3.1. Radiopharmaceuticals (RF)
 - 3.1.1. RN of Iodine - ¹³¹I or ¹²³I
 - 3.1.2. ^{99m}Tc-pertechnetate
4. Normal scintigraphy of TG
 - 4.1. Place, form, size, structure
 - 4.2. Function - thyroid uptake of ^{99m}Tc
5. Thyroid Pathology in Place - Ectopy
 - 5.1. sublingual goiter
 - 5.2. retrosternal goiter
6. Pathology in Size - enlarged TG (goiter, struma)
 - 6.1. Diffuse goiter (Struma diffusa) – Eu-, Hyper- and Hypothyroid goiter
 - 6.2. Nodular goiter (Struma nodosa)

- 6.3. Scintigraphic differentiation of thyroid nodules
 - 6.3.1. Cold nodules – cysts; malignant tumours
 - 6.3.2. Warm nodules - benign adenomas
 - 6.3.3. Hot nodules - benign autonomous adenomas - Compensated, sub-compensated, de-compensated (Toxic adenoma)
- 7. Thyroid Scintigraphy (WB) with ¹³¹Iodine - indications
- 8. Tumour-positive scintigraphy of TG
 - 8.1. Tumour-specific RF for thyroid malignancies - ^{99m}Tc-MIBI, ²⁰¹TlCl

PRACTICE № 3 – 2 h

RND OF KIDNEYS

- 1. Anatomy and Physiology of Kidneys
 - 1.1. main functions of the kidneys
 - 1.2. Glomerular Filtration (GF), Tubular Secretion (TS)
- 2. RF for RN kidney imaging
 - 2.1. For dynamic scintigraphy
 - 2.1.1. By TS -¹³¹I-Hypuran; ^{99m}Tc-MAG3 – ERPF
 - 2.1.2. By GF - ^{99m}Tc-DTPA – GFR
 - 2.2. For static scintigraphy - ^{99m}Tc-DMSA
- 3. RN Renography - TACs (renograms)
 - 3.1. The normal renogram
 - 3.1.1. I phase (vascular, perfusion)
 - 3.1.2. II phase (secretory)
 - 3.1.3. III phase (excretory)
 - 3.2. Pathological renograms
- 4. Dynamic GC scintigraphy - Functional-morphological imaging of the kidneys
 - 4.1. Performance
 - 4.2. Diagnostic information
 - 4.2.1. Perfusion
 - 4.2.2. Anatomy and morphology
 - 4.2.3. Function – total, relative
 - 4.2.4. Non-invasive determination of Renal Filtration (GFR) and Secretory Clearances (ERPF)
- 5. Static and SPECT renal imaging
- 6. Main indications for static renal scintigraphy – scintigraphic findings
 - 6.1. Inborn disorders
 - 6.1.1. Ectopy – ptosis
 - 6.1.2. Horse-shoe kidney
 - 6.2. Diffuse processes – nephritis
 - 6.3. Space-occupying processes (SOP)
 - 6.3.1. Cysts, Polycystosis
 - 6.3.2. Malignant Tu

PRACTICE № 4 – 2 h

RND OF SKELETAL SYSTEM. RND IN ONCOLOGY. PET

- 1. Anatomy and physiology of skeletal system
 - 1.1. Structure of bone tissue
 - 1.2. Bone tissue metabolism

2. Radiopharmaceuticals for Bone Scintigraphy (BS) - Phosphate compounds - ^{99m}Tc -MDP
3. Peculiarities of Bone Scintigraphy (BS) - extremely sensitive and relatively non-specific method
4. Types of BS
 - 4.1. late static planar whole-body (WB) GC
 - 4.2. targeted static BS
 - 4.3. SPECT
 - 4.4. 3-phase bone scintigraphy (3-PBS)
5. Evaluation of scintigraphic findings
6. The normal adult and immature skeleton
7. Main indication for BS
 - 7.1. Early detection of bone metastases
 - 7.2. Cardinal features of skeletal metastatic disease
8. Other indications for BS
 - 8.1. Degenerative (artroso-artrhtritic) bone-joint disorders
 - 8.2. Trauma and bone fractures
 - 8.3. Primary malignant bone tumours
9. 3-PBS in inflammatory bone-joint disorders
10. RND in oncology (RND of malignant tumours)
 - 10.1. Radio-imuno scintigraphy – looking for the “Golden bullet”
 - 10.2. Tumour-specific RF for thyroid malignancies - ^{99m}Tc -MIBI, ^{201}Tl -Thalium
 - 10.3. Scintigraphic imaging of malignant tumours by means of radio-labeled monoclonal Anti-bodies (Ab), targeted at tumour-specific Anti-genes (Ag), e.g. Anti-CEA-Ag.
11. PET
 - 11.1. positron emitting RN and RPh
 - 11.2. PET scanners
 - 11.3. main indications for metabolic imaging

PRACTICLE № 5 – 2 h

CLASSIFICATION OF RADIOTHERAPY METHODS. MODERN RADIOTHERAPY EQUIPMENT. TNM CLASSIFICATION OF MALIGNANT TUMORS

1. Introducing the students to the material base of the Clinic of Radiation Therapy (CRT) and the requirements of the department related to the training in radiation therapy
2. Introducing students to the main goals of training in radiation therapy
3. Introducing students to the methods of radiation therapy and visualization according to the available equipment in CRT
 - 3.1. According to the type of radiation source
 - 3.2. According to the location of the source relative to the patient's body
 - 3.2.1. Percutaneous radiation therapy -
 - contact therapy - irradiation with ^{90}Sr , ^{32}P , etc. ;
 - short-distance therapy (Shaul therapy, brachytherapy);
 - medium distance (superficial and medium-deep X-ray therapy);
 - long-distance irradiation (TGT, particle accelerators). Modern radiotherapy devices
 - 3.2.2. Intracavitary RT
 - 3.2.3. Interstitial RT

- 3.2.4. Metabolic (intracorporeal) RT
- 3.3. According to the dose distribution in space and time - IMRT / intensity-modulated radiotherapy /, VMAT / volume-modulated radiotherapy /, IGRT / image-gated radiotherapy, SRT / stereotactic radiation therapy /, SBRT / stereotactic body radiation therapy /
- 4. Introducing students to TNM - the system of malignant tumors
 - 4.1. TNM system
 - T - size and local spread of the tumor
 - N - lymphogenic distribution in the regional lymphatic basin
 - M - hematogenous spread / metastases /
 - 4.2. TNM-system - as a basis for staging patients, determining treatment tactics and comparing treatment results
 - 4.3. TNM system - as a prognostic factor
- 5. Demonstration of the available equipment in CRT and its therapeutic possibilities

PRACTICE № 6 – 2 h

RADIATION THERAPY (RTh) OF BREAST CANCER AND LUNG CANCER

- A. 1. The basic principles of radiotherapy planning
 - 1.1. Clinical and biological planning
 - 1.2. Anatomical and topographic planning - principles of 3-D conformal radiation therapy; delineation of the irradiated volumes
 - 1.3. Dosimetric planning - the role of the radiotherapist and physics
- B. 1. Breast cancer (BC) - etiology, histological variants, TNM - system
 - 2. Complex treatment of breast cancer - surgery, radiation, chemotherapy, hormone therapy, targeted therapy, others
 - 3. Types of radiotherapy for breast cancer:
 - 3.1. Teleradiotherapy (TRT) - electron and photon therapy, tele-gamma therapy
 - 3.2. Preoperative, postoperative, radical, palliative
 - 3.3. Irradiated volumes, dose distribution in space and time, daily and total focal doses, risk organs.
 - 3.4. Clinical-biological and dosimetric planning and implementation of the radiotherapy plan
 - 4. Demonstration of clinical cases
- C. Lung cancer - etiology, histological variants, TNM - system
 - 1. Complex therapy - surgery, radiotherapy, chemotherapy, immunotherapy, targeted therapy
 - 2. Radiation therapy
 - 2.1. Types - preoperative, postoperative, radical, symptomatic
 - 2.2. Dose distribution in space and time - daily and total focal doses
 - 2.3. Demonstration of clinical cases

PRACTICE № 7 – 2 h

RADIATION THERAPY (RTh) OF CERVICAL CANCER AND UTERINE CANCER

- 1. Radiation Therapy of Cervical cancer
 - 1.1. Etiology, histological types, TNM-staging
 - 1.2. treatment options – surgery, radiation therapy
 - 1.3. Types of RTh - preoperative RT, postoperative RT, radical RT (intracavitary and external beam RT), palliative RT

2. Radiation Therapy of Uterine cancer
 - 2.1. Etiology, histological types, TNM-staging
 - 2.2. treatment options – surgery, radiation therapy, hormonal therapy
 - 2.3. Types of RTh – preoperative RT, postoperative RT, radical RT (intra-cavitary and external beam RT), palliative RT

PRACTICE № 8 – 2 h

RADIATION THERAPY (RTh) OF PROSTATE CANCER AND RECTAL CANCER

1. Prostate cancer – screening, diagnosis, staging, general principles of therapy. Role of radiotherapy.
2. Rectal cancer - screening, diagnosis, staging, general principles of therapy. Role of radiotherapy.

LITERATURE

1. Medical oncology. Edited by K. Timcheva. Sofia 2018. ISBN 978-954-553-145-3
2. Collection of tests in clinical oncology. Edited by J. Grudeva-Popova. Plovdiv 2018 ISBN 978-619-7085-97-6
3. Anemia in malignant diseases. I. Nenova, J. Grudeva-Popova. Plovdiv 2016. ISBN 978-619-7085-62-4
4. Pharmacotherapy and problems of clinical pharmacy (part 2). Edited by M. Karaivanova. Sofia 2014
5. Guide to radiotherapy for medical students - Marinova L, Yaneva M., Varna 2008
6. CardioOncology or Oncocardiology - modern issues of diagnosis and treatment. J. Grudeva-Popova (ed.). Plovdiv 2012. ISBN 978-954-9549-58-4
7. Collection of clinical oncology tests. Zhanet Grudeva-Popova (ed). Plovdiv 2019
8. Radiation Oncology Self-assessment Guide, John Suh (Editor), 2017
9. The MD Anderson Manual of Medical Oncology. Hagop M. Kantarjian, Robert A. Wolff, Charles A. Koller, McGraw-Hill Medical. 2nd edition, 2011
10. Clinical Radiation Oncology: Expert Consult-Online and Print Consult, Leonard L. Gunderson (Author), Joel E. Tepper (Author) Saunders; Revised edition, 2019
11. Textbook of Radiation Oncology 3 Ed. Richard MD Hoppe (Author), Saunders; 5-rd Revised edition, 2018
12. Radiation Oncology - management decisions. Chao Cl., Perez C, Brady LW Lippincott Williams & Wilkins, 4th edition, 2014
13. Textbook of Medical Oncology. Franco Cavalli (Editor), Stanley B. Kaye, Heine H. Hansen, Heine H Hansen, James O. Armitage, Martine Piccart-Gebhart (Editor). Informa Healthcare; 5th edition, 2019

**EXAMINATION CONSPECT
OF NUCLEAR MEDICINE AND RADIOTHERAPY**

1. Radiation oncology - basic principles, planning and equipment.
2. Classification of methods for radiation oncology: according to the type and source of radiation; in accordance with the location of the source relative to the patient's body.
3. Classification of TNM for malignant tumors. Radiation reactions and complications.
4. Radiation therapy for breast cancer.
5. Radiation therapy for lung cancer.
6. Radiation therapy for rectal cancer. Combined radio-chemotherapy.
7. Radiation therapy for cervical and uterine cancer.

8. Radiation therapy for prostate cancer.
9. Basic principles of radionuclide diagnostics. Equipment. Radionuclides. Methods.
10. Radionuclide diagnosis of the thyroid gland.
11. Radionuclide diagnosis of the kidneys.
12. Radionuclide diagnostics of bones.
13. Radionuclide diagnostics in oncology. PET-CT.

QUESTIONS FOR SELF-PREPARATION

Topic 1

RADIONUCLID DIAGNOSTICS - BASIC PRINCIPLES

1. What are the basic principles of radionuclide diagnostics?
2. The most important physical quantities and units characterizing radionuclides?
3. What is the structure of radionuclide generators and the principle of operation?
4. What are the characteristics of radiopharmaceuticals and the requirements for them?
5. What are the main features of SPECT and PET scanners?
6. What are the types of nuclear medical diagnostic methods?

Topic 2

RADIONUCLID DIAGNOSIS OF THE THYROID GLAND

1. What are the indications for thyroid scintigraphy?
2. What are the main radiopharmaceuticals for functional-morphological examination of the thyroid gland?
3. What is the information value of thyroscintigraphy in diffuse and focal processes?
4. What is the principle of tumor-positive diagnosis and its application in diseases of the thyroid gland?
5. What is the role of RIA in thyroid disease?

Topic 3

RADIONUCLIDE DIAGNOSTICS OF THE EMBASSY SYSTEM

1. What are the types of nuclear medicine methods for determining the functional and morphological state of the excretory system?
2. What is the diagnostic value of nuclear medical methods for determining the functional and morphological state of POS?
3. What are the indications for dynamic renal scintigraphy?
4. What factors determine the choice of radiopharmaceutical for renal scintigraphy?
5. In which cases it is necessary to perform static scintigraphy with ^{99m}Tc DMSA?

Topic 4

RADIONUCLID DIAGNOSIS OF THE BONE SYSTEM.

RADIONUCLID DIAGNOSTICS IN ONCOLOGY

1. What are the types of nuclear medicine methods for examination of the bone and joint apparatus?
2. What are the main radiopharmaceuticals?
3. What is the role of bone scintigraphy for the diagnosis and staging of cancer?
4. What are the indications for 3-phase bone scintigraphy?
5. What are the most commonly used tumor-positive radiopharmaceuticals?
6. What is the application of PET in oncology?
7. What is the advantage of hybrid research methods over conventional ones?

Topic 5

CLASSIFICATION OF RADIATION THERAPY METHODS.

TNM CLASSIFICATION OF MALIGNANT TUMORS

1. What are the basic principles of radiation therapy of malignant tumors?
2. What are the methods of radiation therapy according to the type and source of radiation?
3. What are the methods of radiation therapy according to the location of the source relative to the patient's body?
4. What are the methods of radiation therapy according to the dose distribution in space and time?
5. What is the role of TNM - the system for determining treatment tactics and prognosis of malignant tumors?
6. Indicate the principle of action and therapeutic possibilities of linear accelerators.

Topic 6

RADIATION TREATMENT OF MALIGNANT DISEASES OF:

A. THE BREAST GLAND

1. What are the stages of breast cancer according to the TNM system ?.
2. What are the methods for treating breast cancer?
3. What types of radiotherapy are used for breast cancer?
4. What factors influence the clinical and biological planning in breast cancer?
5. Indicate the main steps in dosimetric planning of breast cancer?
6. Determine the therapeutic behavior at different stages of the disease / TNM - system /.
7. Define the role of radiation therapy in the complex treatment of breast cancer?

B. LUNGS

1. Present the classification of lung cancer according to the TNM-system - clinical stages.
2. Indicate the main histological variants and their importance in determining therapeutic behavior.
3. What methods are included in the complex treatment of lung cancer?
4. What methods of radiotherapy are used for lung cancer according to the stage of the disease and the goals?
5. What methods of radiotherapy are used in lung cancer according to the dose distribution in space and time?
6. What are the possibilities for radiotherapy of non-tumor diseases?
7. What are the basic principles of radiotherapy for non-tumor diseases - indications and contraindications for treatment?

Topic 7

RADIATION TREATMENT FOR CANCER OF THE CERVIX AND BODY OF THE UTERUS

1. What are the stages of planning radiotherapy for malignant diseases?
2. What characterizes clinical-biological planning and what is its result?
3. What is the purpose of anatomical and topographic planning?
4. What is the role of the radiotherapist and physicist in dosimetric planning?
5. What methods of radiotherapy are used for cervical cancer?
6. What treatment is used for cervical cancer depending on the stage of the disease?
7. What methods of radiotherapy are used for cancer of the uterine body?
8. What equipment is needed for radiotherapy for cervical and uterine cancer?

Topic 8

RADIATION TREATMENT OF RECTAL CANCER AND PROSTATE CANCER:

A. RECTUM CANCER

1. What are the stages of planning radiotherapy?
2. What characterizes clinical-biological planning and what is its result?
3. What is the purpose of anatomical and topographic planning?
4. What radiotherapy methods are used for rectal cancer?
5. What treatment is applied depending on the stage of the disease?
6. What methods of radiotherapy are used in rectal cancer?
7. What equipment is needed for radiotherapy at this location?
8. Role of preoperative radiochemotherapy

B. PROSTATE CANCER

1. Is there a modern screening for the disease
2. Modern diagnostic methods
3. Principles of staging
4. General principles of treatment
5. Place of radiotherapy - external irradiation, brachytherapy, palliative radiotherapy of bone metastases

TESTS FOR SELF-ASSESSMENT

1. The physical half-life of a radionuclide is:
 - a) the dose absorbed in the diseased focus
 - b) the number of the decayed nuclei per unit of time
 - c) the time for which the initial activity of the radionuclide decreases in half
2. The most widely used radionuclide in Nuclear Medicine is:
 - a) 125 Iodine
 - b) 131 Iodine
 - c) 99m Technetium
3. The normal renogram consists of:
 - a) four phases
 - b) two phases
 - c) three phases
4. The Activity of a RN is defined as:
 - a) the number of the decayed nuclei per unit of time
 - b) the time for which the initial activity of the radionuclide decreases in half
 - c) the Energy absorbed in a volume of tissue
5. The principle diagnostic device in NM is:
 - a) Nuclear reactor
 - b) Gamma Camera
 - c) Cyclotron
6. The most widely used radionuclide for thyroid scintigraphy is:
 - a) 125 Iodine
 - b) 131 Iodine
 - c) 99m Technetium
7. Radionuclide Renography is method for functional diagnosis of:
 - a) bones
 - b) thyroid gland

- c) kidneys
- 8. A Cyst in the thyroid gland presents on the scintigram as:
 - a) hot nodule
 - b) warm nodule
 - c) cold nodule
- 9. The Gamma Camera scintigraphy gives diagnostic information about:
 - a) organ's anatomy
 - b) organ's morphology and function
 - c) both a) and b)
- 10. The RPh used for Bone scintigraphy is:
 - a) ^{99m}Tc -MDP
 - b) ^{99m}Tc -Pertechnetate
 - c) ^{131}I -NaI
- 11. The main indication for bone scintigraphy is:
 - a) inflammatory bone disorders
 - b) early detection of bone metastases
 - c) benign bone tumors
- 12. The most frequently used RPh for PET is:
 - a) ^{18}F -FDG
 - b) ^{99m}Tc -Pertechnetate
 - c) ^{131}I -NaI
- 13. Pathological renograms are:
 - a) obturation and nephrectomic
 - b) isostenuric and reduction
 - c) both a) and b)
- 14. Toxic adenoma of the Thyroid gland presents on the scintigram as:
 - a) hot compensated nodule
 - b) hot sub-compensated nodule
 - c) hot de-compensated nodule
- 15. Which of the following RPh is used for Tumour-positive scintigraphy:
 - a) ^{99m}Tc -Pertechnetate
 - b) ^{99m}Tc -MIBI
 - c) ^{131}I -Hypuran
- 16. Measuring Unit for Activity of RN is:
 - a) Beckerel (Bq)
 - b) Gray (Gy)
 - c) Roentgen ®
- 17. Thyroid nodule with equal to the surrounding tissue uptake is defined as:
 - a) hot nodule
 - b) warm nodule
 - c) cold nodule
- 18. The scintillation Gamma Camera is detector of:
 - a) Alfa-particles
 - b) Beta-particles
 - c) Gamma rays
- 19. Malignant tumors present on scintigraphy with tumor-specific RPh as:
 - a) zones of increased uptake of the RPh
 - b) zones of decreased uptake of the RPh
 - c) zones of absent uptake of the RPh

20. The most used particles for radiotherapy are:
- a) protons
 - b) electrons
 - c) photons
 - d) neutrons
21. For radiotherapy we are using:
- A) Nuclear reactor
 - B) Gamma camera
 - C) Linear accelerator
 - D) all of them
22. Daily dose for radiosurgery is:
- a) 1,8-2Gy
 - b) 2-5Gy
 - c) 5-20Gy
 - d) 20-60Gy
23. Treatment for patients with multiple bone metastases include:
- a) ¹³¹Iodine
 - b) ⁸⁹Strontium
 - c) ¹⁸F-FDG
 - d) ⁶⁶gallium
24. Total dose in chest wall for patient with breast cancer after total mastectomy is:
- a) 40 Gy
 - b) 50Gy
 - c) 60Gy
 - d) none of them
25. We are using combined radiotherapy + Xeloda (Capecitabine) for:
- a) rectal cancer
 - b) ovarian cancer
 - c) anal cancer
 - d) lung cancer
26. Most common place for distant metastases from lung cancer is:
- a) skin
 - b) brain
 - c) liver
 - d) heart

HEAD OF DEPARTMENT

PROF. ZHANET GRUDEVA-POPOVA, MD, PhD

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
DIAGNOSTIC IMAGING

Approved by the Department Council on 01.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

**Diagnostic Imaging
Syllabus**

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								3rd year	
Diagnostic Imaging	VI	Total	Lectures	Practices	ECTS	1.4	5.0	V	VI
		108	48	60	3.6			1/2	2/2

DISCIPLINE: Roentgenology and radiology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: Mandatory

LEVEL OF QUALIFICATION: Master

FORMS OF TRAINING: Lectures, practices, self-preparation

YEAR OF TRAINING: Regularly

DURATION OF TRAINING: Two semesters

ACADEMIC HOURS: 48 hours of lectures, 60 hours of practices

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Multimedia presentations, thematically separate collections with digital and digitized images, solving practical cases

FORMS OF EVALUATION: Ongoing assessment, tests, seminars

EVALUATION CRITERIA: Average grade is formed for each semester

ASPECTS OF EVALUATION CRITERIA: Participation in seminars, solving tests, preparation of multimedia presentations

SEMESTER EXAM: Yes / entrance test, essay and interview. Variants have also been prepared for a distance online exam /

STATE EXAM: No

LECTURER: Habilitated lecturer from the department of Diagnostic Imaging

DEPARTMENT: Diagnostic Imaging

ANNOTATION

The training in Diagnostic Imaging aims to form doctors with extensive knowledge of modern methods of imaging, their informative value, their application in clinical practice, protocols for the appointment of imaging examination and selection of the most informative methods according to the required diagnosis. Students get acquainted with the imaging symptomatology of nosological units in accordance with medical standards and international requirements of the discipline, and also get acquainted with the modern diagnostic equipment.

BASIC AIMS OF THE DISCIPLINE

The students' education includes fundamental knowledge on the physical and technical aspects of diagnostic imaging – the nature and properties of X-rays, the X-ray equipment and X-ray imaging, the nature and properties of ultrasound diagnostics, CT and MRI diagnostics. The basics of radiation protection is being studied, as well as work with contrast agents, preparation of patients for X-ray examination, methods of examination and X-ray symptomatology of diseases of the respiratory system, cardiovascular system, digestive system, urinary system, obstetrics and gynecology, mammary glands, bones and joints, neuroradiology, dental imaging.

EXPECTED RESULTS

The medical student must:

- know the indications for the imaging examinations by nosological units, the contraindications for examination and the cases in which it is necessary to postpone the imaging examination or to replace it with an other examination;
- master the rules of radiation protection;
- know the basics of X-ray examination methods, as well as other image-diagnostic examination methods, the preparation for image-diagnostic examinations and the system for image interpretation;
- be acquainted with the radiological symptoms of the most common diseases by systems;
- acquire the following obligatory competencies - theoretical knowledge and practical skills.

How to fill document for diagnostic examination.

Description of radiography of the lung, normal and in the presence of pathology.

Preparation of the patient for X-ray and ultrasound examination of the digestive tract.

Description of the X-ray image in the normal gastrointestinal tract and in the presence of pathology.

Preparation of the patient for examination of the urinary system.

Description of examination of the urinary system in norm and pathology.

Description of examination of bones and joints in norm and pathology.

Presence of an examination of the lungs and digestive tract or a multimedia demonstration.

Presence during examinations in the ultrasound diagnostics rooms

Imaging examination methods in emergencies (pneumothorax, fractures, acute abdomen, pulmonary thrombosis).

Working with contrast agents. Premedication and control of allergic conditions. Rules and behavior.

Knowledge of the basic principles of interventional diagnosis and treatment.

LECTURES

LECTURE № 1 - 2 hours

Physical and technical aspects of diagnostic imaging

- Obtaining, nature and properties of X-rays. X-ray tube.
- Basic radiology methods of examination - X-ray and non X-ray. Methods and principles of obtaining images in different radiological methods.

- Methods for digitization of conventional X-ray images. Digital radiography. Methods for documenting imaging studies. Image archiving and transmission systems. DICOM, PACS
- Radiation protection - basic rules of operation. Dosimetry. Quality assurance in diagnostic imaging.

LECTURE № 2 - 2 hours

Bone diseases

- Imaging methods of bone examination.
- Normal X-ray anatomy of bones and joints.
- Main pathological processes in the bones: osteoporosis, osteosclerosis, osteolysis, osteonecrosis, periostosis, pathological bone remodeling.
- Traumatic injuries of the bones and the joints
- Inflammatory bone diseases.

LECTURE № 3 - 2 hours

Bone diseases

- Congenital dislocation of the hip joint. Hip dysplasia.
- Aseptic bone necrosis.
- Inflammatory bone diseases.
- Degenerative bone and joint diseases.
- Benign bone tumors.
- Malignant bone tumors.

LECTURE №4 - 2 hours

Obstetrics & Gynecology diseases

- Diagnostic methods in obstetrics and gynecology. Pregnancy and choice of diagnostic methodology according to the duration of pregnancy and indications for imaging.
- Methods of examination of mammary glands. Diseases of the mammary glands.
- Imaging methods of examination of the male and female pelvis. Diagnosis of diseases of the female genitalia.

LECTURE № 5 - 2 hours

Respiratory system

- Imaging methods for examination of the respiratory system - indications and possibilities of the methods.
- X-ray anatomy of normal chest and respiratory organs.
- General X-ray simiotics of diseases of the chest and the respiratory system. Basic terms in the description of the study. Description of normal and pathological imaging.
- Imaging diagnosis of bronchial diseases. Bronchial obstruction. Factors. Types. Radiological characteristics of the changes. Foreign bodies in the bronchi.

LECTURE №6 - 2 hours

Inflammatory diseases of the lungs

- Diagnostic imaging of non-specific inflammatory diseases of the lungs. Bronchitis. Pneumonia. Bacterial, viral, incl. COVID 19 pneumonia - findings and classification.
- Diseases of the pleura - pleural effusion, pneumothorax, pleural tumors, calcifications.
- Imaging diagnosis of the parasitic diseases of the lungs - echinococcus; X-ray characteristic.

LECTURE № 7 - 2 hours

- Pulmonary tuberculosis. Classification. X-ray images in primary and secondary pulmonary tuberculosis.
- Pneumoconiosis-silicosis, asbestosis.
- Benign and malignant lung tumors

LECTURE № 8 - 2 hours

Diseases of the heart

- Imaging methods for heart examination
- Imaging anatomy of the heart and large vessels.
- Heart diseases - acquired defects, pericarditis, myocarditis, cardiomyopathy
- Pulmonary changes in heart disease.

LECTURE № 9 - 2 hours

Diseases of the vessels

- Imaging methods for examination of vessels.
- Interventional methods for vascular diseases.
- Vascular diseases - aortic dissection, aortic aneurysm and thrombosis, atherosclerosis, Pulmonary thrombosis.

LECTURE № 10 - 2 hours

Diseases of the digestive system

- Imaging methods for examination of the digestive tract.
- Normal X-ray anatomy of the esophagus, stomach and duodenum.
- X-ray semiotics of diseases of the digestive tract.
- Diseases of the esophagus - atresia, achalasia, diverticula, tumors, corrosive esophagitis, varicose veins.
- Foreign bodies in the esophagus.

LECTURE № 11 - 2 hours

Diseases of the stomach. Acute abdomen

- Diseases of the stomach - peptic ulcer, hiatal hernia - radiological symptoms. Complications of peptic ulcer disease.
- Stomach tumors.
- Acute abdomen - etiology, differential diagnosis, diagnostic methods.

LECTURE № 12 - 2 hours

Diseases of the small and large intestine

- Normal X-ray anatomy and imaging methods of small and large intestines.
- Imaging diagnosis of diseases of the small and large intestines
- Inflammatory bowel diseases - appendicitis, enteritis, Crohn's.
- Tumors of the small and large intestines

LECTURE № 13 - 2 hours

Diseases of the hepato-biliary system

- Imaging methods and normal X-ray anatomy of the liver and bile ducts
- Diagnostic imaging of the diseases of the hepato-biliary system
- Liver diseases - diffuse liver diseases - steatosis, cirrhosis; Focal liver diseases - primary and secondary.
- Diseases of the gallbladder and bile ducts: cholelithiasis, cholecystitis, tumors.

LECTURE № 14 - 2 hours

Diseases of the pancreas

- Imaging methods and normal radiological anatomy of the pancreas.
- Acute and chronic pancreatitis.
- Cysts and tumors of the pancreas.

LECTURE № 15 - 2 hours

Diseases of the urinary tract

Imaging methods of examination of the urinary tract

Normal radiological anatomy of the urinary tract

Diseases of the urinary tract - nephrolithiasis, hydronephrosis, congenital kidney abnormalities, kidney and bladder tumors. Imaging and diseases of the prostate gland.

LECTURE № 16 - 2 hours

Diseases of the CNS

- Imaging methods in the CNS. Brain examination.
- Ischemic and hemorrhagic strokes of the brain.
- Intracranial traumatic injuries.
- CNS tumors.
- Imaging methods for examination of the spine and spinal cord.
- Traumatic injuries to the spine and spinal cord.
- Disc herniations.

Practices

I-st SEMESTER

Practical № 1 – 2 hours

Introduction to Radiology

- Introduction to the specialty radiology and the structure of the department

Basic imaging methods for examination

X-ray methods: Radiography; Fluoroscopy; DSA; Computed tomography; PET-CT.

Non- ionizing methods :Ultrasound; MRI;PET-MR.

Contrast materials for diagnostic imaging-classification. Advantages and disadvantages.

Indications and contraindications.

Radiation protection-basic rules of work.

Practical № 2 – 2 hours

Demonstration of diagnostic imaging equipments in the bases for practical training

Structure of imaging machines.

Interaction of X-rays with matter. Obtaining X-ray images. Geometric properties of the X-ray image. Qualities of the X-ray image. Obtaining an image- analog and digital. DICOM-standart. PACS.

Practical № 3 – 2 hours

Diagnostic imaging of the bones

Imaging methods for examination of the bones

X- ray anatomy of bones and joints

Bone pathologies: osteoporosis, osteosclerosis, osteolysis, osteonecrosis, periostosis, pathological bone remodeling and deformity.

Practical № 4– 2 hours

Bone diseases

- Traumatic injuries of bones and joints
- Congenital dislocation of the hip joint. Hip dysplasia.
- Aseptic bone necrosis.
- Inflammatory bone diseases.

Practical № 5– 2 hours

Degenerative bone and joint diseases

Benign bone tumors

Malignant bone tumors

Practical № 6 – 2 hours

Diagnostic imaging in obstetrics and gynecology

Diagnostic imaging in obstetrics and gynecology. Pregnancy diagnosis and monitoring of pregnancy according to its term. Indications for diagnostic imaging.

Diagnostic imaging of the mammary glands

Diseases of mammary glands. Ca glandulae mammae

Diagnostic imaging of diseases of the female pelvis

Practical № 7 – 2 hours

- Summary, discussion on thesis prepared and presented by students.
- Test. Interpretation of imaging study.

II-nd SEMESTER

Practical № 8 – 2 hours

Respiratory system

Imaging methods for examination of the respiratory system- indications and possibilities of the methods.

X-ray anatomy of normal chest and respiratory organs

General X-ray semiotics of diseases of the chest and respiratory system

Basic terms when describing a study.

Description of normal imaging and examination with pathological findings

Practical № 9 – 2 hours

Inflammatory Lung Diseases.

Imaging diagnosis of bronchial diseases

Impaired bronchial patency. Factors. Types. Radiological characteristics of the changes.

Foreign bodies in the bronchi.

Imaging diagnosis of non-specific inflammatory diseases of the lungs. COVID 19 pneumonia – imaging findings and classification.

Diseases of the pleura - pleural effusion, pneumothorax.

Practical № 10 – 2 hours

Inflammatory Lung Diseases

- Pulmonary tuberculosis. Classification. X-ray images in primary and secondary pulmonary tuberculosis
- Imaging diagnosis of parasitic diseases of the lungs - echinococcus; X-ray characteristic.

Practical № 11 – 2 hours

Tumors and occupational diseases of the lungs

Pneumoconiosis-silicosis, asbestosis.

Benign lung tumors

Malignant lung tumors

Practical № 12 – 2 hours

Cardiovascular System

Imaging methods for examination of the heart.

X-ray anatomy of the heart.

Heart diseases- acquired valvular lesions, pericarditis, myocarditis, cardiomyopathy.

Pulmonary changes in heart diseases.

Practical № 13 – 2 hours

Cardiovascular system

Imaging methods for vessels

- Interventional methods for vascular diseases.
- Vascular diseases - aortic dissection, aortic aneurysm and thrombosis, atherosclerosis, Pulmonary embolism.

Practical № 14– 2 hours

Diagnostic imaging of Gastrointestinal tract

Imaging in dentistry

Imaging methods for examination of the digestive tract.

Normal X-ray anatomy of the esophagus, stomach and duodenum.

X-ray semiotics of diseases of the digestive tract.

Diseases of the esophagus - atresia, achalasia, diverticula, tumors, corrosive esophagitis, varicose veins.

Foreign bodies in the esophagus

Practical № 15– 2 hours

Diagnostic imaging of disease of the stomach, small and large intestines. Acute abdomen.

Diagnostic imaging of diseases of the stomach- ulcer and its complications, hiatal hernia - imaging signs.

Gastric tumors.

Acute abdomen– etiology, differential diagnosis, imaging methods

Diagnostic imaging of diseases of the small intestines and large intestine: normal anatomy and pathological conditions

Inflammatory bowel diseases - appendicitis, enteritis, Chronic ulcerative colitis, Crohn's disease

Tumors of the colon

Practical № 16– 2 hours

Diagnostic imaging of diseases of hepatobiliary system

Imaging modalities for diagnostics and normal X-ray anatomy of the liver and biliary system.

Diagnostic imaging of diseases of the hepatobiliary system.

Liver diseases: Diffuse liver diseases – steatosis, cirrhosis. Focal liver lesions- benign and malignant tumors –primary and secondary.

Diseases of gallbladder and biliary system: cholelithiasis and cholecystitis.

Practical № 17– 2 hours

Diseases of the pancreas

Imaging methods and normal X-ray anatomy of the pancreas.

Acute and chronic pancreatitis

Cysts and tumors of the pancreas.

Practical № 18– 2 hours

Disease of the urinary tract

Imaging methods for diagnostics of the urinary tract

Normal X-ray anatomy of the organs of the urinary tract.

Diseases of the urinary tract -nephrolithiasis, hydronephrosis,congenital kidney abnormalities, tumors of the kidneys and urinary bladder - renal cell carcinoma,transitional cell carcinoma, renal cysts.

Practical № 19– 2 hours

Neuroradiology

Imaging methods in the CNS. Brain examination.

Ischemic and hemorrhagic strokes of the brain.

Intracranial traumatic injuries.

CNS tumors.

Practical № 20– 2 hours

Neuroradiology

Imaging methods for examination of the spine and spinal cord.

- Traumatic injuries to the spine and spinal cord.
- Disc herniations.

Practical № 21– 2 hours

Polytrauma-image-diagnostic algorithm.

CT image of traumatic injuries of parenchymal abdominal organs.

Overview of emergencies - BTE, aortic dissection, pneumothorax, pneumoperitoneum, ileus, emergencies in neurology and neurosurgery - strokes, intracranial trauma.

Practical № 22– 2 hours

- Summary of basic terms in diagnostic imaging.
- Description of normal imaging and examination with pathological findings in various organs and systems.

Conspectus

1. X-ray tube - basic components. X-ray image - obtaining, essence, qualities.
2. Digital X-ray images - obtaining. Methods for archiving and transmitting images. DICOM. PACS.
3. Principles of computed tomography - modern development
4. Principles of ultrasound examination - application
5. Principles of magnetic resonance imaging – concept of sequence
6. Contrast tools for diagnostic imaging - classification. Advantages and disadvantages.
7. Invasive X-ray methods. Interventional radiology
8. Radiation protection of staff and patients.
9. Imaging methods for examination of the respiratory system
10. X-ray diagnosis of airway diseases
11. Nonspecific inflammatory diseases of the lungs
12. Diseases of the pleura
13. Pulmonary tuberculosis. Classification. X-ray images in primary and secondary pulmonary tuberculosis
14. Lung cancer - diagnosis and staging with imaging methods.
15. Benign lung tumors. Echinococcus of the lungs
16. Occupational diseases of the lungs - silicosis
17. Imaging methods for examination of the mediastinum. Tumors of the mediastinum
18. Methods for imaging of the heart, coronary vessels, large and peripheral vessels
19. Normal X-ray anatomy of the cardiovascular shadow
20. Imaging diagnosis of acquired heart defects
21. Diseases of the myocardium
22. Imaging diagnosis of pericardial diseases
23. Imaging in diseases of the aorta and peripheral vessels.
24. Imaging methods for examination of the esophagus and stomach. Normal X-ray anatomy of the esophagus and stomach
25. Diseases of the esophagus - diverticula, strictures, tumors, varicose veins
26. Imaging diagnosis of peptic ulcer of the stomach and duodenum. Complications.
27. Hiatal hernia. Benign and malignant tumors of the stomach
28. Imaging methods for examination of the small and large intestines. Carcinoma of the colon
29. Imaging methods for examination of the liver. Diffuse liver diseases.
30. Focal diseases of the liver - primary and secondary tumors
31. Imaging methods for examination of the biliary system. Diseases of the gallbladder and bile ducts.
32. Imaging diagnosis of the pancreas. Diffuse and focal diseases. Pancreatic cancer.
33. Imaging methods for examination of the urinary system
34. Normal X-ray anatomy of the urinary system. Varieties and anomalies.
35. Urolithiasis. Hydronephrosis.
36. Tumors of the kidneys, ureters and bladder. Tumors of the prostate gland .
37. Imaging methods in obstetrics and gynecology.
38. Imaging diagnosis of the mammary gland. Benign and malignant diseases of the breast.
39. Imaging methods for examination of the musculoskeletal system.
40. X-ray images of the main pathological processes in the bones

41. Traumatic diseases of the bones and joints - fractures, fissures, dislocations, dislocation fractures, subluxations
42. Osteomyelitis - acute, chronic. Atypical forms. Bone and joint tuberculosis.
43. Benign bone tumors - osteoma, osteoid-osteoma, osteoblastoma
44. Benign bone tumors - chondroma, osteochondroma. hemangiomas, osteoclastoma
45. Malignant bone tumors - osteosarcoma
46. Malignant bone tumors - Ewing's sarcoma. Myeloma. Chondrosarcoma
47. Inflammatory and degenerative-dystrophic diseases of the joints and spine
48. Aseptic osteonecrosis - Perthes' disease.
49. Imaging methods for examination of the central nervous system
50. Brain tumors.
51. Imaging diagnosis in ischemic stroke.
52. Imaging diagnosis of intracranial hemorrhages.
53. Pulmonary thromboembolism - modern imaging methods for diagnosis
54. Aortic aneurysm and dissection
55. Examination methods and X-ray images in acute abdomen - differential diagnostic plan. Perforation of a luminal abdominal organ. Ileus
56. Posttraumatic patient

Bibliography

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2. Рентгенология и радиология, проф.д-р. Делов, Проф.д-р Узунов -1999г.
3. Целотелесна компютърна томография – Вегенер, изд”Шеринг”2001г.
4. Образна диагностика на кистични лезии на панкреаса, псевдокисти и кистични неоплазми“ – А. Хилендаров, К. Велкова.
5. Практическо ръководство по образна диагностика на храносмилателната система, В. Сираков, К. Велкова.
6. Мултидетекторна компютърна томография“ – К. Велкова, Вл. Сираков, Н. Сираков, Л.Червенков.
7. Практическо ръководство на ултразвуковата диагностика на жлъчно-чернодробната област и панкреаса“ А. Хилендаров.
8. Клинична Образна диагностика. Актуализиран лекционен курс за медицински сестри и акушерки , А. Хилендаров.
9. Тумори на пикочоотделителната система – Вл. Сираков, А. Шопов – 2002 год.
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11. Тестове за подготовка по образна диагностика на студентите медици и специализанти, Вл. Сираков – 2013 год.
12. “Encyclopedia of Medical Physics” – Tabakov S., F. Milano, S-E. Strand, C. Lewis, P. Sprawls, EMITEL Consortium. Vol. 1 & 2, 2013, Taylor & Francis, CRC Press, ISBN-13: 978-1439846520
13. “Radiation Protection in Medical Imaging and Radiation Oncology” – R.J.Vetter and M.S. Stoeva, Taylor & Francis, London. 2016.
14. Диагностика и лечение на остеопорозата-практическо ръководство. С.Цветкова,

А.Баталов, 2012, ISBN978-954-9549-57-7

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MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
OTORHINOLARYNGOLOGY

Approved by the Department Council on 06.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

Otorhinolaryngology
Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								4 th year	
Otorhinolaryngology	VII/VIII	Total	Lectures	Practices	ECTS	1.5	4.5		VIII
		90	45	45	3.0				3/3

DISCIPLINE: Otorhinolaryngology / Ear Nose and Throat diseases

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Compulsory

LEVEL OF QUALIFICATION: Master degree

FORMS OF TRAINING: Lectures and practice

YEAR OF TRAINING: 4th

DURATION OF TRAINING: one semester

ACADEMIC HOURS: 45 hours of lectures and 45 hours of practice

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Multimedia; All ENT instruments and equipment (microscopes, endoscopes, audiometers, tympanometers)

FORMS OF EVALUATION: at least two tests during the semester, final exam consisting of practical exam, test and essay

EVALUATION CRITERIA: practical skills and theoretical knowledge

ASPECTS OF EVALUATION CRITERIA: clinical thinking, examination skills, differential diagnosis, diagnostic options, handling of emergency cases, treatment options and decision making.

SEMESTER EXAM: YES

STATE EXAM: YES (practice and theory)

LECTURER: prof. Vicheva; assoc prof Pazardzhikliev

DEPARTMENT: ENT department

ANNOTATION

Otolaryngology/ otolaryngology-head and neck surgery or Ears, Nose, and Throat (ENT) diseases is a medical specialty which focuses on the conditions affecting the ear, upper aerodigestive tract and the neck.

BASIC AIMS OF THE DISCIPLINE

Training in ear, nose and throat diseases aims to provide basic knowledge and practical skills in graduates of medicine and dental medicine with a master's degree and prepare them for work in an outpatient setting.

EXPECTED RESULTS

After completion of the course students must have acquired knowledge of:

1. Anatomy and Physiology of the Ears, Nose and Throat
2. Pathophysiology and clinical manifestation of diseases of these organs.
3. Performing a basic ENT examination.
4. Theoretical knowledge and practical skills in the treatment of the most common ENT diseases.
5. Theoretical knowledge and practical skills about the most common ENT emergencies.
6. To recognize the early manifestations of malignant diseases in ENT.

LECTURES

1. Conditions of the external ear. Developmental anomalies of the external ear. Impetigo of the external ear. Seborrheic dermatitis. Eczema of the ear. Thermal injury of the external ear – frostbite, burns. Erysipelas. Othematoma. Perichondritis. Foreign bodies in the external ear canal. Earwax. Otomycosis. Exostosis of the external auditory canal. Traumatic rupture of the tympanic membrane. Tumors of the external ear.	3h.
2. Conditions of the middle ear. Acute otitis media. Acute otitis and infectious diseases. Acute otitis media in infants Otitis media with effusion – acute and chronic. Streptococcus pneumoniae otitis. Ear barotrauma. Facial nerve palsy. Acute mastoiditis.	3h.
3. Chronic otitis media and specific infectious diseases of the middle ear. Chronic otitis: Mesotympanitis and Epitympanitis, Cholesteatoma. Tuberculosis of the middle ear. Syphilitic otitis media. HIV-associated otitis. Tumors of the middle ear.	3h.
4. Conditions of the inner ear. Inflammatory diseases of the inner ear. Labyrinthitis. Vestibular neuritis, Cochlear neuritis. Sudden hearing loss. Tinnitus. Presbycusis. Deafness. Herpes zoster oticus. Non-inflammatory diseases of the inner ear. Meniere's disease. Otosclerosis. Tumors of the internal auditory meatus /Statoacoustic neuroma/	
5. Otogenic intracranial complications. Extradural abscess. Subdural abscess. Otogenic purulent meningitis. Otogenic arachnoiditis. Thrombophlebitis of the sigmoid sinus and otogenic sepsis,. Thrombophlebitis of the cavernous sinus. Otogenic brain abscess. Abscess of the cerebellum. Ageing and the auditory and vestibular system.	3h.
6. Conditions of the nose and paranasal sinuses. Deformities of the external nose. Deformities of the paranasal sinuses. Deviation of the nasal septum - septoplasty. Rhinophyma. Foreign bodies in the nose. Rhinitis sicca anterior. Epistaxis. Nasal bone fractures. Hematoma and abscess of the nasal septum. Tumors of the external nose.	3h.
7. Inflammatory diseases of the nose. Acute rhinitis in infants and young children. Furuncle of the nasal vestibule. Gonococcal rhinitis. Diphtheria of the nose. Foreign body in the nose. Chronic rhinitis. Chronic atrophic rhinitis (Ozena). Olfactory disorders.	3h.
8. Conditions of the paranasal sinuses. Inflammatory diseases of the paranasal sinuses. Acute sinusitis. Acute maxillary sinusitis. Acute ethmoiditis. Acute frontal sinusitis. Acute sphenoid sinusitis. Aeosinusitis Chronic sinusitis with and without polyposis. Nasal polyposis. Surgical treatment of sinus diseases. Allergic rhinitis. Vasomotor rhinitis.	3h.
9 Complications of the paranasal sinus diseases. Tumors of the paranasal sinuses. Orbital complications of sinusitis. Palpebral edema. Palpebral abscess. Orbital periostitis. Apex orbitae syndrome. Orbital cellulitis. Orbital abscess and phlegmon. Optic neuritis. Neoplasms of the nasal cavity and paranasal sinuses – benign and malignant.	3h.
10 Conditions of the oral cavity and tongue. Congenital anomalies /anomalies of the lips, mouth and palate clefts/. Inflammatory diseases of the lips and oral cavity - cheilitis, stomatitis. Necrotising ulcerative stomatitis (Noma, cancrum oris). Mycotic stomatitis. Chemical stomatitis. Oral manifestation of systemic and hematological diseases. Abscesses of the floor of the mouth and tongue.	3h.

Submandibular phlegmon. Glossitis. Tumors of the oral cavity and tongue – benign and malignant.	
11 Conditions of the salivary glands. Salivary secretion disorders. Ranula. Trauma of the salivary glands. Sialadenitis - acute and chronic. Sialolithiasis. Sialosis. Sjogren's and Mikulicz disease. Tumors of the salivary glands – benign and malignant	3h.
12 Conditions of the pharynx. Inflammatory diseases – acute nasopharyngitis, acute nonspecific pharyngitis, chronic non-specific pharyngitis, herpetic lesions of the pharynx. Tonsillitis – Acute tonsillitis, Acute adenoiditis, Vincent's angina. Chronic tonsillitis. Adenoid hypertrophy. Tonsillar hypertrophy. Obstructive sleep apnea.	3h.
13 Conditions of the pharynx Complications of the inflammatory diseases of the pharynx – peritonsillar abscess, retropharyngeal abscess, parapharyngeal abscess. Pharyngeal trauma. Tumors of the pharynx – benign and malignant.	3h.
14 Conditions of the larynx, trachea and bronchi. Acute laryngitis. Croup. Acute epiglottitis. Laryngeal edema. Laryngeal abscess. Acute stenosing laryngotracheitis. Chronic laryngitis. Foreign bodies in the larynx. Laryngeal trauma. Acute laryngeal stenosis. Laryngeal dyspnea. Chronic laryngeal stenosis. Laryngeal paralysis. Acute and chronic tracheal stenosis. Foreign bodies in the trachea and bronchi	3h.
15 Conditions of the larynx and esophagus. Benign and malignant neoplasms of the larynx. Cervical metastasis. Chronic infectious and specific diseases of the upper respiratory tract – Respiratory scleroma, Tuberculosis, Syphilis. Professional diseases of the ENT. Conditions of the esophagus – Diverticulum, Spasm, Varices, Esophagitis and Reflux disease. Chemical trauma of the esophagus. Esophageal stricture. Foreign bodies in the esophagus	3h.

PRACTICES

1. Examination of the external ear Introductory speech. Anamnesis, Inspection, Palpation. Otoscopy. Position of the physician and the patient. Setup and instruments. Methods of examination in the ENT practice	3h.
2. Otoscopic examination of the healthy tympanic membrane Anatomy of the middle ear. Anatomical details of the tympanic membrane, mobility, position, color. Central v marginal perforation of the TM. Examination of the eustachian tube /Politzer balloon test, Valsalva maneuver/.	3h.
3. Otoscopic examination of tympanic membrane pathology Demonstration of patients with acute and chronic infection of the middle ear – aural toilet, suctioning, syringing. 3h. Earwax removal. Clinical anatomy of the middle ear	3h.
4. Functional examination of hearing Physiology of hearing. Speech test, Tuning fork tests. Audiometry. Frequency spectrum of perception. Conductive v sensorineural hearing loss. Weber, Rinne, Schwabach and Gelle tests	3h.
5. Functional examination of the vestibular system Physiology of balance. Caloric reflex test, Barany rotation test. Pressure test. Fistula test. Demonstration of patients with balance disorders.	3h.
6. Examination of the nose Clinical anatomy of the nose. Respiratory and olfactory functions of the nose. Anterior, middle and posterior rhinoscopy. Nasal packing. Demonstration of patients with diseases of the nose.	3h.
7. Examination of the paranasal sinuses Clinical anatomy of paranasal sinuses. Anamnesis, Inspection, Palpation. Maxillary sinus puncture. Radiological	3h.

examination of paranasal sinuses. Demonstration of patients with paranasal sinus pathology.	
8. Examination of oral cavity and pharynx Clinical anatomy and physiology of the oral cavity and the pharynx. Anamnesis, Inspection, Palpation. Examination of the pharynx and tonsils. Demonstration of patients with pathology of the mouth and pharynx.	3h.
9. Examination of the larynx Clinical anatomy and physiology of the larynx. Anamnesis, Inspection, Palpation. Indirect and direct laryngoscopy. Demonstration of patients with diseases of the larynx.	3h.
10. Examination of patients Bronchoscopy, Esophagoscopy, Foreign bodies in the esophagus and esophageal dilatation.	3h.
11. – 14. Examination of ENT patients Examination of patients in the ENT practice Methods of treatment in the ENT practice. Emergency ENT.	

BIBLIOGRAPHY

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3. Essential Otolaryngology: Head and Neck Surgery, Tenth Edition by K. J. Lee
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5. Color Atlas of ENT diagnosis by Bull T
6. Oxford Handbook of ENT and Head and Neck Surgery (Oxford Medical Handbooks)
7. Oxford American Handbook of Otolaryngology (Oxford American Handbooks of Med

CONSPECTUS

Conspectus for ENT Exam 4th Year Medicine

1. Anatomy and physiology of the external ear. Non-inflammatory diseases and inflammatory diseases. Otomycosis.
2. Anatomy and physiology of the middle ear. Methods of examination. Acute Otitis media in adults and infants. Otitis media with effusion, Mastoiditis, Facial nerve paralysis. Clinical complications.
3. Chronic Otitis media - types. Clinical complications. Traumatic rupture of the tympanic membrane.
4. Anatomy and physiology of the inner ear. Methods of examination. Otosclerosis. Clinical complications.
5. Vestibular disorders. Examination of the Vestibular System. Meniere's Disease, Labyrinthitis. Vestibular Neuritis.
6. Otogenic complications – extracranial and intracranial. Diagnosis and treatment.
7. Anatomy and physiology of the nose. Clinical Examination of the Nose. Nasal pyramid fracture. Epistaxis.
8. Anatomy and physiology of the paranasal sinuses. Clinical Examination of the. Acute and Chronic Rhinosinuitis.
9. Pediatric Rhinosinuitis. Orbital complications in diseases of the nose and paranasal sinuses. Cerebrospinal Fluid Rhinorrhea
10. Allergic Rhinitis. Nasal polyposis. Neoplasms of the Nose and Paranasal Sinuses.

11. Basic Anatomy and Physiology of the Lips and Oral Cavity. Inflammatory diseases of the Lips and Oral Cavity. Oral Floor Abscess. Angioedema. Anatomy, Physiology and Immunology of the Pharynx. Methods of Examination of the Pharynx.
12. Diseases of the Pharynx. Diseases of the Nasopharynx – adenoids, juvenile angiofibroma. Acute and Chronic Tonsillitis, Scarlet Fever, Plaut-Vincent Angina, Diphtheria, Infectious Mononucleosis. Tonsillogenic complications: Peritonsillar abscess. Retropharyngeal and parapharyngeal abscess. Diseases of the hypopharynx.
13. Diseases of the Salivary glands. Anatomy, Clinical Examination, Imaging Studies, and Biopsy of the Salivary Glands. Noninflammatory and Inflammatory Diseases. Sjogren Syndrome. Tumors of the Salivary Glands.
14. Adult and Pediatric Obstructive Sleep Apnea. Diagnosis, Physical Examination and Treatment.
15. Anatomy and physiology of the larynx. Methods of Examination. Stridor. Malformations of the larynx. Diphtheria. Acute Subglottic Laryngitis. Acute Epiglottitis. Acute laryngitis. Angioneurotic Laryngeal Edema. Chronic Nonspecific Laryngitis. Reinke's Edema. Tuberculous Laryngitis
16. Tumors of the Larynx. Vocal Cord Polyps. Vocal Cord Nodules. Laryngeal Papilloma. Laryngeal Squamous Cell Carcinoma. Spindle Cell Carcinoma. Neuroendocrine Carcinoma. Surgical treatment options for laryngeal carcinoma. Laryngectomy Effects and Voice Rehabilitation. Tracheotomy and Cricothyrotomy
17. Laryngeal Trauma. Recurrent Laryngeal Nerve Paralysis. Basic Principles of Speech. Dysphonia. Vocal Cord Paralysis. Stridor. Cough.
18. Emergencies and Primary Measures in the ear, nose and throat. Foreign Bodies. Anatomy and physiology of the Esophagus. Corrosive Esophagitis. Treatment.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
HYGIENE AND ECOLOGY

Approved by the Department Council - Protocol № 7/30.05.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

HYGIENE AND ECOLOGY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								3 rd year	
		Total	Lectures	Practices	ECTS			V	VI
Hygiene and Ecology	VI	120	60	60	4.0	2.0	6.0	2/2	2/2

DISCIPLINE:

Hygiene and Ecology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master degree /M/

FORMS OF TRAINING:

Lecture and practical courses (practical and laboratory classes, seminars, site visits)

YEAR OF TRAINING:

3rd year

DURATION OF TRAINING:

Vth and VIth semesters

ACADEMIC HOURS:

60 academic hours of lecture courses and 60 academic hours of practical courses

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Audiovisual equipment, laboratory equipment, different tools and technical devices for demonstration and performance of the application of modern methods in Hygiene

FORMS OF EVALUATION:

Ongoing evaluation, tests, oral examinations, colloquia on different hygiene sections

EVALUATION CRITERIA:

Average annual grade

ASPECTS OF EVALUATION CRITERIA:

The exam grade, the grades from the colloquia and ongoing monitoring

SEMESTER EXAM:

Yes (written and oral exam)

STATE EXAM:

Yes (written and oral exam as a part of the State exam of Hygiene, Epidemiology, Infectious diseases and Social medicine)

LECTURER:

Academic rank lecturer from the Department of Hygiene

DEPARTMENT:

“Hygiene”

ANNOTATION

The programme of Hygiene and Ecology allows students to acquire knowledge and skills in the basic concepts of Hygiene as a preventive medical science.

The aim of the programme is the application of hygiene theoretical knowledge and practical ability in the clinical medical practice.

BASIC AIMS OF THE DISCIPLINE

Main course tasks include:

- knowledge of actual problems and effects (positive and negative) of some factors (air, water, food) on human health;
- knowledge of prophylactic measures against the negative effects of the factors of vital environment (living, working, educational et al. environment);
- knowledge of nutritional prevention programmes against some non-communicable diseases with social importance;
- knowledge of healthy lifestyle including the system of measures for prevention and improvement of human health so that active longevity can be ensured;
- measures for safety and health factors at work and education.

EXPECTED RESULTS

At the end of course medical students must have the following knowledge and skills:

- theoretical knowledge and practical ability in the field of Hygiene about health aspects of the vital environmental factors;
- medical students must know the basic and actual contaminants in air, water, soil, food products and their health consequences;
- active participation in the prophylactic measures against the negative effects of the factors of vital environment;
- application of acquired knowledge in the field of principles of healthy lifestyle;
- application of acquired prophylactic knowledge in the clinical medical practice in relation to the role of negative environmental factors effects on the appearance and development of diseases;
- application of acquired knowledge in the field of nutritional prevention programmes against some non-communicable diseases with social importance;

- application of prophylactic measures for workers exposed to different occupational hazards;
- knowing the actual health problems among children and adolescents helps to apply the hygiene requirements to their education and professional orientation.

LECTURES

LECTURE № 1 – 2 acad. hours

HYGIENE AS A MAIN PROPHYLACTIC MEDICAL SCIENCE – SUBJECT, AIM, TASKS, BRANCHES, METHODS. CURRENT HYGIENE ENVIRONMENTAL ISSUES.

1. Introduction to Hygiene.
2. Historical review of the development of Hygiene as a science.
3. Main branches and methods of Hygiene.
4. Environmental health service in Bulgaria – basic functions and activities.

LECTURE № 2 – 2 acad. hours

ATMOSPHERE. AIR COMPOSITION. HYGIENE CHARACTERISTIC OF PHYSICAL FACTORS OF THE ATMOSPHERE.

1. Atmosphere – definition, zones of atmosphere.
2. Air composition.
3. Hygiene characteristic of Physical factors of the Atmosphere – meteorological and heliomagnetic factors.
4. Sun radiation – UV, visible and infrared radiation.
5. Meteorological factors – Atmospheric pressure, Air temperature, Humidity, Air velocity, Air ionization.
6. Factors, coming from the cosmos – Sun and Electromagnetic radiation. Effects of the physical factors of the atmosphere on the man's organism.

LECTURE № 3 – 2 acad. hours

CLIMATE AND WEATHER. DISEASES DEPENDENT ON METEOROLOGICAL FACTORS. ACCLIMATIZATION. HEALTH EFFECTS OF AIR POLLUTION AND PREVENTION.

1. Climate. Diseases dependent on sharp changes of meteorological factors.
2. Weather. Acclimatization.
3. Air quality. Air pollutants and their effects.
4. Winter and Summer Smog – characteristic and health importance.
5. Prevention of Air pollution.

LECTURE № 4 – 2 acad. hours

HYGIENE REQUIREMENTS TO DRINKING WATER QUALITY.

1. Importance of Water as a major element of the biosphere.
2. World water sources.
3. Waterborne diseases.
4. Hygiene requirements to drinking water quality.

LECTURE № 5 – 2 acad. hours

HEALTH REQUIREMENTS TO WATER SUPPLY. WATER PURIFICATION AND DISINFECTION.

1. Water supply sources.
2. Systems of Water distribution.
3. Water purification and disinfection.
4. Water pollution.
5. Health protection of Water supplies.

LECTURE № 6 – 2 acad. hours

HYGIENE OF SOIL. DISPOSAL OF WASTES.

1. Soil structure and characteristic.
2. Chemical content and Soil pollution.
3. Microorganisms and protozoa in the Soil.
4. Disposal of Wastes – methods.
5. Disposal of Solid Wastes.
6. Disposal of Liquid Wastes.

LECTURE № 7 – 2 acad. hours

HYGIENE CHARACTERISTICS OF LIVING CONDITIONS IN THE AREAS. HYGIENE CHARACTERISTICS OF NOISE “POLLUTION” IN URBAN AREAS. URBANIZATION. HYGIENE CHARACTERISTICS OF THE HOUSING CONDITIONS.

1. Hygiene requirements to the Planning and Building in the areas.
2. Urban greening and public health.
3. Noise in urban areas – definition, sources, health effects, prevention and control.
4. Urbanization.
5. Hygiene characteristics of the Housing conditions.
6. Health effects related to hygiene conditions of the houses.

LECTURE № 8 – 2 acad. hours

HOSPITAL HYGIENE. COMMON HYGIENE REQUIREMENTS TO HOSPITALS.

1. Common hygiene requirements to Clinics and Medical centers.
2. Common hygiene requirements to the territory and planning of Hospitals.
3. Disposal of Hospital wastes.

LECTURE № 9 – 2 acad. hours

HYGIENE REQUIREMENTS TO THE SPECIAL HOSPITALS (CLINICS) WITH HIGH EPIDEMIOLOGICAL RISK.

1. Hygiene requirements to the Operating theatre (room).
2. Hygiene requirements to the Infectious diseases hospitals (clinics) and those for treatment of tuberculosis.
3. Hygiene requirements to the Children’s hospitals (clinics).
4. Hygiene requirements to the Hospitals (clinics) for delivery and gynaecological diseases.

5. Hygiene requirements to the Psychiatric hospitals.
6. Hygiene requirements to the Clinical pathology clinics.

LECTURE № 10 – 2 acad. hours

PERSONAL HYGIENE. PRINCIPLES OF HEALTHY LIFESTYLE.

1. Healthy lifestyle.
2. Conditioning and physical activity as the elements of the Healthy lifestyle.
3. Personal Hygiene.
4. Hygiene characteristics of washing means.
5. Hygiene characteristics of Dress materials and Shoes.

LECTURE № 11 – 2 acad. hours

IONIZING RADIATION. SOURCES AND BIOLOGICAL EFFECTS OF IONIZING RADIATION. OCCUPATIONAL AND MEDICAL EXPOSURE.

1. Main terms and radiation units.
2. Sources of Ionizing radiation. Occupational and Medical exposure.
3. Biological effects of Ionizing radiation.

LECTURE № 12 – 2 acad. hours

MAIN PRINCIPLES OF IONIZING RADIATION PROTECTION.

1. Main principles of protection.
2. Risk and control of Ionizing radiation (Ionizing radiation monitoring)
3. Practical measures for Ionizing radiation protection.

LECTURE № 13 – 2 acad. hours

CHILDHOOD AND ADOLESCENT HYGIENE. AGE PERIODS. GROWTH AND DEVELOPMENT OF CHILDREN. ACCELERATION. MORBIDITY AMONG CHILDREN AND ADOLESCENTS.

1. Age, morphological and physiological peculiarities among children and adolescents.
2. Growth and developmental age periods.
3. Growth and Development. Acceleration.
4. Characteristic of morbidity among children and adolescents.

LECTURE № 14 – 2 acad. hours

PHYSIOLOGICAL BASES OF SCHOOL EDUCATION. HYGIENE REQUIREMENTS TO DAILY REGIMEN OF CHILDREN AND ADOLESCENTS. PREVENTION OF SCHOOL FATIGUE AND EXHAUSTION. PHYSICAL CONDITIONING.

1. Physiological bases of school education.
2. Hygiene requirements to daily regimen of children and adolescent.
3. School fatigue and exhaustion – prevention.
4. Medical control on physical education.
5. Physical conditioning (training).

LECTURE № 15 – 2 acad. hours

HYGIENE OF WORK AND CAREER ORIENTATION IN SCHOOLS. HYGIENE REQUIREMENTS TO KINDERGARTENS AND SCHOOLS.

1. Hygiene of work and career orientation in schools.
2. Hygiene requirements to Crèches and Kindergartens.
3. Hygiene requirements to Schools.
4. Basic prophylactic tasks and activities of medical specialists in Kindergartens and Schools.

LECTURE № 16 – 2 acad. hours

HYGIENE OF NUTRITION. NUTRIENTS – PHYSIOLOGICAL IMPORTANCE, SOURCES AND NEEDS.

1. Hygiene of Nutrition – current issues and perspectives.
2. Nutrition as a biological and social process.
3. Nutrients – Macronutrients (Proteins, Fats and Carbohydrates) and Micronutrients (Vitamins and Minerals) – physiological importance, sources, and needs.

LECTURE № 17 – 2 acad. hours

FOODS – CLASSIFICATION, COMPOSITION, IMPORTANCE IN HUMAN NUTRITION.

1. Classification and hygiene evaluation of Foods.
2. Foods of animal origin.
3. Foods of vegetable origin.
4. Fats and Oils.
5. Beverages. Alcohol and Health.

LECTURE № 18 – 2 acad. hours

FOOD PROCESSING AND PRESERVATION.

1. Food processing.
2. Food preservation.
3. Functional foods and beverages.
4. Genetically modified foods.

LECTURE № 19 – 2 acad. hours

HEALTHY AND CURATIVE NUTRITION. ALTERNATIVE NUTRITION.

1. Healthy nutrition – principles. Bulgarian physiological norms of population's nutrition.
2. Curative nutrition – principles, importance.
3. Enteral and parenteral nutrition.
4. Alternative nutrition.

LECTURE № 20 – 2 acad. hours

NUTRITION OF DIFFERENT POPULATION'S GROUPS.

1. Nutrition of pregnant and lactating women.
2. Nutrition of children.
3. Nutrition of schoolchildren.

LECTURE № 21 – 2 acad. hours

NUTRITION OF DIFFERENT POPULATION'S GROUPS.

1. Nutrition of people engaged in mental work. Nutrition in case of stress.
2. Nutrition in sportsmen.
3. Nutrition in case of occupational hazards.
4. Nutrition of old people.

LECTURE № 22 – 2 acad. hours

FOODBORNE DISEASES.

1. Foodborne diseases- definition, classification.
2. Foodborne diseases as a result of biological food contamination. Prevention.
3. Foodborne diseases as a result of chemical food contamination. Prevention.
4. Non-microbial food poisoning. Prevention.
5. Diseases in result of super sensitiveness (“food allergy”).
6. Drug-nutrient interactions.

LECTURE № 23 – 2 acad. hours

FOODBORNE DISEASES.

1. Diseases in result of irregularly nutrition.
2. Undernutrition (inadequate, malabsorption) and over-nutrition.
3. Diseases because of non-balanced nutrition.

LECTURE № 24 – 2 acad. hours

CURRENT ISSUES IN OCCUPATIONAL HYGIENE (MEDICINE).

1. Occupationa Hygiene (Medicine) – subject, aim, tasks, methods. Current issues.
2. Work physiology.
3. Changes in the body during work
4. Work activity forms. Modern work-related problems.

LECTURE № 25 – 2 acad. hours

PHYSIOLOGY AND PSYCHOLOGY AT WORK. ERGONOMICS.

1. Work capacity.
2. Fatigue and Exhaustion.
3. Ergonomics – basic principles.
4. Ergonomics in the use of video display.
5. Psychology at work – professional stress.

LECTURE № 26 – 2 acad. hours

PHYSICAL HAZARDS IN WORKPLACE.

1. Occupational Noise, Ultrasound and Infrasound – definition, classification, sources, health effects, evaluation, prevention.
2. Occupational Vibrations – definition, classification, sources, health effects, evaluation, prevention.
3. Non-ionizing radiation – classification, sources, health effects, control measures.

LECTURE № 27 – 2 acad. hours

PHYSICAL HAZARDS AND DUST IN WORKPLACE.

1. Industrial microclimate (heat and cold) – definition, health effects, control measures.
2. Atmospheric pressure in workplace.
3. Dust and particulate – classification, composition, health effects and risk. Occupational prevention.

LECTURE № 28 – 2 acad. hours

CHEMICAL AND BIOLOGICAL HAZARDS IN WORKPLACE.

1. Chemical hazards – classification, toxic effects of hazardous substances.
2. Toxicology – toxicokinetics and toxicodynamics. Hazards, risks and risk assessment. Prevention of occupational diseases and poisoning.
3. Chemical hazards in workplace – toxic gases (chemical asphyxiants), heavy metals, organic solvents, pesticides.
4. Biological hazards in workplace – classification, characteristics.

LECTURE № 29 – 2 acad. hours

OCCUPATIONAL MEDICINE ISSUES IN HEALTHCARE, CHEMICAL AND TEXTILE INDUSTRY.

1. Adverse factors of the work process.
2. Characteristic of work.
3. Hazards in workplace – physical, chemical, biological, ergonomics, psychosocial.
4. Morbidity among healthcare workers.
5. Prophylactic measures.

LECTURE № 30 – 2 acad. hours

OCCUPATIONAL MEDICINE ISSUES IN MECHANICAL ENGINEERING AND METALLURGY.

1. Adverse factors of the work process.
2. Characteristic of work.
3. Hazards in workplace – physical, chemical, biological, ergonomics, psychosocial.
4. Morbidity among healthcare workers.
5. Prophylactic measures.

PRACTICES

PRACTICAL № 1 – 2 acad. hours

STATE HEALTH CONTROL - ORGANIZATION, STRUCTURE, PUBLIC HEALTH PROTECTION ACTIVITIES. REGIONAL HEALTH INSPECTION (RHI).

1. State Health Control – organization, structure, public health protection activities.
2. Regional Health Inspection (RHI) – structure and basic activities.
3. Hygiene norms and standards.
4. Laws, Ordinances and relative documents in the field of Hygiene.

PRACTICAL № 2 – 2 acad. hours

METHODS FOR AIR POLLUTION ANALYSIS. DETERMINATION OF CO₂, CO, SO₂, NO₂, LEAD AEROSOLS, DUST.

1. Air pollutants assessment. National system for air pollution monitoring.
2. Methods for sample collection – absorption and grab sampling.
3. Determination of CO, CO₂ and SO₂.
4. Determination of SO₂ and NO₂ in air samples.
5. Determination of Lead aerosols and Dust in environment and workplace.

PRACTICAL № 3 – 2 acad. hours

AIR QUALITY MONITORING (SITE VISIT/SEMINAR).

1. Air and noise pollution.

PRACTICAL № 4 – 2 acad. hours

HYGIENE INVESTIGATION AND EVALUATION OF MICROCLIMATE FACTORS.

1. Microclimate – definition, components, health importance.
2. Methods for hygiene investigation and evaluation of air temperature, air humidity, air velocity and IR radiation.
3. Results discussion.

PRACTICAL № 5 – 2 acad. hours

METHODS FOR COMPLEX MICROCLIMATE EVALUATION.

1. Methods for complex microclimate evaluation: a) Subjective methods – Questionnaire method for determination a subjective thermal sensation according to the 7-bale scale of Bedford, Effective Temperature (ET) index, Corrected Effective Temperature (CET) index, Fanger's comfort criteria for Predication of Thermal Comfort; b) Objective methods – Physical methods (Resulting Temperature (RT), Wet Bulb Globe Temperature (WBGT) index), Physiological methods (Pulse frequency, Blood pressure level, Vegetative Index of Kerdo, Average skin temperature, Average body temperature, Heat content of the body, Evaporative heat loss) and Integral methods (Heat Stress indices).
2. Complex microclimat evaluation using the appliance Thermal Comfort Date Logger.
3. Results discussion.

PRACTICAL № 6 – 2 acad. hours

HEALTH CONTROL OF WATER SUPPLIES AND DRINKING WATER – PRELIMINARY AND CURRENT. WATER SAMPLING. ORGANOLEPTIC (AESTHETIC), PHYSICAL AND CHEMICAL ANALYSIS OF DRINKING WATER.

1. Monitoring of drinking water.
2. Water sampling for chemical and microbiological analysis of drinking water.
3. Organoleptic (aesthetic) analysis of drinking water – determination of water color, odor, taste and turbidity.
4. Analysis of other (physical) drinking water parameters with indicative significance – determination of water hardness and water temperature.

5. Chemical analysis of drinking water – determination of pH, Oxidizability, Ammonia, Nitrite and Nitrate, Chloride and Sulphate.
6. Determination of Zinc and Copper in drinking water.
7. Results discussion. Health risk assessment.
8. Epidemiological methods for evaluation of water factor on public health.

PRACTICAL № 7 – 2 acad. hours

MICROBIOLOGICAL ANALYSIS OF DRINKING WATER. PURIFICATION AND DISINFECTION OF WATER.

1. Microbiological analysis of drinking water.
2. Purification of water – experimental coagulation.
3. Disinfection of water.
4. Chlorination – principles, methods for determination the residual chlorine in drinking water.
5. Purification of water on a small scale.

PRACTICAL № 8 – 2 acad. hours

HYGIENE EVALUATION OF HEATING, LIGHTING AND VENTILATION IN HOUSING, PUBLIC, INCLUDING HOSPITAL BUILDINGS.

1. Hygiene evaluation of Heating in housing, public including hospital buildings.
2. Hygiene evaluation of Ventilation – volume of adequate ventilation, actual volume of ventilation, ventilation rate.
3. Hygiene evaluation of Lighting – natural and artificial. Results discussion.

PRACTICAL № 9 – 2 acad. hours

HYGIENE INVESTIGATION OF HOSPITALS. HYGIENIC REQUIREMENTS TO SPECIAL HOSPITALS (CLINICS) WITH HIGH EPIDEMIOLOGICAL RISK. PREVENTION OF THE INTER-HOSPITAL INFECTIONS.

1. Hygiene requirements to special hospitals (clinics) with high epidemiological risk.
2. Hospital-acquired (nosocomial) infections – definition.
3. Control measures of nosocomial infections.
4. Prevention of nosocomial infections – principles. Discussion on the role of the physician in the prevention and control of hospital-acquired infections.

PRACTICAL № 10 – 2 acad. hours

COMMUNITY HYGIENE COLLOQUIUM.

1. Written (Test) examination.
2. Oral examination.

PRACTICAL № 11 – 2 acad. hours

MAIN PRINCIPLES OF IONIZING RADIATION SAFETY. RADIATION PROTECTION.

1. Radiation protection and safety conditions.
2. Ionizing radiation – main principles of protection.

3. Decontamination (deactivation). Ways and means for decontamination.
4. Introduction to the activity of the State Radiation Control Department at Regional Health Inspection Plovdiv.

PRACTICAL № 12 – 2 acad. hours

METHODS FOR CONTROL AND EVALUATION OF HEALTH STATUS AND PHYSICAL DEVELOPMENT OF CHILDREN AND ADOLESCENTS.

1. Growth and development monitoring of children and adolescents.
2. Methods for control and evaluation of child and adolescents' growth and development – anthropometry and somatoskopiya.
3. Health problems and career orientation in schools.

PRACTICAL № 13 – 2 acad. hours

HYGIENIC INVESTIGATION OF KINDERGARTENS AND SCHOOLS (SITE VISIT/SEMINAR).

PRACTICAL № 14 – 2 acad. hours

COLLOQUIUM IN IONIZING RADIATION HYGIENE AND CHILDHOOD AND ADOLESCENT HYGIENE.

1. Written (Test) examination.
2. Oral examination.

PRACTICAL № 15 – 2 acad. hours

SUMMARY ON PROBLEMS OF COMMUNITY HYGIENE, IONIZING RADIATION HYGIENE AND CHILDHOOD AND ADOLESCENT HYGIENE.

1. Discussion on problems of Community Hygiene.
2. Discussion on problems of Ionizing radiation Hygiene.
3. Discussion on problems of Childhood and Adolescent Hygiene.

PRACTICAL № 16 – 2 acad. hours

ASSESSMENT OF PERSONAL NUTRITION. METHODS FOR DETERMINATION OF DAILY ENERGY EXPENDITURE, NORMAL BODY WEIGHT, BODY MASS INDEX AND PERSONAL NUTRITIONAL REQUIREMENTS.

1. Role of the diet and nutrition in the prevention of chronic diseases */noncommunicable diseases (NCD)/*.
2. Assessment of personal nutrition. Methods for determination of daily energy expenditure.
3. Determination of normal body weight and body mass index (BMI).
4. Determination of personal nutritional requirements; population nutrient intake goals.
5. Principles of healthy nutrition.
6. Results discussion.

PRACTICAL № 17 – 2 acad. hours

DIETARY ASSESSMENT METHODS.

1. Dietary assessment methods.

2. Physiological norms of population's nutrition.
3. Making and evaluation a diet per person from determinate population group.

PRACTICAL № 18 – 2 acad. hours

ASSESSMENT OF NUTRITIONAL STATUS.

1. Nutritional status – definition.
2. Nutritional status – main indices and methods for assessment.
3. Hygienic assessment of different eating patterns – tasks to solve.

PRACTICAL № 19 – 2 acad. hours

NUTRITION OF DIFFERENT POPULATION'S GROUPS.

1. Nutrition of pregnant and lactating women.
2. Nutrition of children.
3. Nutrition of schoolchildren.

PRACTICAL № 20 – 2 acad. hours

ALIMENTARY PREVENTION OF NONCOMMUNICABLE DISEASES.

1. Alimentary prevention of noncommunicable diseases – risk factors, main principles of prevention.
2. Alimentary prevention of cardiovascular diseases.
3. Alimentary prevention of metabolic and metabolic diseases – obesity, diabetes mellitus, gout, osteoporosis.
4. Alimentary cancer prevention.

PRACTICAL № 21 – 2 acad. hours

HYGIENE INVESTIGATION OF FOOD PRODUCTS. HYGIENIC INVESTIGATION OF MEAT, MILK, BABY FOOD AND CANNED FOOD.

1. Hygiene investigation of Food products – indicators, stages.
2. Taking of Meat sample and sample analysis – organoleptic, chemical, microbiological, parasitological indicators.
3. Hygiene investigation of Milk – taking of Milk sample and organoleptic, chemical and biochemical analysis of milk.
4. Hygiene evaluation of Baby food and Canned food.
5. Results discussion.

PRACTICAL № 22 – 2 acad. hours

HYGIENE INVESTIGATION OF CATERING ESTABLISHMENTS. HACCP. (SITE VISIT/SEMINAR)

1. Hazard Analysis and Critical Control Point (HACCP).
2. Preliminary and current health control in Catering Establishments.
3. Hygiene requirements to Catering Establishments – building, food handling areas, equipment and utensils, food transport, delivery, storage, handling, cooking and cooked foods, washing up.
4. Requirements in personal appearance and health status of food handlers.

PRACTICAL № 23 – 2 acad. hours

PREVENTION OF FOODBORNE DISEASES AS A RESULT OF BIOLOGICAL AND CHEMICAL CONTAMINATION OF FOOD. DUTIES OF MEDICAL SPECIALIST IN THE CASE OF FOODBORNE OUTBREAK.

1. Duties of medical specialist in the case of foodborne outbreak.
2. Discussion on the cases of foodborne diseases.
3. Foodborne diseases – control and preventive measures.

PRACTICAL № 24 – 2 acad. hours

NUTRITION HYGIENE COLLOQUIUM.

1. Written (Test) examination.
2. Oral examination.

PRACTICAL № 25 – 2 acad. hours

ERGONOMIC AND PSYCHOLOGICAL HAZARDS IN WORKPLACE. PSYCHOLOGICAL AND NEUROCOGNITIVE APPROACHES TO THE ASSESSMENT OF WORK CAPACITY AND FATIGUE.

1. Methods for assessment of Work capacity and Fatigue.
2. Methods for investigation of Nervous system – attention, memory, tremometriya, time of reaction.
3. Results discussion.
4. Preventive measures.

PRACTICAL № 26 – 2 acad. Hours

PHYSICAL HAZARDS IN WORKPLACE. HYGIENE ASSESSMENT OF NOISE AND VIBRATIONS.

1. Hygiene assessment and measurement of Noise – definition, measurement, personal hearing protection, audiometric testing.
2. Hygiene assessment and measurement of Occupational Vibrations – definition, measurement, control measures, prevention.

PRACTICAL № 27 – 2 acad. hours

CHEMICAL AND BIOLOGICAL HAZARDS IN WORKPLACE. HYGIENE-TOXICOLOGICAL EVALUATION OF CHEMICALS. HYGIENE CONTROL IN THE USE OF PESTICIDES.

1. Toxikometry of chemical substances using in industry and agriculture. Pesticides – definition, classification, toxicity, exposure.
2. Duties of medical specialists in the use of Pesticides.
3. Hygiene control in the use of Pesticides. Methods for Pesticides application – presentation.
4. Medical tests for the effects of Organophosphorous and Carbamate pesticide exposure.
5. Preventing pesticide exposure, protective clothing, and personal safety.
6. Occupational medicine issues in Agriculture.

PRACTICAL № 28 – 2 acad. hours

OCCUPATIONAL MEDICINE ISSUES IN SOME ECONOMIC BRANCHES (SITE VISIT/SEMINAR)

1. Occupational medicine issues in Healthcare.
2. Occupational medicine issues in Chemical industry.
3. Occupational medicine issues in Textile industry.
4. Occupational medicine issues in Mechanical engineering.
5. Occupational medicine issues in Metallurgy.

PRACTICAL № 29 – 2 acad. hours

OCCUPATIONAL MEDICINE COLLOQUIUM.

1. Written (Test) examination.
2. Oral examination.

PRACTICAL № 30 – 2 acad. hours

OCCUPATIONAL HEALTH SERVICE – SUBJECT, MAIN TASKS, ACTIVITIES, RESPONSIBILITIES AND DUTIES.

1. Subject, main tasks and activities of the Occupational health service.
2. Responsibilities and duties of the Occupational health service.

BIBLIOGRAPHY

1. Hygiene and Medical Ecology (Textbook for medical and dental students) edited by Prof. P. Gatseva, Lax Book Plovdiv, 2016. ISBN: 978-619-189-042-2
2. Hygiene and Ecology (Handbook for practical exercises for medical students) edited by Assoc. Prof. P. Gatseva, Medical Publ. House VAP Plovdiv, 2011. ISBN: 978-954-8326-47-6
3. Lecture and Practical Course in Hygiene.

CONSPECTUS IN HYGIENE AND ECOLOGY

THEORETICAL PART

1. Hygiene as a main prophylactic medical science – subject, aim, tasks, branches, methods. Current hygiene environmental issues.
2. Atmosphere – importance and structure. Air composition.
3. Air pollutants (classification, sources) and their health effects. Winter and summer smog – characteristic and health importance. Prevention of air pollution.
4. Hygiene characteristic of physical factors of the atmosphere.
5. Climate and weather. Diseases dependent on meteorological factors. Acclimatization.
6. Importance of water as a major element of the biosphere. Waterborne diseases.
7. Hygiene requirements to drinking water quality.
8. Hygiene requirements to water distribution – water supply sources and systems of water distribution. Health protection of water supplies.
9. Water purification and disinfection.

10. Hygiene of soil. Soil structure, physical characteristic and chemical content. Microorganisms and protozoa in the soil. Soil pollution. Disposal of solid and liquid wastes.
11. Hygiene characteristics of living conditions in the areas. Hygiene requirements to the planning and building in the areas. Urban greening and public health. Noise in urban areas – definition, sources, health effects, prevention and control. Urbanization.
12. Hygiene characteristics of the housing conditions. Health effects related to hygiene conditions of the houses.
13. Hospital hygiene. Common hygiene requirements to hospitals. Disposal of hospital wastes.
14. Hygiene requirements to hospitals (clinics) with high epidemiological risk – infectious diseases hospitals (clinics) and those for treatment of tuberculosis, children's hospitals (clinics), psychiatric hospitals.
15. Hygiene requirements to hospitals (clinics) with high epidemiological risk – operating theatre (room), hospitals (clinics) for delivery and gynaecological diseases, clinical pathology clinics.
16. Healthy lifestyle. Conditioning and physical activity as the elements of the healthy lifestyle.
17. Personal hygiene. Hygiene characteristics of washing means. Hygiene characteristics of dress materials and shoes.
18. Ionizing radiation. Sources of ionizing radiation. Occupational and medical exposure.
19. Biological effects of ionizing radiation.
20. Risk and control of ionizing radiation (ionizing radiation monitoring). Main principles of protection.
21. Hygiene of nutrition. Proteins, fats and carbohydrates – physiological importance, sources and needs. Dietary fibre.
22. Vitamins – physiological importance, sources and needs. Antivitamins.
23. Minerals – physiological importance, sources and needs.
24. Hygiene importance of milk and dairy products, eggs.
25. Hygiene importance of meat, fish and their products.
26. Foods of vegetable origin – cereals, wheat, vegetables and fruit, pulses (legumes) and nuts, spices.
27. Sugar, sugar products and honey. Fats and oils. Alcohol. Beverages.
28. Functional foods and beverages. Genetically modified foods.
29. Food processing and preservation.
30. Healthy nutrition – main principles. Curative nutrition – principles, importance. Enteral and parenteral nutrition. Alternative nutrition.
31. Nutrition of pregnant and lactating women.
32. Nutrition of children and schoolchildren.
33. Nutrition of people engaged in mental work. Nutrition in case of stress. Nutrition in sportsmen. Nutrition in case of occupational hazards.
34. Nutrition of old people.
35. Foodborne diseases as a result of biological food contamination. Prevention.
36. Foodborne diseases as a result of chemical food contamination. Prevention.
37. Diseases in result of super sensitiveness (“food allergy”). Drug-nutrient interactions.
38. Diseases in result of irregularly nutrition.

39. Diseases because of non-balanced nutrition – obesity, cardiovascular diseases, cancer, diabetes mellitus, gout.
40. Occupational hygiene (medicine) – subject, aim, tasks. Work activity forms. Modern work-related problems. Occupational health service.
41. Physiology of work. Changes in the body during work.
42. Work capacity, fatigue and exhaustion.
43. Ergonomics – basic principles. Ergonomics in the use of video display.
44. Physical hazards in workplace – industrial microclimate and atmospheric pressure.
45. Physical hazards in workplace – noise, ultrasound and infrasound, occupational vibrations.
46. Non-ionizing radiation in workplace – ultraviolet radiation, infrared radiation, radiofrequency radiation, extremely low frequency radiation and static fields, lasers.
47. Dust and particulate – classification, composition, health effects and risk. Occupational prevention.
48. Chemical hazards in workplace – classification, toxic effects of hazardous substances. Toxicology – toxicokinetics and toxicodynamics. Hazards, risks and risk assessment. Prevention of occupational diseases and poisoning.
49. Chemical hazards in workplace – heavy metals. Occupational health risk. Prevention.
50. Chemical hazards in workplace – toxic gases. Occupational health risk. Prevention.
51. Chemical hazards in workplace – organic solvents. Occupational health risk. Prevention.
52. Chemical hazards in workplace – pesticides. Occupational health risk. Prevention.
53. Occupational medicine issues in Healthcare.
54. Occupational medicine issues in Chemical industry.
55. Occupational medicine issues in Textile industry.
56. Occupational medicine issues in Mechanical engineering.
57. Occupational medicine issues in Metallurgy.
58. Occupational medicine issues in Agriculture.
59. Childhood and adolescent hygiene. Age, morphological and physiological peculiarities among children and adolescents. Growth and developmental age periods.
60. Child and adolescent growth and development. Acceleration. Characteristic of morbidity among children and adolescents.
61. Physiological bases of school education. Hygiene requirements to daily regimen of children and adolescent. School fatigue and exhaustion – prevention.
62. Physiological bases of physical education. Medical control on physical education.
63. Hygiene of work and career orientation in schools.
64. Hygiene requirements to Crèches and Kindergartens.
65. Hygiene requirements to Schools.

PRACTICAL PART

1. State health control – organization, structure, public health protection activities. Regional health inspection (RHI).
2. Methods for hygienic investigation and evaluation of main physical factors of the air – Air Temperature and Air Humidity.
3. Methods for hygienic investigation and evaluation of main physical factors of the air – Air Velocity and IR radiation.

4. Subjective methods for complex microclimate evaluation.
5. Objective methods for complex microclimate evaluation — physical, physiological and integral methods.
6. Air pollutants. Air sampling for gases and vapors. Monitoring of air pollution.
7. Determination of CO and CO₂, SO₂ and NO₂ in air samples.
8. Determination of Lead aerosols and dust in air samples.
9. Methods for hygienic investigation of water supplies and drinking water.
10. Water sampling for chemical and microbiological analysis. Monitoring of drinking water.
11. Organoleptic (aesthetic) and physical analysis of drinking water.
12. Chemical analysis of drinking water – pH-range, Oxidizability, Chloride, Sulfate.
13. Chemical analysis of drinking water – Ammonia, Nitrite, Nitrate.
14. Microbiological analysis of drinking water.
15. Purification of drinking water – experimental coagulation. Disinfection of drinking water – chlorination, principles, methods for determination the residual chlorine in drinking water. Disinfection of water on a small scale.
16. Hygienic evaluation of heating, lighting and ventilation in housing, public including hospital buildings.
17. Main principles of protection of external exposure and closed devices, and open sources of radiation. Decontamination (deactivation).
18. Assessment of personal nutrition. Methods for determination of daily energy expenditure, personal nutritional requirements and normal body weight.
19. Dietary assessment methods.
20. Nutritional status – main indices and methods for assessment. Hygienic assessment of different eating patterns.
21. Food health control – indicators, stages.
22. Hygiene evaluation of meat. Taking of the meat samples. Laboratory tests.
23. Hygiene evaluation of milk. Taking of the milk samples. Laboratory tests.
24. Hygiene evaluation of baby foods and canned foods.
25. Foodborne diseases – control and preventive measures. Duties of medical specialist in the case of foodborne disease outbreak.
26. Hygiene requirements to catering establishments. Hazard Analysis and Critical Control Point (HACCP).
27. Neurocognitive approaches to the assessment of work capacity and fatigue – investigation of the nervous system and analyzers.
28. Hygiene-toxicological evaluation of chemicals. Principles of hygiene norms of chemical substances. Main criteria for assessment.
29. Health control in the use of pesticides. Duties of medical specialist in the use of pesticides. Tests for the effects of organophosphorous and carbamate pesticide exposure.
30. Hygiene assessment and measurement of noise and occupational vibrations.
31. Methods for control and evaluation of child and adolescents' growth and development – anthropometry and somatoskopiya.

CONSPECTUS IN HYGIENE FOR STATE EXAM

as a part of the state exam of Hygiene, Epidemiology, Infectious diseases and Social medicine

1. Hygiene as a main prophylactic medical science – subject, aim, tasks, branches, methods. Current hygiene environmental issues.
2. Atmosphere – importance and structure. Air composition.
3. Air pollutants (classification, sources) and their health effects. Winter and summer smog – characteristic and health importance. Prevention of air pollution.
4. Hygiene characteristic of physical factors of the atmosphere.
5. Climate and weather. Diseases dependent on meteorological factors. Acclimatization.
6. Importance of water as a major element of the biosphere. Waterborne diseases. Hygiene requirements to drinking water quality.
7. Hygiene requirements to water distribution – water supply sources and systems of water distribution. Water purification and disinfection. Health protection of water supplies.
8. Hygiene of soil. Soil structure, physical characteristic and chemical content. Microorganisms and protozoa in the soil. Soil pollution. Disposal of solid and liquid wastes.
9. Hygiene characteristics of living conditions in the areas. Hygiene requirements to the planning and building in the areas. Urban greening and public health. Noise in urban areas – definition, sources, health effects, prevention and control. Urbanization.
10. Hygiene characteristics of the housing conditions. Health effects related to hygiene conditions of the houses.
11. Hospital hygiene. Common hygiene requirements to hospitals. Disposal of hospital wastes.
12. Hygiene requirements to hospitals (clinics) with high epidemiological risk – infectious diseases hospitals (clinics) and those for treatment of tuberculosis, children's hospitals (clinics), psychiatric hospitals.
13. Hygiene requirements to hospitals (clinics) with high epidemiological risk – operating theatre (room), hospitals (clinics) for delivery and gynaecological diseases, clinical pathology clinics.
14. Healthy lifestyle. Conditioning and physical activity as the elements of the healthy lifestyle.
15. Personal hygiene. Hygiene characteristics of washing means. Hygiene characteristics of dress materials and shoes.
16. Ionizing radiation. Sources of ionizing radiation. Occupational and medical exposure.
17. Biological effects of ionizing radiation.
18. Risk and control of ionizing radiation (ionizing radiation monitoring). Main principles of protection.
19. Hygiene of nutrition. Proteins, fats and carbohydrates – physiological importance, sources and needs. Dietary fibre.
20. Vitamins – physiological importance, sources and needs. Antivitamins.
21. Minerals – physiological importance, sources and needs.
22. Hygiene importance of milk and dairy products, eggs.
23. Hygiene importance of meat, fish and their products.
24. Foods of vegetable origin – cereals, wheat, vegetables and fruit, pulses (legumes) and nuts, spices.

25. Sugar, sugar products and honey. Fats and oils. Alcohol. Beverages.
26. Functional foods and beverages. Genetically modified foods.
27. Food processing and preservation.
28. Healthy nutrition – main principles. Curative nutrition – principles, importance. Enteral and parenteral nutrition. Alternative nutrition.
29. Nutrition of pregnant and lactating women.
30. Nutrition of children and schoolchildren.
31. Nutrition of people engaged in mental work. Nutrition in case of stress. Nutrition in sportsmen. Nutrition in case of occupational hazards.
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MEDICAL UNIVERSITY - PLOVDIV
MEDICAL FACULTY
SECOND DEPARTMENT OF INTERNAL MEDICINE
WITH SECTION OF OCCUPATIONAL DISEASES

SYLLABUS
IN
OCCUPATIONAL DISEASES AND TOXICOLOGY

Approved by the Department Council - Protocol №49/25.05.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

OCCUPATIONAL DISEASES AND TOXICOLOGY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
		Total	Lectures	Practices	ECTS			III year VI
Occupational diseases and toxicology	VI	45	15	30	1.5	0.5	2.0	1/2

DISCIPLINE: OCCUPATIONAL DISEASES AND TOXICOLOGY

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:
Obligatory

LEVEL OF QUALIFICATION: Master /M/

FORMS OF TRAINING: Lectures, exercises, self-preparation.

YEAR OF TRAINING: III year

DURATION OF TRAINING: One semester

ACADEMIC HOURS: 15 hours lectures, 30 hours practical exercises

EDUCATIONAL AIDS/ TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia products; audio-visual materials; authentic materials, posters, disease stories, projects, tables, diagrams, and other non-verbal visuals, consistent with the objectives of the lectures and exercises; discussions; demonstration of clinical cases and diagnostic methods and devices; clinical data and paraclinical studies for diagnosis and interpretation; therapeutic agents and schematics of nosological units; normative documents on occupational diseases related to the disclosure of a procedure for the recognition of the occupational origin of a disease, criteria for occupational diagnosis of diseases, list of occupational diseases, etc.; practical situational tasks; reference materials for developing students' skills for individual work; thematic referrals; preventive programs.

FORMS OF EVALUATION: Current assessment, tests, elaboration of an essay.

EVALUATION CRITERIA: An average grade for each semester is formed.

ASPECTS OF EVALUATION CRITERIA: Participation in discussions, solving of tests, elaboration of an essay.

SEMESTER EXAM: Yes / Incoming Test, Written and Oral Exam.

STATE EXAM: No.

LECTURER: Habilitated lecturers from the Department of Occupational Diseases and Toxicology.

DEPARTMENT: SECOND DEPARTMENT OF INTERNAL MEDICINE

ANNOTATION

The course "Occupational Diseases and Toxicology" enables: to acquire knowledge about the etiological risk factors of the working environment and the labor process (physical, chemical, biomechanical, biological, dust, fibers, aerosols, gases, smoke and vapors) pharmaceuticals, technical fluids, toxic gases, plant and animal poisons, drugs) and the circumstances in which they may arise; awareness of the pathophysiological mechanisms that determine occupational diseases and household intoxications; knowledge of typical clinical manifestations of the impact of occupational risk factors and xenobiotics on the human body; acquisition of diagnostics and treatment skills, poison recognition methods and first-aid poisoning, specializing in specific detoxication and antidote healing techniques; knowledge of the criteria for occupational diagnosis of diseases, disclosure of a procedure for the regulation of occupational disease; awareness of the expertise of occupational diseases; preventive measures.

BASIC AIMS OF THE DISCIPLINE

- Acquiring and learning of knowledge and skills for diagnosis and adequate behavior in patients with suspected occupational disease or acute poisoning with xenobiotics:
 - absorption of the peculiarities of occupational and toxicological history and physical status;
 - objectification of occupational risks: interpretation of the production characteristic, protocols for the investigation of the working environment and other documents on occupational exposure;
- Formation of a working diagnosis and differential diagnosis;
 - appointment of basic and specific studies;
 - Clinical evaluation - interpretation of laboratory and instrumental data, development of specific and non-specific complexes of syndromes, differential diagnosis, and acquisition of skills for a correct therapeutic approach;
- behavior in first medical aid, early specialized care, treatment;
- acquainting with the normative documents related to occupational diseases and skills to manage them;
- knowledge of the differences between occupational disease, occupational accidents and work-related diseases;
- knowledge of the principles for the diagnosis of occupational diseases and the criteria for assessing the occupational origin of the diseases;
- knowledge of the principles of occupational disease expertise;
- preparation of documentation with specificity for toxicology and occupational diseases;
- application of all modern forms, methods and means for primary (prevention of the occurrence of occupational disease), secondary (early detection of occupational disease) and tertiary (elimination of long-term effects of occupational disease and improvement of patient prognosis) prevention as a collection of medical and non-medical events to achieve better health and quality of life through isolation of risk factors (prevention of premorbidity), disease prevention reducing their consequences.

EXPECTED RESULTS

After completing the training, students must:

- be familiar with the normative documents related to occupational diseases and skills to manage them;
- have mastered knowledge of the most common occupational diseases, occupational accidents and work-related illnesses and behavior;

- have acquired professional knowledge of acute and chronic chemical trauma and mode of action in such pathology;
- have knowledge of the principles of prevention and expertise of these disabilities.

LECTURES PROGRAM

III COURSE, VI SEMESTER

№	Theme	Hours	Date
1.	Introduction to occupational pathology - definition, classification, list of occupational diseases. Basic principles of diagnostics, treatment, expertise and medical prophylaxis. Occupational poisoning with metals - lead, mercury, cadmium, manganese, chromium, nickel, arsenic - absorption, metabolism, excretion, pathogenesis, clinical manifestations, early diagnosis, differential diagnosis, treatment. Principles of antidote therapy.	2 h.	
2.	Basics of clinical toxicology - current epidemiology, basic notions, toxic aggression, physiological and medical antitoxic protection.	2 h.	
3.	Chronic occupational intoxications with organic solvents - benzene, benzene, amino and nitro derivatives of benzene - clinic, diagnostics, exposition tests, treatment. Occupational intoxications with synthetic resins and plastics - classification, pathogenesis, clinical manifestations, treatment, expertise. Occupational intoxications with gaseous chemical compounds - chlorine, sulfur, nitrogen, fluorine and CO. Pesticide intoxications - classification, pathogenesis, clinical manifestations, treatment, prophylaxis.	2 h.	
4.	Behavior of the doctor in acute poisoning - Scheme 10. Essence. Toxicological diagnosis - Symptoms and syndromes, degree of severity.	2 h.	
5.	Pneumoconiosis - classification, etiopathogenesis. Silicosis, silicosis - asbestosis, talcosis, kaolinos, coal pneumoconiosis - clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise. Occupational neoplasms	2 h.	
6.	Occupational diseases of the nervous system (radiculopathy, mono- and polyneuropathies, encephalopathies) and musculoskeletal (epicondylitis, tendomyositis, de Quervain's disease, tendonitis, periarthritis, bone-injuries). Vibration disease - classification, etiopathogenesis, clinical manifestations, treatment, expertise and prophylaxis.	2 h.	
7.	Occupational allergic diseases. Occupational bronchial asthma. Bisinosis. Hypersensitive pneumonitis. Occupational skin diseases. Etiopathogenesis, criteria for diagnosis, differential diagnosis, treatment, medical expertise.	3 h.	
8.	Occupational diseases of the hearing, vestibular and visual analyzer, upper respiratory tract. Occupational diseases due to biological factors.	1 h.	

All: 15h.

PRACTICAL EXERCISE PROGRAM ON OCCUPATIONAL DISEASES

III COURSE, VI SEMESTER

№	Theme	Hours	Date
1.	Basics of occupational pathology. Definition, classification, list of occupational diseases. Basic principles of diagnostics, treatment, expertise and medical prophylaxis.	2 h.	
2.	Occupational metal intoxications - diagnostic principles and criteria and labor-expert assessment.	2 h.	
3.	Occupational plastics disorders.	2 h.	
4.	Pneumoconioses - definition, classification. Silicosis. Silicatoses.	2 h.	
5.	Occupational allergic diseases - etiology, diagnostic criteria, treatment, expertise. Chronic occupational bronchitis - classification, etiopathogenesis, diagnosis, criteria for occupational diagnosis, treatment, expertise.	2h.	
6.	Occupational diseases of the nervous and musculoskeletal system.	2 h.	
7.	Vibration disease due to hand-arm and whole-body vibration exposure. Principles and methods of diagnosis of occupational diseases by vibration and biomechanical factors.	3 h.	

All: 15 h.

CLINICAL TOXICOLOGY PRACTICAL EXERCISE PROGRAM

III COURSE, VI SEMESTER

№	Theme	Hours	Date
1.	Outpatient and inpatient toxicological assistance in Bulgaria. Regional Toxicology Center - structure and functions. Allergic and Toxic-Allergic Shock Etiology, Pathogenesis, Clinic. Emergency pre-hospital and stationary medical care. Behavior of the physician and other medical professionals.	3 h.	
2.	Pathogenesis of poisoning. Basic methods of diagnosis and treatment. Behavior of the doctor and medical specialists in acute poisoning at the pre-hospital stage - practical lifesaving and detox procedures.	2 h.	
3.	Acute poisoning with leading cerebral depression syndrome (benzodiazepines, barbiturates and neuroleptics) - diagnosis, first-aid and practically life-saving behavior of the physician. Major healing measures at the station. Closest differential diagnostics options.	2 h.	
4.	Acute poisoning with drugs affecting the cardiovascular system (antihypertensive, digitalis glucosides, diuretics) - diagnosis, first medical care and life-saving behavior of the physician. Major healing measures at the station.	2 h.	
5.	Acute poisoning with biocides (organophosphates, carbamates and pyrethroids). Acute poisoning with technical preparations - acids, bases, antifreeze - diagnosis, first medical care and life-saving behavior of the physician. Major healing measures at the station.	2 h.	
6.	Poisoning with biological poisons - snake poison, arthropods, mushrooms. Diagnosis, peculiarities of the clinical picture of phaloid mushroom intoxication, emergency pre-hospital medical care, treatment at the station.	2 h.	
7.	Acute poisoning with drugs (heroin, amphetamines) and alcohol (ethyl, methyl). Life-saving practical pre-hospital and stationary medical care.	2h.	

All: 15 ч.

LECTURES - THESES

LECTURE № 1 – 2 hours

INTRODUCTION IN OCCUPATIONAL PATHOLOGY. OCCUPATIONAL INTOXICATIONS WITH METALS

1. Definition according to Ordinance on the Procedure for Notification, Registration, Confirmation, Appealing and Reporting of Occupational Diseases
2. Classification of occupational diseases.
3. List of occupational diseases.
4. Basic principles of diagnostics, treatment, expertise.
5. Paraoccupational diseases.
6. Prophylaxis of occupational diseases and disorders.
7. Occupational intoxications with lead /chronic saturnism/, mercury /chronic mercurialism/, manganese, cadmium, chromium, nickel, arsenic:
 - absorption, metabolism, excretion,
 - Etiopathogenesis,
 - Clinical manifestations,
 - Diagnosis
 - Treatment
 - Medical expertise and prophylaxis.

LECTURE № 2 – 2 hours

FOUNDATIONS OF CLINICAL TOXICOLOGY

1. Basics of clinical toxicology - basic concepts, toxic aggression, physiological and medical antitoxic protection.

A brief history of toxicology from ancient times to the present day.

Current epidemiology.

Types of intoxications - classifications.

Basic concepts in general toxicology:

- Poison,
- poisoning,
- toxicity,

- dose,
- critical effect,
- material and functional cumulation,
- acute and chronic intoxication,
- habit,
- remote effects,
- an allergic effect,
- idiosyncrasy.

Toxic aggression:

- local toxic effects
- general toxic processes.

Disabling mechanisms and phenomena.

Natural (physiological) detoxification:

- toxicokinetics
- spontaneous mechanical detoxification
- metabolic detoxification - metabolism, excretion.

LECTURE № 3 – 2 hours

OCCUPATIONAL CHRONIC INTOXICATIONS WITH ORGANIC SOLVENTS, SYNTHETIC RESINS AND PLASTICS, GASEOUS CHEMICAL COMPOUNDS, PESTICIDES

- Occupational poisoning with organic solvents - benzene, amino and nitro derivatives of benzene:
 - 1.1. Etiopathogenesis,
 - 1.2. Clinical manifestations,
 - 1.3. Diagnostics, exposure tests,
 - 1.4. Treatment,
 - 1.5. Medical expertise and prophylaxis.
 - 1.6. Clinic, diagnosis, exposure tests, treatment.
- Occupational damages from acids and alkalis.
- Occupational poisoning with monomers of synthetic resins and plastics:
 - 3.1. Classification of polymers,
 - 3.2. Etiopathogenesis,
 - 3.3. Clinical manifestations,
 - 3.4. Diagnosis,
 - 3.5. Treatment and medical expertise.
- Occupational injuries from irritating vapors and gases:

- 4.1. Etiopathogenesis,
- 4.2. Clinical manifestations,
- 4.3. Diagnosis,
- 4.4. Treatment,
- 4.5. Medical expertise and prophylaxis.
5. Pesticide intoxications - classification, pathogenesis, clinic, treatment, prophylaxis.
- 5.1. Classification,
- 5.2. Pathogenesis,
- 5.3. Clinical manifestations,
- 5.4. Diagnosis,
- 5.5. Treatment and medical expertise.

LECTURE № 4 - 2 hours

BEHAVIOR OF THE PHYSICIAN IN ACUTE POISONING

Acute exogenous poisoning medical protection:

- Behavior of the physician - scheme 10. Essence.

Toxicological diagnosis - symptoms and poisoning syndromes.

- Characteristics of the history, the removal of physical status, laboratory and instrumental research.
- Place of the toxico-chemical analysis in the toxicological diagnosis.
- Degree of severity - technology, criteria.

LECTURE № 5 - 2 hours

PNEUMOCONIOSES. OCCUPATIONAL NEOPLASMS

1. Classification of pneumoconiosis.
2. Silicosis - etiology, pathogenesis, clinic, diagnosis, differential diagnosis, treatment, medical expertise, prophylaxis.
3. Silicases - asbestosis, talcosis, kaolinosis: etiology, pathogenesis, clinic, diagnosis, differential diagnosis, treatment, medical expertise, prophylaxis.
4. Coal pneumoconiosis - etiology, pathogenesis, clinic, diagnosis, differential diagnosis, treatment, medical expertise, prophylaxis.
5. Occupational neoplasms
 - Etiopathogenesis,
 - Clinic,
 - Diagnostics,
 - Treatment,
 - Medical expertise and prevention.

LECTURE № 6 - 2 hours

OCCUPATIONAL DISEASES OF THE NERVOUS AND MUSCLE-SKELETTE SYSTEM. VIBRATION DISEASE

1. Occupational diseases of the peripheral nervous system: radiculitis, mononeuropathies, polyneuropathies - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.
2. Occupational diseases of the central nervous system: cerebrovasia, encephalopathy - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.
3. Occupational diseases of the musculoskeletal system: tendosoma, epicondylitis, tendonitis, periarthrititis, arthrosis, osteoporosis - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.
4. Prophylaxis of occupational diseases of the nervous and musculo-skeletal system.
5. Vibration disease:
 - Classification,
 - Etiopathogenesis,
 - Clinical manifestations,
 - Diagnosis and differential diagnosis,
 - Treatment,
 - Medical expertise,
 - Prophylaxis.

LECTURE № 7 - 2 hours

OCCUPATIONAL ALLERGIC DISEASES. OCCUPATIONAL SKIN DISEASES

1. Classification of occupational allergic diseases.
2. Occupational allergic diseases of the lungs.
 - 2.1. Occupational bronchial asthma - etiopathogenesis, criteria for diagnosis, differential diagnosis, treatment, medical expertise.
 - 2.2. Bisinosis - Etiology, Pathogenesis, Diagnosis, Differential Diagnosis, Treatment, Medical Examination.
 - 2.3. Hypersensitivity pneumonitis - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.
3. Occupational allergic diseases of the upper respiratory tract - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.
4. Occupational allergic skin diseases: dermatitis, eczema - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.

1. Occupational allergic diseases of the visual analyzer - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.
2. Prophylaxis of occupational allergic diseases.
3. Occupational skin diseases.

LECTURE № 8 – 1 hour

OCCUPATIONAL DISEASES OF HEARING. VESTIBULAR AND VISION ANALYZER AND UPPER RESPIRATORY PATHWAYS. OCCUPATIONAL DISEASES BY BIOLOGICAL FACTORS.

1. Occupational hearing impairment:
 - Etiopathogenesis,
 - Clinical manifestations,
 - Diagnosis,
 - Treatment,
 - Medical expertise,
 - Prophylaxis.
2. Occupational Vestibulopathies:
 - Etiology,
 - Clinical characteristics,
 - Diagnosis,
 - Treatment and prophylaxis.
3. Occupational eye diseases.
4. Occupational diseases of the upper respiratory tract:
 - Etiology,
 - Clinical manifestations,
 - Treatment and prophylaxis.
5. Occupational diseases by biological agents - criteria for occupational diagnosis.

PRACTICAL EXERCISES - THESES

OCCUPATIONAL DISEASES

EXERCISE № 1 - 2 hours

FOUNDATIONS OF OCCUPATIONAL PATHOLOGY - INITIAL EXERCISE

1. Definition of occupational disease and occupational accident.
2. Classifications.
3. Taking occupational history and analyzing the data.

- To acquaint the students with the main normative documents in the field of occupational medicine;
 - An administrative procedure for the regulation of an occupational disease; occupational accident, differences between occupational disease and occupational accidents;
 - Specific legal consequences for the confirmation of an occupational disease; Ordinance on the Procedure for Notification, Registration, Confirmation, Appeal and Reporting of Occupational Diseases;
 - List of occupational diseases.
4. Criteria for diagnosis and assessment of occupational diseases.
 5. Basic principles of treatment, expertise and medical prophylaxis.

EXERCISE № 2 - 2 hours

OCCUPATIONAL INTOXICATIONS

1. To acquaint students with the most common occupational intoxications, etiology, pathogenesis, clinical picture, organotropism, specificity of toxic effects, principles and criteria in diagnostics and labor-expert assessment of patients with occupational intoxications, treatment:
 - lead poisoning;
 - mercury poisoning and organic and inorganic mercury compounds;
 - cadmium poisoning;
 - manganese poisoning;
 - poisoning with arsenic, copper, zinc, nickel and chromium (toxic effects, carcinogenic risk);
 - poisoning with organic solvents.
2. Laboratory constellations in chronic occupational poisoning.
3. Presentation and discussion of clinical cases.
4. Individual work with patients.

EXERCISE № 3 - 2 hours

OCCUPATIONAL HAZARDS IN PLASTIC INDUSTRY

1. Definition, classification.
2. The most common intoxications with plastics - specificity of toxic effects, clinical picture, diagnostics, treatment, labor-expert assessment, carcinogenic risk:
 - Ethylene
 - Styrene
 - Methyl methacrylate
 - Acrylonitrile
 - Isocyanates.
3. Vinyl chloride:
 - Peculiarities of acute and chronic toxic effects, carcinogenic risk;
 - Vinyl chloride disease - clinical picture, diagnostic criteria, treatment, labor-expert assessment.
4. Individual work with patients, discussions.

EXERCISE № 4 - 2 hours

PNEUMOCONIOSES

1. Definition, classifications.
2. Pathogenesis.
3. Silicosis - definition, etiology, pathogenesis, clinical-radiographic-morphological and ILO classification, clinical picture, special forms of silicosis, diagnostic criteria, differential diagnosis, treatment, labor-expert assessment.
Presentation and discussion of clinical cases.
Demonstration of pulmonary imaging in silicosis patients.
4. Silicatosis - definition, classification.
 - Asbestos induced occupational injuries - classification.
Clinical picture, diagnosis, differential diagnosis, treatment, and labor-expert assessment of pulmonary asbestosis.
Asbestos as a carcinogen.
 - Talcosis
5. Coal pneumoconiosis - definition, etiology, pathogenesis, forms, clinical picture, diagnosis, treatment, labor-expert assessment.
6. Individual work with patients, discussions.

EXERCISE № 5 - 2 hours

OCCUPATIONAL ALLERGIC DISEASES. OCCUPATIONAL BRONCHITIS

1. Classification of occupational allergic diseases.
2. Occupational bronchial asthma:
 - Definition, etiology, pathogenesis, classification;
 - Clinical picture;
 - Basic criteria for diagnosis and evaluation of occupational etiology of asthma;
 - Treatment, labor-expert assessment;
 - Presentation and discussion of clinical cases with occupational bronchial asthma.
3. Rhinitis - definition, etiology, pathogenesis, classification and forms of ARIA, clinical picture, criteria for diagnosis and evaluation occupational etiology of rhinitis, principles of treatment, pharmacotherapy, specific immunotherapy, labor-expert assessment. Presentation and discussion of clinical cases.
4. Conjunctivitis.
5. Contact allergic dermatitis - definition, etiology, pathogenesis, clinical picture, diagnostic criteria, treatment and labor-expert assessment.
6. Occupational chronic bronchitis - definition, etiology, pathogenesis, classification.
Particularities in the clinical picture and the course of individual forms of occupational bronchitis.

8. Basic criteria for assessing the occupational nature of chronic bronchitis.
9. Differential diagnosis, treatment, occupational-expert evaluation of occupational chronic bronchitis.
10. Presentation and discussion of clinical cases.

EXERCISE № 6 - 2 hours

OCCUPATIONAL DISEASES OF THE NERVOUS AND MUSCULOSKELETAL SYSTEM.

1. Occupational diseases of the peripheral nervous system: radiculitis, mononeuropathies, polyneuropathies - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.

Upper limb autonomic polyneuropathy:

- definition;
- risk groups and factors;
- pathogenesis;
- clinical classification;
- features in the clinical picture and the course of the diseases;
- diagnostic criteria;
- treatment, labor-expert assessment;
- presentation and discussion of clinical cases.

3. Occupational diseases of the central nervous system: cerebraesthesia, encephalopathy - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.

3. Occupational diseases of the musculoskeletal system: tendomyositis, epicondylitis, peri-arthritis, arthrosis, osteoporosis - etiology, pathogenesis, diagnosis, differential diagnosis, treatment, medical expertise.

4. Prophylaxis of occupational diseases of the nervous and musculoskeletal system.

EXERCISE № 7 - 3 hours

VIBRATION DISEASE. PRINCIPLES AND METHODS IN THE DIAGNOSIS OF OCCUPATIONAL DISEASES DUE TO VIBRATIONS AND BIOMECHANICAL RISK FACTORS

1. Definition, risk groups and factors, clinical classification, pathogenesis.
2. Clinical picture of vibration disease by hand-arm vibration impact.
3. Clinical picture of vibration disease caused by whole-body vibration.
4. Criteria for diagnosis, differential diagnosis between the two forms of vibration disease and other diseases.
5. Treatment, labor-expert assessment.
6. Presentation and discussion of patients with vibration disease.

7. Most commonly used methods for the diagnosis of occupational diseases from vibration and overstrain of the musculoskeletal and the peripheral nervous system.
8. Imaging diagnostics - X-ray and CT, readings, informative, diagnostic value.
9. Doppler sonography, angiography of upper limbs.
10. To acquaint the students with the following methods:
 - cold provocation test of the limbs;
 - palesthesiometry;
 - reodermometry;
 - alternating dynamometry;
 - capillaroscopy.Indications, technique of performance, interpretation of results in specific patients.

CLINICAL TOXICOLOGY

EXERCISE № 1 - 3 hours

TOXICOLOGICAL ASSISTANCE IN BULGARIA. ALLERGIC AND TOXO-ALLERGIC SHOCK.

Introducing students to:

- 1.1. Outpatient and inpatient toxicological assistance in Bulgaria.
- 1.2. Composition, structure and functions of the Regional Toxicology Center.
- 1.3. Allergic and toxic-shock-allergic - etiology, pathogenesis, clinical manifestations.
- 1.4. Organization of urgent outpatient and stationary medical care for acute poisoning and allergic shock
- 1.5. Behavior of the physician and other medical professionals. "Scheme 10" Analysis.

EXERCISE № 2 - 2 hours

PATHOGENESIS, DIAGNOSTICS, TREATMENT, BEHAVIOR IN ACUTE INTOXICATION IN THE OUTPATIENT STAGE

- 2.1 Pathogenesis of poisoning - Explanation, interpretation, interpretation of toxic aggression, natural physiological protection and additional medical protection - principles, logical conclusions
- 2.2. Basic Methods of Diagnosis and Treatment of Poisoning - List and Explanation.
- 2.3. Demonstration of healing tactics, behavior chart physician team and medical specialists in acute poisoning in pre-hospital stage, illustration with medical documents and patients
- 2.4 Practical life-saving and detox procedures - demonstration of techniques, illustration with documents, apparatus and narrative of patients.

EXERCISE № 3 - 2 hours

ACUTE POISONING WITH DRUGS WITH PREVAILING CEREBRO-DEPRESSIVE SYNDROME (BENZODIAZEPINES, BARBITURATES AND NEUROLEPTICS)

- 3.1. Diagnosis - symptoms and syndromes.
- 3.2. First medical care and practically life-saving behavior of the physician.

3.3. Major healing measures at the station. Closest differential diagnostic options. Illustration of hospital documentation or hospitalized patients.

EXERCISE № 4 - 2 hours

ACUTE POISONING WITH DRUGS THAT IMPACT ON CARDIOVASCULAR SYSTEM (ANTIHYPERTENSIVE, DIGITALIS GLYCOSIDES, DIURETICS)

- 4.1 Diagnosis - symptoms and syndromes.
- 4.2. First medical care and practically life-saving behavior of the physician. Use of antidotes.
- 4.4. Major healing measures at the hospital.
- 4.5 Closest differential diagnostic versions. Illustration with hospital documentation or hospitalized patients.

EXERCISE № 5 - 2 hours

ACUTE POISONING WITH BIOCIDES (ORGANOPHOSPHATES, CARBAMATES AND PYRETHROIDS) AND TECHNICAL PREPARATIONS (ACIDS, BASES, ANTIFREEZE)

Acute poisoning with biocides (organophosphates, carbamates and pyrethroids) - 1 h.
Acute poisoning with technical preparations - acids, bases, antifreeze - 1 h.

- 5.1. Diagnosis.
- 5.2. First medical care and life-saving behavior of the physician. Use of antidote.
- 5.3. Major healing measures at the station.
- 5.4. Adrenal decontamination techniques. Illustration.

EXERCISE № 6 - 2 hours

POISONING WITH BIOLOGICAL TOXINS - SNAKE VENOM, ARTHROPODS, FUNGI

- 6.1 Current epidemiology
- 6.2. Phaloid mushroom intoxication - diagnosis, clinical picture, urgent pre-hospital medical care,
- 6.3. Hospital treatment.
- 6.4. Closest differential diagnostics options. Illustration with hospital documentation or hospitalized patients.

EXERCISE № 7 - 2 hours

ACUTE POISONING WITH NARCOTICS (HEROIN, AMPHETAMINE) AND ALCOHOL (ETHYL, METHYL).

- 7.1 Life saving practical nursing care
- 7.2 Hospital medical care.

ESSAYS THEMES ON OCCUPATIONAL DISEASES

1. Occupational disorders and lead intoxication.
2. Occupational intoxication with mercury.
3. Occupational manganese and cadmium intoxications.
4. Occupational Intoxications with Organic Solvents.
5. Occupational acid and base intoxications.
6. Occupational damage due to occupational physical risk factors in the working environment and the labor process.
7. Occupational allergic diseases.
8. Occupational diseases from static and dynamic physical load and microtrauma.
9. Pneumoconioses.
10. Occupational neoplasms.
11. Occupational diseases of the skin.
12. Occupational diseases of analysers.
13. Risk assessment and prognosis of occupationally induced diseases, risk profile.
14. Prophylactic programs to prevent the occurrence of occupational disabilities and work-related diseases - types, objectives, organization and control.
15. Promotion of oral health in the impact of risk factors in the working environment - aim, methods of impact on the individual, role of society.

ESSAYS THEMES ON CLINICAL TOXICOLOGY

1. Epidemiology of intoxications worldwide and in Bulgaria.
2. Bulgarian herbs with toxic potential.
3. Antidote drugs - from antiquity to modern times.
4. Poisons and poisoning in antiquity – toxo-pharmaceutical foundations.
5. Comparative characterization of the benzodiazepine toxic properties.
6. Contemporary neuroleptics - comparative pharmaco-toxicological characteristic.
7. Drug toxicity of medications regulating heart rate.
8. New Drugs - pharmacological characteristics and toxicological hazards.
9. Comparative characterization of poisoning with alcohols - ethyl, methyl, ethylene glycol.
10. The most poisonous animals and plants around the world.

QUESTIONS FOR INDIVIDUAL PREPARATION ON OCCUPATIONAL DISEASES

Theme 1

INTRODUCTION IN OCCUPATIONAL PATHOLOGY

1. What is the definition of an occupational disease according to the Ordinance on the Procedure for Notification, Registration, Confirmation, Appeal and Reporting of Occupational Diseases
2. Why is it necessary to have a specific legal framework for occupational diseases require?
3. On what principle is the List of Occupational Diseases established and what is its content?
4. What types of diseases exist according to the classification of occupational diseases?
5. What does a specific occupational disease mean?
6. What does a conditional occupational disease mean?
7. What does a paraoccupational or work-related illness mean?
8. What are the main principles of diagnosis, treatment, expertise in occupational diseases?
9. What are the main principles in the prevention of occupational diseases and dental disorders.
10. What are the main preventive measures for occupational diseases?

Theme 2

VIBRATION DISEASE

1. What is the definition of vibration disease?
2. What are the risky professions with exposure to local vibration effects?
3. What are the main pathogenetic mechanisms of local vibration damage?
4. What are the clinical manifestations of vibrational disease due to local vibrations?
5. What are the common methods for diagnosing vibrational disease by local vibration?
6. What are the main professions exposed to general vibrations in working conditions?
7. What are the main syndromes that build up the clinical picture of vibrational disease from common vibrations?
8. What diagnostic methods contribute to the proving of vibrational disease by total vibrational impact?
9. What are the criteria for the diagnosis of vibrational disease by local and / or general vibrations?
10. What Is The Treatment Of Damage By Vibration?

Theme № 3

PNEUMOCINIOSES

1. What is the definition of pneumoconiosis?
2. What are the types of pneumoconiosis?
2. What is the etiology of silicosis?
4. What are the main pathomorphologic changes, clinical manifestations, and methods for demonstrating silicosis?
5. What is the definition of silicosis?
6. What are the most common types of silicosis?
7. What are the main diagnostic principles?
8. What is characteristic of coal pneumoconiosis?
9. What are the main elements of medical expertise in pneumoconiosis?
10. How is a diagnosis of silicosis, asbestosis?
11. What are the complications of pneumoconiosis?
12. What is the treatment of pneumoconiosis?
13. What is the prevention of pneumoconiosis?

Theme № 4

OCCUPATIONAL ALLERGIC DISEASES

1. Which allergic diseases can be occupationally determined?
2. What are the main clinical manifestations of bronchial asthma and what are the criteria for occupational diagnosis?
3. What is the etiology and clinical characteristic of the rhinitis?
4. What is the hypersensitivity pneumonitis - etiology, clinical picture, diagnosis, treatment?
5. What are the main allergic diseases of the upper respiratory tract?
6. Give examples of occupational allergic diseases to the eye analyzer.
7. Which skin diseases can be occupationally induced?
8. What are the criteria for assessing the occupational origin of occupational allergic diseases?

9. What is the treatment of occupational allergic diseases?
10. What are the measures for the prevention of occupational allergic diseases?

Theme № 5

OCCUPATIONAL DISEASES THE NERVOUS AND MUSCULOSKELETAL SYSTEMS

1. What are the major occupational diseases of the peripheral nervous system?
2. What risk factors in the working environment cause occupational diseases of the peripheral nervous system?
3. What are the basic principles for the occupational diagnosis of the musculoskeletal and peripheral nervous system due to overstrain and microtrauma?
4. What are the major etiological factors in the work environment that cause occupational disorders of the central nervous system?
5. What are the most common occupational diseases of the musculoskeletal system?
6. What are the main occupational risk factors that cause injuries to the musculoskeletal system?
7. What methods are used to diagnose occupational nervous and musculoskeletal disorders?
8. What are the main principles for the occupational diagnosis of musculoskeletal disorders?
9. What is the treatment of occupational disorders of the nervous and musculoskeletal system?
10. What are the main preventive measures to prevent the occurrence of diseases of the nervous and musculoskeletal system of an occupational nature?
11. What is secondary and tertiary prophylaxis in this pathology

Theme № 6

OCCUPATIONAL HEALTH EFFECTS DUE TO HEAVY METALS, ORGANIC SOLVENTS, ACIDS, BASES, PLASTICS, IRRITATING GASES

1. What are the main syndromes of professional lead intoxication?
2. What does biomarker of exposure mean?
3. What does biomarker mean?
4. What are the laboratory tests that contribute to the diagnosis of lead intoxication?
5. What are the main clinical syndromes in occupational mercury intoxication?
6. How is mercury intoxication diagnosed?

7. What are the main clinical manifestations of manganese and cadmium poisoning?
8. What are the characteristics of occupational poisoning with organic solvents - benzene, benzene, amino- and nitro-derivatives of benzene?
9. What are the occupational disabilities of acids and bases?
10. What causes professional poisoning with monomers of synthetic resins and plastics?
11. What are the basic principles for diagnosing occupational intoxications?
12. What are occupational injuries from irritating money and gases?
13. What are the typical clinical manifestations of carbon monoxide poisoning?

Theme № 7

OCCUPATIONAL NEOPLASMS

1. What are the main occupational risk factors that have a proven carcinogenic effect?
2. What causes occupational carcinogens?
3. How is the occupational nature of neoplastic disease proven?
4. What is the prevention of occupational neoplasms?
5. What is typical of the expertise of occupational neoplasms?

Theme № 8

OCCUPATIONAL DISEASES OF BIOLOGICAL FACTORS

1. What are the diseases of biological risk factors in the working environment?
2. What are the risky professions in which these diseases can be observed?
3. What are the main criteria for assessing the occupational nature of an infectious or parasitic disease?
4. What is the treatment of occupational diseases by biological factors?

Theme № 9

OCCUPATIONAL SKIN DISEASES

1. What are the most common occupational skin diseases?

2. What are the criteria for assessing the occupational genesis of skin diseases?
3. What is the treatment and prevention of occupational skin diseases?

QUESTIONS ON CLINICAL TOXICOLOGY FOR INDIVIDUAL WORK (by themes)

1. Toxic coma
2. Toxic pulmonary edema
3. Antidotes - classification, examples and application
4. Acute poisoning with toxic gases
5. Acute poisoning with tricyclic antidepressants (TAD)
6. Acute poisoning with carbon
7. Toxicological syndromes - according to the clinical pathway standard 293

LITERARY SOURCES FOR PREPARATION IN CLINICAL TOXICOLOGY

1. Илиев Я. Пропедевтика на клиничната токсикология ИК-ВАП, Пловдив 2012
2. Yanko Iliev. "Clinical toxicology: lectures for medical students". ИК-ВАП, Пловдив 2012
3. "Тестове по клинична токсикология за самоподготовка и обучение" п/р на Я. Илиев ИК – ВАП Пловдив 2009 г.
4. "Остри отравяния". П/р на Ст. Андонова, П-ро преработено и допълнено изд. "Райков", Пловдив 2000
5. Монов Ал., Клинична токсикология. София, Венел ООД, 1997
6. Александров Н., Практическа спешна токсикология. "Знание" ЕООД, 2000
7. "Отравяния и злополуки в детската възраст". П/р на Хр. Михов и Т. Шмилев. МИ ЕТ" Васил Петров", Пловдив, 2003
8. "Упражнения по Клинична токсикология / асистенти

Additional sources - reviewed manuals and monographs in English, French, German and Russian, subject to prior approval by the Habilitate or Assistant Leader.

POS. Data from Internet sites to be considered unverified!

LITERARY SOURCES FOR PREPARATION IN OCCUPATIONAL DISEASES

1. Хигиена и професионални заболявания, П/р Вл. Бояджиев, С., МФ, 1981.
2. Остри отравяния, П/р Ст. Андонова, Пловдив, Райкови, 2002 г.
3. Професионални болести, П/р А. Савов, С., Рал и Колобър, 2003 г.
4. Професионални болести, П/р В. Костова и В. Петкова, С., Рал и Колобър, 2007.
5. Хигиена, хранене и професионални болести. П/р Б. Попов, С., 2009 г.
6. Textbook on occupational diseases. Sofia, Ralkolober, 2010.

CONSPESTUS

OCCUPATIONAL DISEASES AND TOXICOLOGY SYLLABUS

Specialty “Medicine”

III year

1. Occupational diseases – definition, classification, list of occupational diseases.
Main principles of diagnostics, treatment, expertise and medical prophylaxis.
2. Occupational disease and occupational accident. Expertise of occupational diseases – principles, registration procedures, legal outcomes.
3. Pneumoconiosis – classification, etiology, pathogenesis. Silicosis – clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
4. Silicosis: asbestosis, talcosis, kaolinosi – etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
5. Coal worker’s pneumoconiosis – etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
6. Occupational chronic bronchitis – classification, etiology, pathogenesis, clinical manifestations, diagnosis, diagnostic criteria for occupational etiology, differential diagnosis, treatment, medical expertise.
7. Occupational respiratory allergic diseases. Occupational bronchial asthma. Bisinosis. Etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, diagnostic criteria for occupational etiology, treatment, medical expertise.
8. Hypersensitivity pneumonitis - etiology, pathogenesis, clinical manifestation, diagnosis, treatment, medical expertise.

9. Occupational intoxications with irritant gasses (fluorine, hydrogen fluoride, chlorine, hydrogen chloride or sulfide, ammonia, sulfur dioxide). Etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
10. Occupational intoxications with nitrogen oxides – etiology, pathogenesis, clinical manifestation, diagnosis, treatment, medical expertise.
11. Occupational intoxication with carbon monoxide - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
12. Occupational intoxications with non-organic lead compound (chronic saturnism) - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
13. Occupational intoxications with organic lead compounds (tetraethyl lead) - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
14. Occupational intoxications with non-organic mercury compounds (mercurialism) - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
15. Occupational intoxications with non-organic manganese compounds - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
16. Occupational intoxications with cadmium compounds - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
17. Occupational intoxications with arsenic compounds - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
18. Occupational intoxications with nickel, chromium and compounds - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
19. Occupational intoxications with organic solvents: petrol - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
20. Occupational intoxications with benzene and its compounds (xylene, styrene, toluene) - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
21. Occupational intoxications with nitro- and amino-benzenes - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
22. Occupational intoxications with carbon disulfide - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.

23. Occupational intoxications with monomers of synthetic resins and plastics - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
24. Acute and chronic intoxications with pesticides – classification, pathogenesis, specific toxicity, clinical manifestations of the most common intoxications (organophosphate, chlorinated pesticides, carbamates, dithiocarbamates), occupational risk, diagnostic and therapeutic algorithm.
25. Lateral and medial epicondylitis - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
26. Tendomyositis of the lower arm - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
27. De Quervain's disease - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
28. Stenosing flexor tenosynovitis (trigger finger) - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
29. Humeroscapular periarthrititis - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise.
30. Occupational bone and joint diseases - etiology, pathogenesis, clinical manifestations, occupational diagnostic criteria, treatment, medical expertise.
31. Occupational radiculopathy - etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
32. Occupational distal autonomic neuropathy of upper limbs - etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
33. Mononeuropathy in entrapment compression syndromes of the carpal, cubital and Guyon's canal - etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
34. Vibration disease due to hand-arm vibration- etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
35. Vibration disease due to whole-body vibration - etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.

36. Occupational hearing impairments - etiology, pathogenesis, clinical manifestations, diagnosis, treatment, medical expertise and prophylaxis. Health Effects of Exposure to Ultrasound and Infrasound.
37. Occupational skin diseases - etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, treatment, medical expertise.
38. Occupational neoplasms - etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, criteria for occupational diagnosis, treatment, medical expertise.
39. Occupational diseases due to biological factors - etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis, criteria for occupational diagnosis, treatment, medical expertise.
40. Pathogenesis of intoxication – toxicokinetic mechanisms.
41. Treatment methods of acute intoxications – united therapeutic scheme, principles, means and methods of cleansing of the entrance of toxins, methods for blood depuration (haemodepuration).
42. Antidote detoxification.
43. Acute toxic respiratory injuries.
44. Acute barbiturate intoxications.
45. Acute intoxications with benzodiazepines.
46. Acute intoxications with antidepressants
47. Acute intoxications with narcotics.
48. Acute intoxications with atropine.
49. Acute alcohol intoxications – ethyl, methyl
50. Acute intoxications with ethylene glycol
51. Acute intoxications with tetrachlormethane
52. Acute intoxications with chinine
53. Acute intoxications with antipyretics – aspirin, paracetamol
54. Acute intoxications with cyanide compounds
55. Acute intoxications with digitalis preparations.
56. Snake poison intoxications.

57. Phaloid mushroom intoxications
58. Muscarinic and myco-atropine mushroom intoxication.
59. Acute alkaline and acidic intoxications
60. Anaphylactic shock – definition, etiology, pathogenesis, types, clinical manifestations, diagnostic and therapeutic algorithms.

Compilers:

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MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

Ophthalmology

Approved by the Department Council on 13.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			4th year	
Ophthalmology	VII							VII	VIII
		75	30	45	2.5	1.2	3.7	2/3	

DISCIPLINE:

Ophthalmology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master

FORMS OF TRAINING:

Lectures, seminars, practice

YEAR OF TRAINING:

IV

DURATION OF TRAINING:

1 semester

ACADEMIC HOURS:

30h lectures, 45h practical classes

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Well - equipped classrooms, examination rooms, audiovisual equipment, multimedia discussions, demonstration of examination techniques, diagnostics and treatment.

FORMS OF EVALUATION:

Current control - weekly test, oral interview, review test.

EVALUATION CRITERIA:

Written examination, oral examination.

ASPECTS OF EVALUATION CRITERIA:

Participation in the weekly tests, results from the final test

SEMESTER EXAM:

Written examination, oral examination.

STATE EXAM:

No

LECTURER:

Assoc. Prof. Marin Atanasov, MD, PhD, FEBO

DEPARTMENT:

Ophthalmology

ANNOTATION

History and the subject of ophthalmology. Anatomy of the visual organ. Key features of the visual organ. Light perception. Color vision. Central and peripheral vision. Refraction of the eye and its anomalies. Diseases of the orbit and eyelids. Diseases of the lacrimal apparatus and conjunctiva. Diseases of the cornea and sclera. Diseases of the uvea. Diseases of the lens. Glaucoma. Diseases of the retina. Paediatric ophthalmology. Eye movement disorders. Eye injuries. Ocular manifestations of general diseases. Emergency in ophthalmology. Blindness and its problems.

BASIC AIMS OF THE DISCIPLINE

1. Knowledge of anatomy and physiology of the visual organ.
 2. Systematic approach to examination of the eye and its adnexa.
 3. Understanding and free use of terminology in ophthalmology.
 4. Quality theoretical and practical training in ophthalmology.
 5. Knowledge of ocular pathology.
 6. Excellent knowledge of emergencies in ophthalmology and principles of first aid.
- Master the necessary theoretical and practical skills in ophthalmology. Detection of refractive errors, physiology and pathology of the eyeball. Obtaining the necessary practical skills.

EXPECTED RESULTS

➤ ***Theoretical knowledge:***

1. Anatomy of the visual organ.
2. Key features of the visual organ.

3. Light perception. Color vision.
4. Central and peripheral vision.
5. Refraction of the eye and its anomalies.
6. Diseases of the orbit and eyelids.
7. Diseases of the lacrimal apparatus and conjunctiva.
8. Diseases of the cornea and sclera.
9. Diseases of the uvea.
10. Diseases of the lens.
11. Glaucoma.
12. Diseases of the retina.
13. Paediatric ophthalmology.
14. Eye motility disorders.
15. Eye injuries.
16. Ocular signs in general diseases.
17. Emergency in ophthalmology.
18. Blindness and its problems.

Practical skills:

1. *Exposure of the conjunctiva*
2. Expression of tear sac
3. Canal and nasal test
4. Fluorescein staining test
5. Examination of corneal sensitivity
6. Biomicroscopy
7. Retroillumination
8. Indirect ophthalmoscopy (principle and performance)
9. Examination of color vision
10. Examination of visual acuity, perception and projection of light
11. Confrontation method for examination of visual field
12. Measurement of intraocular pressure by palpation
13. Recognizing types of corrective lenses
14. Eye drops instillation
15. Eye ointments application
16. Patching and Dressings
17. Lavage of the conjunctiva
18. Tonometry - Goldman and Shiotts / principles and performance /

LECTURES

LECTURE 1 - 2 HOURS

SUBJECT AND HISTORY OF OPHTHALMOLOGY.

LIGHT PERCEPTION. COLOR VISION

1. Definition and subject of ophthalmology.
2. Meaning of ophthalmology.
3. Features of ophthalmology
 - High demand for ophthalmic care
 - Complex character
 - Close liaison with other medical specialties
4. History of ophthalmology
 - Prehistoric times
 - Ancient civilizations: Assyria and Babylonia, Ancient Egypt, Judaic culture, Ancient Indian culture; Ancient Chinese culture, ancient cultures in America.
 - Classical civilizations: Greece, Alexandria, Rome.
 - Ages: Byzantium, the Arab Ophthalmology; European ophthalmology ...
 - Renaissance and later eras
 - Bulgarian ophthalmology
5. Development of ophthalmological
 - Phylogenesis
 - Ontogenesis
6. Basic functions of the visual organ.
 - Light perception
 - Color vision
 - The form vision
 - Depth perception and stereoscopic vision
7. Essentials of vision
 - Definition of light: theory, photometric units
 - Conversion of light energy into nerve impulses
8. Light perception
 - Definition: absolute sensitivity, discriminative sensitivity
 - Adaptation: to light and dark, methods for examination of adaptation
 - Disturbances in adaptation (hemeralopia, nyctalopia): symptomatic, functional.
9. Colour perception.
 - Definition
 - Spectral colors
 - Characteristics of color: Hue, luminance, saturation
 - Basic colors: red, green, blue

- Additional colors
- Complimentary colors
- Theories of color vision
- Methods for examination of color vision

LECTURE 2 - 2 HOURS

ANATOMY OF THE EYEBALL.

CENTRAL AND PERIPHERAL VISION.

I. Anatomy the eyeball.

1. Anatomy of orbit
 - Composition of the orbit
 - Features of the walls of the orbit
 - Major openings in the orbit
 - Contents of the orbit
 - Changes in the position of the eyeball
2. Anatomy of the eyelids.
3. Anatomy of the conjunctiva.
4. Anatomy of the cornea
5. Anatomy of the uvea
 - Iris
 - Ciliary body
 - Choroid
6. Anatomy of the lens.
7. Anatomy of the vitreous.
8. Anatomy and histology of the retina.

II. Central and peripheral vision.

1. Central vision: Visual acuity, visual angle.
 - Visual charts: Snellen, Monoyer, examination of visual acuity.
2. Peripheral vision.
 - Definition
 - Visual field
 - Importance of the visual field for clinical practice
 - Historical development of methods for analysis of visual field
 - Methods for subjective field of vision: a control (confrontation method of Donders, campimetry, perimetry - kinetic, static
 - Objective methods for testing the visual field.

LECTURE 3 – 2 HOURS

REFRACTION OF THE HUMAN EYE. ACCOMMODATION. REFRACTIVE ERRORS

1. Similarities between human eye and photocamera
2. Physical optics. Physical refraction. Physiological optics
3. The human eye as an optical system

4. Clinical refraction
 - Emmetropia
 - Myopia
 - Hyperopia
5. Causes for ametropias: theories, types of ametropia
6. Static and dynamic clinical refraction
 - far point of view in different clinical refractions
7. Accommodation
 - definition
 - near point of view
 - mechanism of accommodation
 - field of accommodation
 - range of accommodation
8. Presbyopia
9. Pathology of accommodation: paralysis and spasm of accommodation
10. Astigmatism
 - simplex astigmatism
 - compound astigmatism
11. Methods for refraction testing
 - subjective methods
 - objective methods
12. Correction of refractive errors
13. Myopia – clinical presentation
14. Hyperopia – clinical presentation

LECTURE 4 – 2 HOURS

DISEASES OF THE ORBITA.

- I. Diseases of the orbit.
2. Congenital diseases of the orbit.
 - Craniodystososes - meningocele and encephalocele
3. Vascular diseases of the orbit.
 - Oedema of the orbit
 - Bleeding and hematoma of the orbit
 - Intermittent exophthalmus (proptosis)
 - Pulsating proptosis
4. Inflammation of the orbit.
 - Anterior and posterior osteoperiostitis of the orbit
 - Orbital cellulitis
 - Thrombophlebitis of the orbit
 - Orbital phlegmona
 - Panophthalmitis
 - Tenonitis: serous and purulent
5. Parasitic diseases of the orbit.
 - Trichinosis
 - Echinococcosis
6. Endocrine orbitopathy
 - Thyroid associated orbitopathy (TAO)
 - Endocrine ophthalmopathy

7. Tumours of the orbit

- Benign: dermoid cyst, holosteoma, angioma,
- Malignant: sarcoma, carcinoma, glioma, meningioma lymphoma

LECTURE 5 - 2 HOURS

DISEASES OF THE EYELIDS AND THE LACHRYMAL SYSTEM

1. Diseases of the eyelids.
2. Function of the eyelids.
3. Diseases of the eyelids
 - Congenital anomalies
 - Diseases of the eyelid skin: noninflammatory and inflammatory
 - Diseases of eyelashes
 - Static and dynamic disorder of the eyelids: entropion, ectropion, blepharospasm, lagophthalmos, ptosis of eyelids
 - Eyelid tumors: benign and malignant.

Diseases of the lacrimal apparatus

1. Significance and composition of the tear film. Types of tear secretion
2. Anatomy of lacrimal apparatus: lacrimal gland and lacrimal drainage system
3. Diseases of the lacrimal gland
 - Acute dacryoadenitis
4. Diseases of lacrimal drainage system
 - Congenital and acquired changes of lacrimal puncta
 - Canaliculitis
 - Acute dacryocystitis

LECTURE 6 – 2 HOURS

DISEASES OF THE CONJUNCTIVA AND KERATOKONJUNCTIVITIS

Diseases of the conjunctiva

1. Frequency and significance of conjunctival diseases
2. Function of the conjunctiva
3. Morbid changes in the conjunctiva: hyperemia – conjunctival and ciliary, chemosis, folliculae, papillae, phlyctena, discharge – catarrhal, purulent, fibrinous
4. Inflammatory diseases of the conjunctiva /conjunctivitis/.
 - Classification: acute, subacute, chronic conjunctivitis; catarrhal, purulent, membranous and pseudomembranous conjunctivitis; allergic conjunctivitis; conjunctival-corneal damage in different skin diseases; other conjunctivitis
 - Acute catarrhal conjunctivitis: aetiology, clinics, treatment
 - Purulent conjunctivitis /gonorrhoeic/
 - Membranous /diphtheric/ and pseudomembranous conjunctivitis
 - Chronic conjunctivitis
5. Differential diagnosis between conjunctivitis and keratitis.

6. Phlyctenulosis keratoconjunctivitis
 - etiology
 - clinical signs
 - treatment
7. Vernal keratoconjunctivitis
 - etiology
 - clinical signs
 - treatment
8. Trachoma
 - distribution
 - etiology
 - clinical signs
 - differential diagnosis
 - complications
 - treatment
9. Degenerative diseases of the conjunctiva
 - pinguecula
 - pterygium.

LECTURE 7 – 2 HOURS

DISEASES OF THE CORNEA

Diseases of the cornea

- Function of cornea
 - Methods for corneal investigation
 - Pathological changes in cornea: opacities – infiltration, cicatrix, degeneration; vascularisation: superficial, deep
1. Changes in corneal shape and size
 2. Inflammatory corneal diseases
 - Superficial nonpurulent keratitides
 - Superficial purulent keratitides
 - Deep /stromal/ keratitides
 - Trophic keratitides
 3. Treatment and consequences of keratitides

LECTURE 8 - 2 HOURS

DISEASES OF THE UVEAL TRACT

I. UVEITIS.

1. Etiology and histopathology of uveitis.
 - exogenous agents
 - endogenous agents: acute and chronic infectious, non-infectious, focal infectious, immunoallergic, endocrine and genetic mechanisms.
2. Classification of Uveitis
 - according to etiology: infectious – exogenous and endogenous, non-infectious
 - according to duration: acute, subacute and chronic

- according to exudation: serous, fibrinous, purulent and hemorrhagic
- according to histopathology: granulomatous and nongranulomatous
- according to anatomical localization: Anterior uveitis, Intermediate uveitis, Posterior uveitis and Panuveitis
- 3. Anterior uveitis
 - subjective symptoms
 - objective symptoms
 - exogenous anterior uveitis
 - endogenous anterior uveitis: acute infectious diseases, chronic infectious diseases, focal infectious, metabolic diseases, rheumatological diseases
 - therapy of acute anterior uveitis: topical and systemic.
- 4. Intermediate uveitis.
- 5. Posterior uveitis (chorioretinitis)
 - subjective symptoms
 - objective symptoms
 - clinical types: diffuse, multifocal, focal, central, peripheral, juxtapapillary
 - complications
 - therapy
- 6. Panuveitis
 - Tuberculosis
 - Syphilis
 - Toxoplasmosis
 - Sarcoidosis
 - Uveitis in non-infectious multi-system diseases
 - Ocular involvement in AIDS
 - Sympathetic ophthalmia
 - Acute purulent uveitis
- II. Uveitic tumours.

LECTURE 9 – 2 HOURS

DISEASES OF THE LENS

1. Function of the lens.
2. Methods for examination.
3. Diseases, connected with changes in lens' location.
 - ectopia lentis
 - luxation and subluxation of the lens
4. Diseases, connected with changes in lens transparency
 - acquired cataract: age-related, traumatic, pathologic, complicated, radiation-induced
 - management of the acquired cataract: medical and surgical
 - congenital cataract: types, clinical features, management.

LECTURE 10 – 2 HOURS

GLAUCOMA

- I. NATURE OF GLAUCOMA. DEFINITION.
- II. PHYSIOLOGY OF THE AQUEOUS HUMOR.
- III. INTRAOCULAR PRESSURE. METHODS FOR MEASUREMENT.
- IV. ETHIOPATHOGENESIS.
- V. CLASSIFICATION OF THE GLAUCOMAS:

- primary glaucoma: angle-closure glaucomas, open-angle glaucomas, combined mechanism glaucoma
- secondary glaucoma
- congenital glaucoma
- 1. Primary angle-closure glaucoma
 - pathogenesis: relative papillary block, narrowing anterior chamber angle, plateau iris, vitreo-lenticular block
 - clinical features
 - differential diagnosis
- 2. Open-angle glaucomas
 - types: primary, pseudoexfoliative, pigmentary
- A. Primary open-angle glaucoma
 - pathogenesis: dystrophic changes in different parts of the aqueous drainage system, combined with partial block of the anterior chamber angle by the iris' root or goniosynechia.
 - clinical features
 - differential diagnosis
- B. Pseudoexfoliative open-angle glaucoma.
- C. Pigmentary open-angle glaucoma.
- 3. Combined forms of glaucoma.
- VI. COMMON FEATURES AMONG THE PRIMARY GLAUCOMAS.
- VII. DIFFERENCES IN THE CLINICAL COURSE OF THE THREE TYPES OF GLAUCOMA
- VIII. MANAGEMENT
 - medical
 - surgical
 - laser

LECTURE 11- 2 HOURS

DISEASES OF THE RETINA AND OPTIC NERVE

1. Retinal functions.
2. Diagnostic methods.
3. Classification of retinal diseases.
 - Retinal vascular diseases
 - Retinal inflammation diseases
 - Retinal degenerative diseases
 - Phakomatoses
 - Retinal changes in blood diseases
 - Retinal detachment
 - Retinal tumours
 - Traumatic retinal diseases
 - Congenital retinal diseases
 - Perinatal injuries
4. Symptoms of retinal diseases
 - subjective symptoms

- objective symptoms
- 5. Retinal vascular diseases.
 - haemodynamic disturbances in retinal vessels: acute retinal artery occlusion, acute retinal vein occlusion
 - retinal changes in systemic vascular diseases: Hypertensive retinopathy, Kidney retinopathy, Retinopathy of prematurity, Diabetic retinopathy.
- 6. Inflammatory retinal vascular disease.
- 7. Retinal inflammatory diseases.
 - primary inflammatory retinal diseases: Central serous chorioretinopathy
 - secondary inflammatory retinal diseases: metastatic retinitis, tuberculosis retinitis.
- 8. Retinal degenerative diseases.
 - Retinal pigment epithelium degeneration
- 9. Retinal detachment
 - Rhegmatogenous retinal detachment
 - Tractional retinal detachment
 - Exudative, tumour retinal detachment
- 10. Retinal tumours – Retinoblastoma.
- 11. Diseases of the optic nerve.
 - Papillary edema
 - Anterior ischemic optic neuropathy
 - Neuritis/papillitis
 - Retrobulbar neuritis

LECTURE 12 – 2 HOURS

OCULAR SYMPTOMS IN SYSTEMIC DISEASE

1. Two-way connection between eye and organism.
2. Importance of the ocular examination in general diseases diagnostics.
3. Ocular manifestations in acute infectious diseases.
4. Ocular manifestations in chronic infectious diseases.
5. Ocular manifestations in collagenosis.
6. Ocular manifestations in endocrine disorders.
7. Ocular manifestations in metabolic disorders.
8. Ocular manifestations in vascular diseases.
9. Ocular manifestations in hematologic disorders.
10. Ocular manifestations in central nervous system disorders.
11. Ocular manifestations in AIDS.

LECTURE 13 – 2 HOURS

OCULAR MOTILITY PROBLEMS, CHILD'S VISION

1. Motility of the eye.
 - Eye muscle movement

- Function of the eye muscles.
- 2. Binocular vision.
 - Prerequisites
 - Types
 - Retinal correspondence
 - Methods of examination of binocular vision.
- 3. Heteroforia.
 - Types
 - Clinical manifestations
 - Treatment
- 4. Concomitant squint.
 - Types
 - Etiology
 - Clinical features
 - Examination methods
 - Treatment: optical, pleoptical, orthoptical, surgical, complex
- 5. Paralytic squint.
 - Etiology
 - Clinical features
 - Treatment
 - Differential diagnosis between concomitant and paralytic strabismus

LECTURE 14 - 2 HOURS

OCULAR TRAUMAS. EMERGENCY IN OPHTHALMOLOGY

1. Frequency and importance of blindness.
2. Types of ocular traumatism: civil, industrial, pediatric, agricultural, military.
3. Classification of ocular traumatism
 - contusions
 - injuries: penetrating and non-penetrating – with or without foreign body
 - combustions
- A. Eyelid trauma:
 - contusions
 - injuries
- B. Orbital trauma
- C. Globe trauma
 - contusions
 - injuries: non-penetrating and penetrating, with or without foreign body
 - explosive injuries
- D. Combustions
 - thermal
 - chemical
 - radiation
 - a. Management of combustions: medical, surgical
 - b. General practitioner duties

EMERGENCY AID IN OPHTHALMOLOGY.

1. Emergency aid steps given by the general practitioner (GP) in cases of trauma of the eyeball and ocular adnexa.
2. Emergency aid steps given by the GP in cases of burns.
3. Emergency aid steps given by the GP in cases of occlusion of the central retinal artery.
4. Emergency aid steps given by the GP in cases of thrombosis of the central retinal vein.

5. Emergency aid for acute angle closure glaucoma.
6. Emergency aid for acute iridocyclitis.

LECTURE 15 – 2 HOURS

BLINDNESS – CAUSES AND PREVENTION

1. Definition of blindness.
2. Most common causes of blindness.
3. Types of blindness
 - absolute
 - practic
 - work
 - professional
 - pedagogical
 - monolateral and bilateral
 - reversible and irreversible
4. Problems of blindness
 - moral and ethic
 - social
5. Rehabilitaion of the blind.

Lectures

№	Topic	Hours	Date
1	HISTORY OF OPHTHALMOLOGY. COLOR VISION AND LIGHT PERCEPTION	2	
2	ANATOMY OF THE EYEBALL, CENTRAL AND PERIPHERAL VISION.	2	
3	REFRACTION OF THE EYE, ACCOMMODATION, ANOMALIES OF REFRACTION	2	
4	DISEASES OF THE ORBITA.	2	
5	DISEASES OF THE EYELIDS AND THE LACHRYMAL SYSTEM	2	
6	DISEASES OF THE CONJUNCTIVA AND KERATOKONJUNCTIVITIS	2	

7	DISEASES OF THE CORNEA	2	
8	DISEASES OF THE UVEAL TRACT	2	
9	DISEASES OF THE LENS	2	
10	GLAUCOMA.	2	
11	DISEASES OF THE RETINA AND OPTIC NERVE.	2	
12	OCULAR SYMPTOMS IN SYSTEMIC DISEASE	2	
13	OCULAR MOTILITY PROBLEMS, CHILD'S VISION	2	
14	OCULAR TRAUMAS. EMERGENCY IN OPHTHALMOLOGY	2	
15	BLINDNESS – CAUSES AND PREVENTION	2	

Total: 30 h

PRACTICES

Practice 1 - 3 hours

**ANATOMY OF THE EYEBALL. SYSTEMIC EXAMINATION OF PATIENTS.
FOCAL ILLUMINATION EXAMINATION OF THE CONJUNCTIVA**

I. Anatomy of the eyeball

1. Bulbus oculi – form, poles, meridians, equator

II. Systemic examination of patients

1. Visit to the outdoor patients office: methods of examination of the anterior and posterior segments of the eye, visual charts, correction lenses, direct and indirect ophthalmoscopes, perimeter, tonometer, bio-microscope, instruments.

2. Systemic examination of the patient – history of the disease.

3. Examination of the conjunctiva.

4. Focal illumination.

5.Demonstration of patients: diagnosis, differential diagnosis, treatment.6. Schematic drawing of the eyeball.

III. Focal illumination –

IV. Examination of the conjunctiva.

PRACTICE 2 - 3 HOURS

PATHOLOGY OF LIGHT PERCEPTION AND COLOR PERCEPTION. PERIPHERAL VISION

I. Light perception

1. Light sensitivity threshold, adaptation.
2. Light perception.
- 3.Pathology of light perception.

II Color vision

1. Characteristics of colors, principle of pseudochromsatism.
2. Examination with the charts of Rabkin.
3. Pathology of color vision.

III. Peripheral vision

- 1.Anatomical substrate of peripheral vision and limits of the visual field.
2. Examination of peripheral vision, control method of Donders.
4. Diagnosis of visual field anomalies.

PRACTICE 3 - 3 HOURS

CENTRAL VISION. REFRACTION AND REFRACTORY ANOMALIES. VISUAL ACUITY.

I. Central vision. Visual acuity.

1. Angulus minimum visibille
2. Visual charts of Snellen, Monoye.
3. Examination of visual acuity, formula of Donders.
4. Examination of the visual acuity by the students.

II. Refraction and refraction anomalies.

- 1.Physical optics. Physical refraction. Physiological optics.
2. The eye as an optic system.
3. Clinical refraction: emetropia, myopia, hypermetropia.
4. Acomodation.
5. Presbyopia.
6. Astigmatismus.
7. Methods of examination of the refraction – subjective, objective.
8. Correction of the anomalies of refraction.
9. Symptoms of myopia.
10. Symptoms of hypermetropia..
11. Correction lenses.
12. Skiascopy.

PRACTICE 4 - 3 HOURS

TRANSILLUMINATION. OPHTHALMOSCOPY. SKIASCOPY.

1. Transillumination – demonstration of the technique. Pathology of the transparent media.
2. Practical exercise in transillumination.
3. Ophthalmoscopy – direct and indirect. Principles of ophthalmoscopy.
4. Practical exercise in direct and indirect ophthalmoscopy.
5. Skiascopy.

PRACTICE 5 - 3 HOURS

DISEASES OF THE ORBIT AND EYELIDS..

I. Diseases of the orbit.

1. Congenital diseases of the orbit.
2. Circulatory diseases of the orbit.
3. Inflammatory diseases of the orbit..
4. Parasitic diseases of the orbit.
5. Endocrine diseases with orbital symptoms. орбитни прояви.
6. Malignant and benign tumors of the orbit.

II. Diseases of the eyelids.

1. Congenital anomalies of the eyelids.
2. Diseases of the skin of the eyelids: inflammatory, non inflammatory.
3. Diseases of the eyelashes.
4. Static and dynamic anomalies in the lids position: entropion, ectropion, blepharospasmus, lagophthalmus, ptosis of the eyelids.
5. Malignant and benign tumors of the eyelids.

III. Demonstration of patients.

PRACTICE 6 - 3 HOURS

DISEASES OF THE LACHRYMAL APPARATUS AND THE CONJUNCTIVA.

I. Diseases of the lachrymal apparatus.

1. Acute dacruoadenitis.
2. Congenital and acquired anomalies of the lachrymal puncta.
3. Canaliculitis.
4. Chronic dacryocistitis.
5. Acute dacryocystitis.

II. Diseases of the conjunctiva.

1. Pathologic changes in the conjunctiva: hyperemia- conjunctival and ciliary, edema, follicles, papillas, phlyctenas, secretion – catarrhal, purulent, fibrin.
2. Inflammation of the conjunctiva (conjunctivitis) – acute, mild, chronic conjunctivitis, catarrhal, purulent, membranous, pseudo membranous, chlamidial, allergic conjunctivitis, conjunctiva-corneal damage in skin diseases, other conjunctivitis.

III. Examination of the lachrymal apparatus and conjunctiva:

1. Examination of the lachrymal secretion – Shirmer test.
2. Examination of the lachrymal pathway:
 - Canalicule test
 - nasal test
 - Anel test – demonstration.

- 3.Evacuation of the contents of the achrymal sac
- 4.Examination of the conjunctiva.
- 5.Focal illumination, bio microscopy.

IV. Demonstration of patients.

PRACTICE 7 - 3 HOURS

DISEASES OF THE CORNEA

- 1.Pathologic changes in the cornea: opacities – infiltration, cicatrix, degeneration, pathologic vessels: superficial, deep.
- 2.Changes in the form and dimensions of the cornea.
- 3.Inflammatory diseases of the cornea:
 - superficial, non purulent keratitis
 - superficial purulent keratitis
 - deep (parenchimal) keratitis
 - trophic keratitis
- 4.permanent changes after keratitis and their treatment.
- 5.Examination of the corneal sensitivity.
- 6.Focal illumination, bio microscopy.
- 7.Instillation of eye drops and crèmes.

PRACTICE 8 - 3 HOURS

DISEASES OF THE UVEA

- 1.Normal structure of the iris – examination by focal illumination.
- 2.Cilliary hyperemia. Differential diagnosis between cilliary and conjunctival hyperemia.
- 3.Pathologic changes in iridocyclitis – changes of the structure of the iris, precipitates, Tyndall effect, posterior synechiae, opacities. Differential diagnosis between iridocyclitis, conjunctivitis, keratitis and acute closure angle glaucoma.
- 4.Examination of patients.
- 5.Treatment of iridocyclitis.
- 6.Demonstration of patients.
- 7.Trans illumination.

PRACTICE 9 - 3 HOURS

TEST EXAMINATION. REVIEW.

PRACTICE 10 - 3 HOURS

DISEASES OF THE LENS.

- 1.Trans illumination.
- 2.Examination of a patient with a cataract in one eye and transparent lens in the other eye by focal illumination, trans illumination and bio microscopy.
- 3.Examination of an aphakic patient.
- 4.Correction of aphakia.

- 5.Demonstration of patients, video film – cataract extraction.
- 6.Bio microscopy, trans illumination.

PRACTICE 11 - 3 HOURS

GLAUCOMA. DIAGNOSTICS, PERIMETRY, TREATMENT, PREVENTION.

- 1.Examination of the IOP:
 - a.by palpation
 - б.by the tonometer of Maklakov.
 - в.by the tonometer of Schiots and Goldmann.
- 2.Medical documentation of a glaucoma patient – changes of IOP during daytime, perimeters.
- 3.Demonstration of patients and differential diagnosis between open angle glaucoma and cataract.
- 4.Prevention of glaucoma and monitoring of glaucoma patients. .
- 5.Perimetry.
- 6.Treatment – medical, surgery, laser operations.
- 7.Demonstration of patients, video film – surgical treatment of glaucoma.

PRACTICE 12 - 3 HOURS

RETINAL DISEASES. RETINOPATHY OF PREMATURITY. RETINAL VASCULAR DISEASES. RETINAL DETACHMENT. MACULAR DEGENERATION. RETINAL TUMORS. OPTIC NERVE DISEASES.

1. Classification of the retinal diseases.
2. Retinal vascular diseases.
3. Retinal changes in systemic diseases.
4. Retinopathy of prematurity.
5. Retinal detachment.
6. Macular degeneration.
7. Malignant melanoma of the choroid – clinical picture, treatment.
8. Retinoblastoma – clinical picture, treatment.
9. Optic nerve head edema, optic neuritis, retrobulbar neuritis – ophthalmoscopy, clinical picture, treatment.
10. Anterior ischemic optic neuropathy.
11. Trans illumination.
12. Ophthalmoscopy.

PRACTICE 13 - 3 HOURS

TRAUMAS AND URGENCY IN OPHTHALMOLOGY.

1. What do we do when there is a trauma of the eye and the accessory structures of the eye.
2. Foreign bodies in the conjunctiva and the cornea.
3. Demonstration of patients with ocular traumas: blunt trauma, penetrating traumas of the eyeball.
4. First aid in ocular burns – thermal, chemical.
5. First aid in penetrating injuries of the eyeball.
6. First aid in acute closure angle glaucoma, occlusion of the central retinal artery or vein.
7. Demonstration of patients.

PRACTICE 14 - 3 HOURS

DISTURBANCE OF OCULAR MOTILITY. VISION IN CHILDHOOD.

- I. Disturbance of ocular motility.
 1. Subjective complaints.
 2. Objective findings in concomitant and paralytic strabismus.
 3. What should the general practitioner do?
- II. Congenital anomalies.
- III. Demonstration of patients.

PRACTICE 15 - 3 HOURS

INTRODUCTION. BLINDNESS

I. Problems of blindness.

1. Definition of blindness.

2. Most common diseases leading to blindness.

3. Types of blindness.

- absolute
- practical
- connected with work
- professional
- pedagogic
- monocular and binocular
- reversible and irreversible.

4. Problems of blindness.

- moral and ethical
- social

5. Rehabilitation of blind people.

Note: During practice including the anterior and posterior segment of the eye, patients are demonstrated and practical skills developed, depending on the theme of the practice.

PRACTICE COURSE

4 ears, VII (VIII) semester

№	Topic	Hours	Date
	ANATOMY OF THE EYEBALL. SYSTEMIC EXAMINATION OF PATIENTS WITH OCULAR DISEASE. FOCAL ILLUMINATION, EXAMINATION OF THE CONJUNCTIVA.	3 h	
	PATHOLOGY OF COLOR VISION AND LIGHT PERCEPTION, PERIPHERAL VISION	3 h	
	CENTRAL VISION. REFRACTION AND ANOMALIES OF REFRACTION. VISUAL ACUITY.	3 h	
	TRANS ILLUMINATION, OPHTHALMOSCOPY, SKIASCOPY	3 h	

	DISEASES OF THE ORBIT AND EYELIDS	3 h	
	DISEASES OF THE LACHRYMAL APPARATUS AND CONJUNCTIVA	3 h	
	DISEASES OF THE CORNEA	3 h	
	DISEASES OF THE UVEA	3 h	
	TEST EXAMINATION – REVIEW	3 h	
	DISEASES OF THE LENS	3 h	
	GLAUCOMA – DIAGNOSTICS, PERIMETRY, TREATMENT, PREVENTION	3 h	
	DISEASES OF THE RETINA. RETINOPATHY OF PREMATURITY. RETINAL VASCULAR DISEASE. RETINAL DETACHMENT. MACULAR DEGENERATION. RETINAL TUMORS. PATHOLOGY OF THE OPTIC NERVE	3 h	
	TRAUMAS AND OCULAR URGENCY	3 h	
	DISTURBANCE OF OCULAR MOTILITY. VISION IN CHILDHOOD	3 h	
	INTRODUCTION. BLINDNESS	3 h	

Total: 45 h.

BIBLIOGRAPHY

TEXTBOOK	AUTHORS	Publisher
Clinical Ophthalmology	Kanski J.	Butterworth Heinemann , UK, 1997
Diabetic Retinopathy.	Editor Mohammad Shamsul Ola.	InTech, Rijeka, Croatia, Feb. 2012.
Practical guide in ophthalmology	Editor: Prof. M. Konareva- Kostianeva	Medical University, Plovdiv, 2013
Ophthalmology	Gerhard K. Lang	Thieme, Stuttgart- New York, 2000

Basic and Clinical Science Course

Published by the American Academy of Ophthalmology, 12 sections

QUESTIONNAIRE FOR THE END EXAM IN OPHTHALMOLOGY MEDICAL STUDENTS

1. Eyeball – general information.
2. Anatomy of the outer layer of the eyeball / cornea, sclera /.
3. Anatomy of the middle layer of the eyeball / uvea /.
4. Anatomy of the retina.
5. Anatomy of the visual pathways.
6. Anatomy of the eyelids and conjunctiva.
7. Anatomy of lacrimal apparatus.
8. Anatomy of the orbit.
9. Anatomy of the muscular system of the eye - external muscles of the eye.
10. Light perception. Adaptation. Methods of examination. Disturbances of adaptation.
11. Colour vision. Theories and disturbances.
12. Central vision. Visual acuity. Examination of visual acuity. Visual charts.
13. Peripheral vision. Visual field. Methods for examination. Changes in visual field – scotomata, anopsias concentric narrowing.
14. Binocular vision. Fusion.
15. Diseases the orbit - general data. Inflammatory diseases of the orbit and soft tissues of the orbit.
16. Tumours of the orbit. Parasitic orbital diseases.
17. Inflammatory diseases of the skin and subcutaneous tissue of the eyelids. Diseases of the eyelid margins.
18. Tumours of the eyelids and conjunctiva.
19. Disturbances of eyelid mobility and position.
20. Inflammatory diseases of the conjunctiva – signs and symptoms
21. Conjunctivitis – types, signs, treatment.
22. Chronic conjunctivitis. Chlamydial conjunctivitis - paratrachoma and trachoma.
23. Allergic and autoimmune conjunctivitis. Vernal conjunctivitis. Lymphatic keratoconjunctivitis. Degenerations the conjunctiva - pinguecula and pterygium. Dry eye syndrome.
24. Diseases of the lacrimal drainage system.
25. Superficial non - purulent keratitis.
26. Superficial purulent keratitis.
27. Anomalies in size and curvature of the cornea. Keratoconus. Keratoplasty. Corneal refractive surgery.

28. Anterior uveitis / iridocyclitis / - clinical features, complications, differential diagnosis, treatment.
29. Posterior uveitis, chorioretinitis.
30. Inflammatory diseases of the whole uvea - tubercular, syphilitic, Toxoplasma, sarcoidosis. Ocular signs in AIDS.
31. Sympathetic ophthalmia. Endophthalmitis.
32. Malignant melanoma of the uvea.
33. Diabetic retinopathy and retinal changes in hypertension.
34. Acute retinal arterial and venous occlusive disease (branch and central retinal artery and vein occlusion).
35. Age – related macular degeneration (AMD). Retinitis pigmentosa. Central serous retinopathy.
36. Retinal detachment - congenital, primary, secondary.
37. Tumours of the retina / retinoblastoma /.
38. Retinopathy of prematurity (ROP).
39. Papilloedema. Inflammation of the optic nerve - papillitis, retrobulbar neuritis.
40. Ischaemic optic neuropathy. Optic atrophy - primary and secondary.
41. Pupil - general data. Normal reactions of the pupil. Abnormal reactions of the pupil.
42. Senile cataract, forms, stages, treatment. Aphakia.
43. Congenital cataracts. Changes of lens location - traumatic, congenital.
44. Primary open-angle glaucoma.
45. Angle closure glaucoma.
46. Congenital glaucoma. Secondary glaucomas - pigmentary, pseudoexfoliative, neovascular and traumatic.
47. Refraction of the eye. Physical optics. Eye as an optical system. Physical and clinical refraction. Examination of refraction - subjective and objective methods.
48. Accommodation - types, paralysis and spasm of accommodation. Presbyopia.
49. Hypermetropia, hyperopia.
50. Nearsightedness, myopia.
51. Astigmatism. Anisometropia. Eyeglasses - definition of spectacle lenses, magnifying glasses, telescopic spectacles. Contact lenses.
52. Eye motility disorders - general data. Amblyopia - types and treatment. Concomitant squint.
53. Paralytic squint.
54. Trauma the eyeball and its adnexa - general data. Classification. Injuries to the eye and its adnexa. Principles of treatment.
55. Penetrating injuries of the eyeball and adnexa with or without foreign body. Principles of treatment.
56. Eye burns - thermal, chemical. Radiation damage of the eyes. Principles of treatment.
57. Blindness - degrees, causes and types. The most common topical drugs in ophthalmology.
58. Emergency in ophthalmology: traumas, acute glaucoma attack, acute occlusion of retinal arteries and veins.

QUESTIONNAIRE FOR THE PRACTICAL EXAM IN OPHTHALMOLOGY MEDICAL STUDENTS

1. Exposing of the conjunctiva.
2. Massage of the lacrimal sac.
3. Shirmer test.
4. Fluorescein test.
5. Examination of the corneal sensitivity.
6. Biomicroscopy.
7. Illumination.

- 8.Ophthalmoscopy.
- 9.Examination of color vision.
- 10.Examination of visual acuity, perception and projection of light.
- 11.Control method of examination of visual field.
- 12.Palpation method of examination of the intraocular pressure.
- 13.Instillation of ocular medicaments (drops, crèmes).

MEDICAL UNIVERSITY OF PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

NEUROLOGY

Approved by the Department Council - Protocol №3/26.05.2022

Approved by the Faculty Council – Protocol №6/15.06.2022

Name of course:

Neurology

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								IV year	
		Total	Lectures	Practices	ECTS			VII	VIII
Neurology	VIII	120	60	60	4.0	2.0	6.0	2/2	2/2

Type of course according to the Unified Governmental Regulations:

Compulsory

Educational level:

Magister (Master)

Teaching methods:

Lectures, exercises, self-study.

Length of training:

Two semesters

Hours:

30 hours of lectures, 30 hours of practical training exercises

Auxillary teaching aids:

Multimedia presentations, discussions, demonstration of patient-based cases, abnormal findings of EMG, EEG, Doppler sonography, CT, MRI and angiography approaches

Assessment forms:

Continuous assessment during the semesters, 1 colloquium per semester, entrance exam test on general neurology, written exam on clinical neurology and practical exam

Rating:

The average rating is based on colloquiums passed during the semesters; the written and theoretical exams (after a successful entrance test with a threshold of 65% correct answers).

Note:

If there is some uncertainty about the final rating, additional questions can be asked in relation to the items from the written exam or lapses from the practical exam.

Semestrial exam:

Entrance tests, written and practical exam.

Leading lecturer:

Senior qualified lecturer from the Department of Neurology

Department: Neurology

ANNOTATION

The main aim of the clinical discipline of Neurology is theoretical and practical training of future physicians for the comprehensive care of the neurological patient, including the ability to assess the need for specialized consultative neurological help or emergency hospitalization of the patient in a hospital for active treatment.

The teaching courses of Neurology are as follows:

General Neurology which includes:

- taking the case history and examining the patient;
- investigation and identification of the symptoms and syndromes of the impairment of the central nervous system (CNS) and peripheral nervous system (PNS);
- the possibilities of making a topical diagnosis by clinical, laboratory, neurophysiological and neuroimaging approaches.

Clinical Neurology. Contemporary and challenging neurological diseases:

Cerebrovascular, inflammatory, degenerative, demyelinating, movement disorders, epilepsy, headache and other paroxysmal conditions, the pathological disorders of ANS, the tumor and traumatic injuries of CNS, dementias are examined by an accepted algorithm: etiology, pathology, pathogenesis, classifications, clinical features, diagnosis and differential diagnosis, treatment, prognosis and prevention.

THE MAIN GOALS OF THE TEACHING PROGRAMME

Gaining knowledge and skills in applying contemporary approaches and means for the diagnosis, treatment and prevention.

- theoretical knowledge about the anatomy and physiology of the nervous system, symptoms and syndromes of the nervous system impairment, criteria for topical diagnostics of the injuries of CNS, PNS and ANS;

- gaining practical skills in taking a neurological case history and working with a reflex hammer;
- neurological examination with identification of pathological reflexes, sensory and motor disturbances, coordination syndromes and higher cortical dysfunctions
- establishing a topical diagnosis;
- establishing a clinical diagnosis;
- specialized examination of CNS and PNS (EEG, EMG, Doppler sonography, EP), neuroimaging (CT, MRI, cerebral angiography), laboratory (blood, cerebrospinal fluid examination) approaches;
- identification of abnormal laboratory, electrophysiological and neuroimaging findings;
- choosing the adequate therapeutic approach under emergency conditions.

EXPECTED RESULTS

After the completion of the course, student should have knowledge and skills as follows:

- to take a detailed neurological case history
- to know the main symptoms and syndromes of the CNS and PNS injuries
- to possess practical skills for the diagnostics of the general cerebral and focal neurological symptoms
- the ability to make a topical diagnosis
- to be aware of the etiology, pathogenesis, clinical features and diagnostic procedures of neurological diseases
- to know the clinical approaches, laboratory findings and neuroimaging features of different neurological conditions and the main indications for hospitalization
- to know the main principles of treatment under emergency conditions
- to know the primary and secondary means of prevention of the main neurological diseases; to know and recommend related diet regimens and physiotherapy when needed

LECTURES PROGRAMME

IVth year , VIIth semester

№	TITLE	HOURS	DATE
1.	Short history of Neurology Reflex activity and its clinical significance	2 h	
2.	Somatic sensation. Sensory disorders: clinical significance	2 h	
3.	Syndromes of sensory disorders. Pain.	2 h	
4.	Motor system and motor activity. Pyramidal system. Muscle tone	2 h	
5.	Extrapyramidal system and its disorders. Main extrapyramidal syndromes	2 h	
6.	Cerebellum and coordination of movements. Clinical significance of their disorders. Gait and posture	2 h.	
7.	Autonomic nervous system and autonomic disorders	2 h	
8.	General neurological syndromes: syndromes of meningeal irritation, alterations of consciousness, syndromes of elevated intracranial pressure	2 h	
9.	Localization of cerebral functions. Topical diagnosis of brain diseases	2h	
10.	Localization of cerebral functions. Topical diagnosis of individual spinal nerve lesions, root lesions, plexus lesions	2 h	

11.	Localization of cerebral functions. Topical diagnosis of syndromes of spinal cord and brainstem lesions	2 h	
12.	Localization of cerebral functions. Higher cortical functions and their disorders	2 h	
13.	Localization of cerebral functions. Syndromes of lesions of the cerebral lobes	2 h	
14.	Neuroradiology and magnetic resonance imaging (MRI)	2 h	
15.	Clinical neurophysiology. Electroencephalography (EEG). Electromyography (EMG)	2 h	

TOTAL: 30 h.

LECTURES PROGRAMME

IVth year, VIIIth semester

№	TITLE	HOURS	DATE
1.	Diseases of the peripheral nervous system – Bell's palsy, Trigeminal neuralgia. Herpes zoster	2 h	.
2.	Polineurites and polyneuropathies. Guillain-Barre syndrome. Cervical and lumbar radiculopathies	2 h	
3.	Meningites. Neurosyphilis	2 h	
4.	Ist part Encephalomyelites	2 h	

5.	2 nd part Encephalomyelites. Encephalopathies.	2 h	
6.	1 st part Cerebrovascular diseases.	2 h	
7.	2 nd part Cerebrovascular diseases.	2 h.	
8.	Acute stroke treatment	2 h.	
9.	Degenerative diseases. Dystrophinopathies	2 h	
10.	Epilepsy	2 h	
11.	Neuroses. Psychosomatic disorders	2 h	
12.	Headache	2 h.	
13.	Brain tumors	2 h	
14.	Traumatic injuries of nervous system	2 ч.	
15.	Emergencies in neurological practice.	2 ч.	

TOTAL: 30 h.

PROGRAMME OF EXERCISES

IVth year, VIIth semester

№	TITLE	HOURS	DATE
1.	Introduction. Short history of neurology Neurological case history	2 h	
2.	Normal reflexes	2h	
3.	Pathological reflexes. Clinical significance	2 h.	
4.	Somatic sensation. Anatomy and physiology. Examination methods	2 h	
5.	Sensory syndromes - clinical significance	2 h	
6.	Meningeal syndrome. Symptoms of meningeal irritation. Cerebrospinal fluid examination. CSF syndromes	2 h	
7.	Motor system and motor activity. Pyramidal system. Muscle tone and muscle strength. Syndromes of disordered motor function	2 h	
8.	Motor system and motor activity. Extrapyramidal system and its disorders	2 h	
9.	Motor system and motor activity. Coordination of movements. Anatomy and physiology. Clinical significance of their disorders	2 h	
10.	Cranial nerves I-VII.. Anatomy and physiology. Examination methods. Symptomatology	2 h	

11.	Cranial nerves VIII- XII. Anatomy and physiology. Examination methods. Symptomatology. Bulbar palsy. Pseudobulbar palsy	2 h	
12.	Spinal nerves. Spinal cord syndromes. Brainstem syndromes	2 h	
13.	Internal capsule syndrome. Syndromes of lesion of the cerebral cortex	2 h	
14.	Neurophysiological methods of examination of the nervous system	2 h	
15.	Topical diagnosis	2 h	

TOTAL : 30 h

PROGRAMME OF EXERCISES

IVth year, VIIIth semester

Nº	T ITLE	HOURS	DATE
1.	Meningites. Diagnosis. Differential diagnosis. Treatment	2 h	
2.	Colloquium General neurology	2 h	

4.	Peripheral nervous system disorders. Polyneurites. Polyradiculoneurites. Herpes zoster. Tabes dorsalis	2 h	
5.	Encephalomyelites. Diagnosis. Differential diagnosis. Treatment	2 h	
6.	Encephalopathies. Diagnosis. Differential diagnosis. Treatment	2 h	
7.	Haemorrhagic stroke. Diagnosis. Differential diagnosis. Rehabilitation	2 h	
8.	Subarachnoid haemorrhage. Diagnosis. Differential diagnosis. Treatment. Rehabilitation.	2 h	
9.	Ischaemic stroke. Diagnosis. Differential diagnosis. Treatment. Rehabilitation.	2 h	
10.	Brain tumors. Spinal cord tumors. Diagnosis. Treatment	2 h	
11.	Traumatic injuries of the nervous system.	2 h	
12.	Degenerative diseases. Distrophinopathies. Diagnosis. Treatment	2 h	
13.	Epilepsy. Status epilepticus. Diagnosis. Differential diagnosis. Modern treatment	2 h	
14.	Neurological syndromes of some internal diseases – funicular myelosis, collagenoses, polymyosites, SLE, etc.	2 h	
15.	Headache. Neuroses	2 h	

TOTAL: 30 h.

LECTURES

Lecture № 1 – 2 hours

SHORT HISTORY OF NEUROLOGY. REFLEX ACTIVITY AND ITS CLINICAL SIGNIFICANCE

1. Definitions
2. Classifications (types of reflexes)
3. Examination of reflexes
4. Reflex abnormalities
 - 4.1. Quantitative abnormalities
 - 4.2. Qualitative changes of the reflexes (pathological reflexes)
5. Clinical significance
6. Dependence of reflex changes upon site of the lesion

Lecture № 2 – 2 hours

SOMATIC SENSATION. SENSORY DISORDERS: CLINICAL SIGNIFICANCE

1. Definition
2. Functional anatomy of sensation
3. Sensory system examination
 - 3.1. Examination of primary sensory modalities
 - 3.2. Examination of complex sensations
 - 3.3. Application of tests
4. Common signs of disordered general sensation

Lecture № 3 – 2 hours

SYNDROMES OF SENSORY DISORDERS. PAIN

1. Syndromes of peripheral nerve lesion
2. Sensory syndromes of spinal nerve roots
3. Sensory syndrome of the spinal cord
4. Sensory syndromes due to lesions of the brainstem
5. Sensory syndromes due to lesion of the thalamus
6. Sensory syndromes due to lesions of the sensory cortex
7. Psychogenic sensory disturbances
8. Pain

Lecture № 4 – 2 hours

THE MOTOR SYSTEM AND MOTOR ACTIVITY. PYRAMIDAL SYSTEM. MUSCLE TONE

1. Pyramidal (corticospinal) system
2. Anatomy and physiology of the motor act
3. Terminology and definitions.
4. Examination of the motor system
 - 4.1. Muscle volume
 - 4.2. Muscle strength
5. Syndromes of disordered motor function
 - 5.1. Syndrome of lower motor neuron lesion
 - 5.2. Upper motor neuron syndrome
 - 5.3. Specific syndromes according to the location of lesion along the upper (pyramidal tract) and lower motor neuron
6. Muscle tone. Syndromes of disordered muscle tone

Lecture № 5 – 2 hours

THE EXTRAPYRAMIDAL SYSTEM AND ITS DISORDERS. MAIN EXTRAPYRAMIDAL SYNDROMES

1. General considerations
2. Anatomy and physiology of the extrapyramidal system
3. Clinical-pathological correlation in lesions of the basal ganglia
4. Examination of the extrapyramidal system
5. Involuntary movements
 - 5.1. Tremor
 - 5.2. Chorea
 - 5.3. Hemiballism
 - 5.4. Athetosis
 - 5.5. Dystonia
 - 5.6. Myoclonus
 - 5.7. Tics
6. Main extrapyramidal syndromes
 - 6.1. Parkinsonian syndrome
 - 6.2. Choreic syndrome

Lecture № 6 – 2 hours

THE CEREBELLUM AND COORDINATION OF MOVEMENTS. CLINICAL SIGNIFICANCE OF THEIR DISORDERS. GAIT AND POSTURE

1. General considerations
2. Anatomy and physiology of coordination
3. Anatomy of the cerebellum
4. Physiology and pathophysiology of the cerebellum
5. Main signs of cerebellar dysfunction
6. Clinical examination of coordination

7. Cerebellar syndromes
 - 7.1.Cerebellar syndrome of midline lesions
 - 7.2.Syndrome of cerebellar hemispheric lesion
 - 7.3.Syndrome of pancerebellar disorders
8. Syndromes of disturbed coordination
9. Gait and posture

Lecture № 7 – 2 hours

AUTONOMIC NERVOUS SYSTEM AND AUTONOMIS DISORDERS

1. General considerations
2. Anatomophysiology of ANS
3. Tests and abnormalities of the autonomic nervous system
4. Autonomic innervation of the pupils and its disorders
5. Anatomy of of bladder function and its disturbances
6. Clinical syndromes of disordered autonomic function
7. Clinical hypothalamic syndromes

Lecture № 8 – 2 hours

GENERAL NEUROLOGICAL SYNDROMES: SYNDROMES OF MENINGEAL IRRITATION, ALTERATIONS OF CONSCIOUSNESS, SYNDROMES OF ELEVATED INTRACRANIAL PRESSURE

1. General considerations
2. Syndrome of meningeal irritation
3. Syndrome of cerebrospinal fluid changes
 - 3.1.Bacterial meningitis
 - 3.2.Tuberculous meningitis
 - 3.3.Viral meningitis
 - 3.4.Subarachnoid haemorrhage
 - 3.5.Meningism
4. Non-obligatory involvement of cranial nerves of brain tissue
5. Non-obligatory syndrome of psychic changes
6. Clinical features in infants
7. Consciousness. Alterations of consciousness. Brain death
 - 7.1.Definition
 - 7.2.Coma

Lecture № 9 – 2 hours

LOCALIZATION OF CEREBRAL FUNCTIONS. TOPICAL DIAGNOSIS OF BRAIN DISEASES

1. Localization problem
2. Lateralization of cerebral functions
3. Brodmann's fields
4. Brain syndromes

Lecture №10 – 2 hours

LOCALIZATION OF CEREBRAL FUNCTIONS. TOPICAL DIAGNOSIS OF INDIVIDUAL SPINAL NERVE LESIONS, ROOT LESIONS AND PLEXUS LESIONS

1. General considerations
2. Anatomy of the peripheral nervous system
3. Clinical syndromes of spinal nerves and root lesions
4. Clinical syndromes of the plexus lesions
5. Clinical syndromes of individual peripheral spinal nerve lesion

Lecture № 11 – 2 hours

LOCALIZATION OF CEREBRAL FUNCTIONS. TOPICAL DIAGNOSIS OF SYNDROMES OF SPINAL CORD AND BRAINSTEM LESIONS

1. Functional anatomy
2. The spinal cord
 - 2.1. Syndrome of spinal ganglion
 - 2.2. Syndrome of posterior roots
 - 2.3. Syndrome of posterior tracts
 - 2.4. Syndrome of posterior horn
 - 2.5. Syndrome of the gray matter
 - 2.6. Syndrome of combined damage of posterior funiculi and corticospinal tracts
 - 2.7. Syndrome of anterior horn
 - 2.8. Syndrome of combined anterior horns and pyramidal tracts damage
 - 2.9. Syndrome of corticospinal tracts
 - 2.10. Syndrome of combined involvement of posterior funiculi, spinocerebellar pathways, and possibly pyramidal tracts
 - 2.11. Syndrome of hemisection of the spinal cord
 - 2.12. Syndrome of complete transection of the spinal cord
 - 2.13. Syndromes of lesions at different levels of the spinal cord
3. Brainstem
 - 3.1 Focal brainstem syndromes – general considerations

- 3.2 Syndromes of medulla oblongata lesions
- 3.3 Syndromes of pons lesions
- 3.4 Syndromes of midbrain lesions.

Lecture №12 – 2 hours

**LOCALIZATION OF CEREBRAL FUNCTIONS.
HIGHER CORTICAL FUNCTIONS AND THEIR DISORDERS**

- 1. Definitions and neurological terms, associated with higher cortical functions and their disorders
- 2. Agnosia
- 3. Apraxia
- 4. Language, speech and aphasia.

Lecture № 13 – 2 hours

**LOCALIZATION OF CEREBRAL FUNCTIONS.
SYNDROMES OF LESIONS OF THE CEREBRAL LOBES**

- 1. Functional anatomy of the cerebral lobes and cerebral cortex
- 2. Functional organization of the cortex
- 3. Syndromes of the cerebral lobes – general considerations
- 4. Frontal lobe
- 5. Parietal lobe
- 6. Temporal lobe
- 7. Occipital lobe
- 8. Subcortical syndromes of the cerebral hemisphere

Lecture № 14 – 2 hours

NEURORADIOLOGY AND MAGNETIC RESONANCE IMAGING

- 1. Neuroradiology
 - 1.1.Plain radiology
 - 1.2.Computed tomography
 - 1.3.Invasive investigations
 - 1.4.Myelography
 - 1.5.Cerebral angiography
- 2. Magnetic resonance imaging (MRI)

Lecture № 15 – 2 hours

CLINICAL ELECTROPHYSIOLOGY

1. Electroencephalography (EEG)
 - 1.1. Neurophysiological bases of EEG
 - 1.2. Normal EEG
 - 1.3. EEG abnormalities
2. Electromyography (EMG) and nerve conduction studies
 - 2.1. Nerve conduction studies
 - 2.2. Electrodiagnostic syndromes
3. Indications for electrodiagnostic investigation
4. Evoked potential study

Lecture № 1 – 2 hours

DISEASES OF THE PERIPHERAL NERVOUS SYSTEM. BELL'S Palsy. TRIGEMINAL NEURALGIA. HERPES ZOSTER

1. Plexus and root lesions
2. Bell's palsy
 - 2.1. Etiology and pathology
 - 2.2. Clinical features
 - 2.3. Treatment and prognosis
3. Trigeminal neuralgia
 - 3.1. Etiology
 - 3.2. Clinical features
 - 3.3. Complications
 - 3.4. Treatment
4. Herpes zoster

Lecture № 2 – 2 hours

POLYNEURITES AND POLYNEUROPATHIES. GUILLAIN-BARRE SYNDROME. CERVICAL AND LUMBAR RADICULOPATHIES.

1. Polyneurites
2. Polyneuropathies
 - 2.1. Patterns of injury
 - 2.2. Classification
 - 2.3. Syndrome of polyneuropathy
3. Guillain-Barre syndrome
 - 3.1. Definition
 - 3.2. Etiology
 - 3.3. Clinical features
 - 3.4. Complications
 - 3.5. Diagnosis and differential diagnosis
 - 3.6. Treatment and prognosis

4. Diabetic polyneuropathy
5. Alcoholic polyneuropathy
6. Cervical and lumbar radiculopathies

Lecture № 3 – 2 hours

MENINGITES. NEUROSYPHILIS

1. Bacterial meningitis
 - 1.1. Etiology. Pathogenesis
 - 1.2. Classification
 - 1.3. Clinical features
 - 1.4. Diagnostic procedures
 - 1.5. Treatment
2. Tuberculous meningitis
 - 2.1. Definition. Risk factors
 - 2.2. Clinical features
 - 2.3. Complications
 - 2.4. Diagnosis
 - 2.5. Treatment
3. Viral meningitis
 - 3.1. Definition. Risk factors
 - 3.2. Clinical features
 - 3.3. Diagnosis and treatment
4. Syphilis. Neurological complications

Lecture № 4 – 2 hours

Ist part. ENCEPHALOMYELITES. Herpes Simplex Virus Encephalitis. AIDS encephalitis. Creutzfeld-Jakob Disease. Subacute Sclerosing Panencephalitis. Lyme Disease

1. Herpes simplex virus encephalitis.
 - 1.1. Etiology and pathology
 - 1.2. Clinical features
 - 1.3. Diagnosis and treatment
2. AIDS encephalitis
 - 2.1. Etiology and pathology
 - 2.2. Clinical features
 - 2.3. Diagnosis and treatment
3. Creutzfeld-Jakob Disease.
 - 3.1. Etiology and pathology
 - 3.2. Clinical features
 - 3.3. Diagnosis and treatment
4. Subacute Sclerosing Panencephalitis.
5. Lyme Disease

Lecture № 5 – 2 hours

2nd part. ENCEPHALOMYELITES. Multiple sclerosis

1. Etiology and epidemiology
2. Pathology and pathogenesis
3. Clinical features
4. Diagnosis and differential diagnosis
5. Treatment
6. Prognosis

Lecture № 6 – 2 hours

1st part. CEREBROVASCULAR DISEASES

1. Haemorrhagic stroke
 - 1.1. Definition
 - 1.2. Etiology
 - 1.3. Pathogenesis
 - 1.4. Classification
2. Subarachnoid haemorrhage
 - 2.1. Clinical features
 - 2.2. Diagnosis and differential diagnosis
3. Intracerebral haemorrhage
 - 3.1. Clinical features
 - 3.2. Diagnosis and differential diagnosis

Lecture №7 – 2 hours

2nd part. CEREBROVASCULAR DISEASES

1. Ischaemic stroke
 - 1.1 Definition
 - 1.2 Etiology. Cerebrovascular risk factors
 - 1.3 Pathogenesis
 - 1.4 Classification
2. Transient ischaemic attacks
3. Ischaemic stroke. Minor stroke. Lacunar infarcts
 - 3.1. Clinical features
 - 3.2. Diagnostic procedures
 - 3.3. Differential diagnosis

Lecture №8 – 2 hours

ACUTE STROKE TREATMENT

1. Treatment of acute ischaemic stroke
2. Treatment of subarachnoid haemorrhage
3. Treatment of intracerebral haemorrhage
4. Stroke prevention
5. Stroke prognosis

Lecture №9 – 2 hours

DEGENERATIVE DISEASES. DYSTROPHYNOPATHIES

1. Alzheimer's disease. Pick's disease
2. Parkinson's disease
3. Myasthenia gravis
4. Amyotrophic lateral sclerosis
5. Hereditary motor and sensory polyneuropathy (Charcot-Marrie-Tooth disease). Spinal muscular atrophy.
6. Dystrophinopathies
7. Myotonic dystrophy

Lecture №10 – 2 hours

EPILEPSY

1. Definition
2. Etiology. Epidemiology
3. Classification of epileptic seizures
4. Guidelines for evaluation after the first seizure
5. Clinical features
6. Diagnosis
7. Principles of antiepileptic drug therapy
8. Status epilepticus
9. Psychosocial and psychiatric issues
10. Practical advice for the epileptic patient

Lecture №11 – 2 hours

THE NEUROSES AND PERSONALITY DISORDERS

1. Neuroses
 - 1.1. Incidence
 - 1.2. Classifications

2. Anxiety neurosis and panic attacks
3. Phobic neurosis
4. Obsessive-compulsive neurosis
5. Hysteria (Briquet Disease, Somatization disorder).
 - 5.1. Special hysterical syndromes
 - 5.2. Principles in treatment of hysteria
6. Hypochondriasis

Lecture №12 – 2 hours

HEADACHE

1. Definition
2. Approach to the patient with headache
3. Acute headache
4. Chronic headache
5. Primary headaches
 - 5.1. Tension-type headache
 - 5.2. Migraine headache
 - 5.3. Cluster headache
 - 5.4. Exertional headaches
6. Secondary headaches

Lecture №13 – 2 hours

BRAIN TUMORS

Lecture №14 – 2 hours

TRAUMATIC INJURIES OF THE NERVOUS SYSTEM

Lecture №15 – 2 hours

EMERGENCIES IN NEUROLOGICAL PRACTICE

1. Nonepileptic paroxysmal conditions
2. Sleep and its disorders
3. Examination methods

PRACTICAL EXERCISES

VIIth semester

Exercise № 1 – 2 hours

Introduction. Short history of neurology.
Neurological case history

Exercise № 2 – 2 hours

Examination of normal reflexes

- Gaining practical skills in working with reflex hammer
- Examination of deep tendon reflexes
- Examination of superficial reflexes
- Examination of patient with normal reflexes

Exercise № 3– 2 hours

Pathological reflexes

- Gaining practical skills in examination of pathological reflexes
- Examination of patient with pathological reflexes
- Identification of reflex abnormalities
- Determination of the clinical significance of reflex changes

Exercise № 4 – 2 hours

Somatic sensation. Anatomy and physiology. Examination methods

- Gaining practical skills in examination of primary sensory modalities
- Gaining practical skills in examination of complex sensations
- Application of tests
- Examination of patient with positive sensory signs
- Examination of patient with negative sensory signs

Exercise № 5 – 2 hours

Sensory syndromes. Clinical significance

- Gaining practical skills in examination of patient with syndrome of peripheral nerve lesion
- Gaining practical skills in examination of patient with syndrome of spinal nerve root
- Gaining practical skills in examination of patient with syndrome of spinal cord
- Gaining practical skills in examination of patient with syndrome of brainstem, thalamus, sensory cortex and psychogenic sensory disturbances

Exercise № 6 – 2 hours

Meningeal syndrome. Symptoms of meningeal irritation. Cerebrospinal fluid examination. CSF syndromes

- Gaining practical skills in examination of patient with meningeal syndrome
- Application of tests
- Examination of patient with meningeal syndrome

Exercise № 7 – 2 hours

Motor system and motor activity. Pyramidal system. Muscle tone and muscle strength. Syndromes of disordered motor function

- Gaining practical skills in examination of muscle volume and muscle strength
- Assessment of muscle tone
- Application of tests for examination of latent hemiparesis
- Examination of patient with upper motor neuron lesion
- Examination of patient with lower motor neuron lesion

Exercise № 8 – 2 hours

Motor system and motor activity. Extrapyramidal system and its disorders

- Examination of patient with Parkinsonian syndrome or other extrapyramidal syndromes
- Application of tests

Exercise № 9 – 2 hours

Motor system and motor activity. Coordination of movements. Anatomy and physiology. Clinical significance of their disorders

- Gaining practical skills in examination of coordination
- Application of tests for detection of static ataxia
- Application of tests for detection of locomotor ataxia
- Application of tests for detection of dynamic ataxia
- Examination of patient with cerebellar syndrome or other syndromes of disturbed coordination

Exercise № 10 – 2 hours

Cranial nerves I-VII.. Anatomy and physiology. Examination methods. Symptomatology.

- Gaining practical skills in examination of cranial nerves I-VI
- Application of tests for main clinical signs and syndromes
- Examination of patient with cranial nerve disorder

Exercise № 11 – 2 hours

Cranial nerves VIII- XII. Anatomy and physiology. Examination methods. Symptomatology. Bulbar palsy. Pseudobulbar palsy

- Gaining practical skills in examination of cranial nerves VII-XII
- Application of tests for main clinical signs and syndromes
- Examination of patient with bulbar palsy
- Examination of patient with pseudobulbar palsy

Exercise № 12 – 2 hours

Spinal nerves. Spinal cord syndromes. Brainstem syndromes

- Gaining practical skills in examination of patient with spinal cord syndromes
- Gaining practical skills in examination of patient with brainstem syndromes
- Application of tests for main clinical signs and syndromes
- Examination of patient with spinal cord or brainstem syndrome

Exercise № 13 – 2 hours

Internal capsule syndrome. Syndromes of lesion of the cerebral cortex

- Gaining practical skills in examination of patient with internal capsule syndrome
- Application of tests for main clinical signs and syndromes
- Examination of patient with internal capsule syndrome or syndrome of lesion of the cerebral cortex

Exercise № 14 – 2 hours

Neurophysiological methods of examination of the nervous system

- Indications for electrodiagnostic investigation
- Electroencephalography
- Electromyography
- Evoked potentials study

Exercise № 15 – 2 hours

Topical diagnosis. Complete neurological examination

- Complete neurological examination
- Examination of patient with focal neurological signs

PRACTICAL EXERCISES

VIIIth semester

Exercise № 1 – 2 hours

Meningites. Diagnosis. Differential diagnosis. Treatment

- Examination of patient with meningeal irritation

Exercise № 2 – 2 hours

Colloquium

General neurology

Exercise № 3 – 2 hours

Peripheral nervous system disorders. Radiculites. Bell's palsy. Trigeminal neuralgia

- Examination of patient with Bell's palsy and trigeminal neuralgia

Exercise № 4 – 2 hours

Peripheral nervous system disorders. Polyneurites. Polyradiculoneurites. Herpes zoster. Tabes dorsalis

- Examination of patient with polyneuropathy

Exercise № 5 – 2 hours

Encephalomyelites. Diagnosis. Differential diagnosis. Treatment

- Examination of patient with multiple sclerosis

Exercise № 6 – 2 hours

Encephalopathies. Diagnosis. Differential diagnosis. Treatment

- Examination of patient with encephalopathy

Exercise № 7 – 2 hours

Haemorrhagic stroke. Diagnosis. Differential diagnosis. Rehabilitation

- Examination of patient with haemorrhagic stroke

Exercise № 8 – 2 hours

Subarachnoid haemorrhage. Diagnosis. Differential diagnosis. Treatment. Rehabilitation.

- Examination of patient with subarachnoid haemorrhage

Exercise № 9 – 2 hours

Ischaemic stroke. Diagnosis. Differential diagnosis. Treatment. Rehabilitation.

- Examination of patient with ischaemic stroke

Exercise № 10 – 2 hours – in Neurosurgery

Brain tumors. Spinal cord tumors. Diagnosis. Treatment

Exercise № 11 – 2 hours – in Neurosurgery

Traumatic injuries of the nervous system.

Exercise № 12 – 2 hours

Degenerative diseases. Distrophinopathies. Diagnosis. Treatment

- Examination of patient with Parkinson's disease, Alzheimer's disease

Exercise № 13 – 2 hours

Epilepsy. Status epilepticus. Diagnosis. Differential diagnosis. Modern treatment

- Examination of patient with epilepsy

Exercise № 14 – 2 hours

Neurological syndromes in some internal diseases – funicular myelosis, collagenoses, polymyosites, SLE, etc

- Examination of patient with different neurological syndromes

Exercise № 15 – 2 hours

- Examination of patient with headache or patient with neurosis

SYLLABUS NEUROLOGY

for 4th year medical students

GENERAL NEUROLOGY

1. Neuron. Neuroglia. Neurotransmitters. Clinical significance
2. Reflex activity. Anatomy and physiology. Pathological changes of extero- and proprioceptive reflexes.
3. Reflex activity - pathological reflexes, spinal cord and stem-brain automatisms.
4. Anatomy and physiology of the general senses. Symptomology and pathophysiology of its disorders.
5. Sensory syndromes in damage to the peripheral nerves, posterior roots and posterior horns of the spinal cord. Thalamic and cortical sensory syndromes. Pain.
6. Conductive sensory disorder (in case of damage to the lateral and posterior columns of the spinal cord). Psychogenic sensory disorders.
7. Smell and taste. Anatomy and physiology. Disorders.
8. Visual, auditory and vestibular analyzers. Anatomy and physiology. Diseases.
9. Motor activity. Pyramidal system. Corticospinal tract. Anatomy and physiology. Central /upper motor neuron/ paralysis.
10. Motor activity. Pyramidal system. Corticobulbar tract. Anatomy and physiology. Pseudobulbar paralysis.
11. Lower motor neuron. Syndrome of lesions of the lower motor neuron, syndromes of lesions of anterior roots, plexuses, peripheral nerves.
12. Motor activity. Extrapyramidal system. Anatomical and physiological data. Parkinsonian syndrome.

13. Motor activity. Extrapyramidal system. Anatomical and physiological data. Chorea, athetosis, dystonia.
14. Muscle tone – anatomy and physiology. Examination. Disorders.
15. Coordination of movements: anatomy and physiology. Examination. Types of ataxia. Ataxia syndromes.
16. Anatomy and physiology of the cerebellum. Cerebellar syndromes.
17. Brainstem syndromes (anatomical and physiological data). Alternating syndromes of the midbrain, pons and medulla oblongata.
18. Cranial nerves - III, IV and VI - anatomical-physiology, examination, syndromes of impairment.
19. Facial nerve – anatomy and physiology, examination. Peripheral and central paralysis of the facial nerve (differential diagnosis).
20. Bulbar group of cranial nerves. Anatomy and physiology. Examination. Bulbar paralysis.
21. Spinal cord. Anatomy and physiology. Syndromes of damage. Syndrome of complete transection at different levels (cervical intumescence, thoracic region, lumbar intumescence); Brown-Sequard syndrome; cone and cauda equina syndrome.
22. Frontal and parietal lobes - anatomical and physiological data. Syndromes of damage.
23. Temporal and occipital lobes - anatomical and physiological data. Syndromes of damage.
24. Internal capsule - anatomical and physiological data. Internal capsule syndromes.
25. Gnosis, praxis and their disorders (agnosia, apraxia).
26. Speech disorders. Types of aphasia.
27. Autonomic nervous system. Anatomical and physiological data. Syndromes of impairment: peripheral, spinal cord and brainstem syndromes.
28. Reticular formation and limbic system. Anatomical and physiological data and clinical significance.

- 29. Consciousness. Quantitative disorders of consciousness. Examination and treatment in cases with neurological coma.
- 30. Meningeal syndrome (syndrome of meningoradicular irritation) .
- 31. Cerebrospinal fluid system. Anatomy and physiology. Cerebrospinal fluid - normal composition and cerebrospinal fluid syndromes.
- 32. Cerebral circulation. Anatomy and physiology.
- 33. X-ray diagnostics in neurology. Cerebral angiography. Myelography. Neuroimaging methods of examination - computed axial tomography, magnetic resonance imaging.
- 34. Clinical electromyography. Clinical electroencephalography. Indications for research and main areas of application in neurology.

CLINICAL NEUROLOGY

- 35. Lumbar radiculopathies. Lumbar disc herniation
- 36. Cervical radiculopathies. Cervical osteochondrosis. Cervical disc herniation
- 37. Facial nerve neuritis.
- 38. Neuralgia and neuritis of the trigeminal nerve.
- 39. Polyneuritis and polyneuropathy. Guillain-Barre polyradiculoneuritis.
- 40. Polyneuropathy. Diabetic, alcoholic and drug polyneuropathy.
- 41. Viral (serous) meningitis
- 42. Epidemic (meningococcal) meningitis and other purulent meningitis
- 43. Tuberculous meningitis.
- 44. Encephalitis. Definition, Classification. General clinical characteristics.
- 45. Secondary (perivenous) encephalitis in acute infections and after vaccinations.

46. Myelitis and myelopathy. Transverse and disseminated myelitis.
47. Herpes simplex encephalitis. Neurological manifestations of AIDS.
48. Multiple sclerosis.
49. Chronic and slow viral infections. Hyperkinetic progressive panencephalitis.
50. Neurosyphilis. Tabes dorsalis.
51. Headache. Main types of primary and secondary type headache. Migraine.
52. Headache. Main types of primary and secondary type headache. Tension headache. Cluster headache.
53. Transient ischaemic attacks (TIA)
54. Stroke. Intracerebral and cerebellar hemorrhages.
55. Stroke. Subarachnoid hemorrhage. Ventricular hemorrhage.
56. Stroke. Ischaemic strokes in the carotid system.
57. Stroke. Ischaemic strokes in the vertebro-basilar system.
58. Brain tumors. Classification. Cerebral and focal manifestations.
59. Tumors of the spinal cord and peripheral nerves (neurinoma of the pontocerebellar angle and cauda equina)
60. Concussion. Traumatic cerebrasthenia.
61. Contusion of the brain. Traumatic encephalopathy.
62. Subdural hematoma. Epidural hematoma.
63. Spinal cord injuries.
64. Myasthenia gravis. Myasthenic and cholinergic crisis.
65. Neural and spinal muscular atrophy.
66. Progressive muscular dystrophies.
67. Amyotrophic lateral sclerosis.
68. Epilepsy – definition, etiology, pathogenesis. Classification and clinical manifestations of epileptic seizures.

69. Epilepsy – diagnosis, differential diagnosis and treatment.
70. Status epilepticus – definition, classification, treatment.
71. Hepatolenticular degeneration.
72. Parkinson's disease
73. Cerebellar degenerative ataxias. Friedrich's disease.
74. Huntington's chorea.
75. Dementia. Alzheimer's disease. Pick's disease.

* For each nosological unit of clinical neurology you need to present: definition, classification, data on etiology, pathogenesis, pathology, clinical manifestations, diagnosis with differential diagnosis and treatment.

RECOMMENDED READING

- 1. *Neurology*. Shotekov. 2015. Sofia. Arco**
- 2. *General Neurology*. Popova, M. Pleven, 2002**
- 3. *Basic Neurology*. Gilroy, J. McGraw-Hill. 2000**
- 4. *Color atlas of neurology*. Rohkamm R. Thieme, 2004**
- 5. *Clinical Neurology*. Aminoff MJ, Greenberg DA, Simon RP. Lange
Medical Books/ McGraw-Hill**
- 6. *Adams&Victor's Principles of Neurology*. 9th edition**

MEDICAL UNIVERSITY OF PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

OBSTETRICS AND GYNECOLOGY

Accepted by the Department Council – Protocol № 4/26.05.2022

Approved by the Faculty Council - Protocol №6/15.06.2022

OBSTETRICS AND GYNECOLOGY

SYLLABUS

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters		
								4 th	5 th	year
		Total	Lectures	Practices	ECTS			VIII	IX	X
OBSTETRICS AND GYNECOLOGY	X	210	90	120	7.0	4.0	11.0	2/2	2/3	2/3

Name of the course:

"OBSTETRICS AND GYNECOLOGY"

Type of discipline according to EDI:

Obligatory

Level of training:

Master / M /

Forms of training:

Lectures, practicals, self-preparation

Training course:

4th and 5th year

Duration of training:

Three semesters

Hours:

90 hours of lectures, 120 hours of practicals

Teaching aids:

Multimedia presentations, discussions, demonstration of thematic patients, diagnostic and operative procedures used in obstetrics and gynecology, solving practical cases, making thematic tests to assess the acquired knowledge during the practicals, including tests for remote examination.

Forms of assessment:

Ongoing assessment, entrance test, exam.

Formation of the assessment:

Exam with final grade.

Aspects in the formation of the assessment:

Evaluation is multicomponent and includes:

- * current assessments from control inspections during the three semesters;
- * test score;
- * assessment from a written exam;
- * oral examination assessment.

Semester exam:

Yes / written and oral exam /.

State Examination:

Yes / written and oral exam /.

Leading lecturer:

Habilitated lecturers from the Department of Obstetrics and Gynecology.

Prof. Dr. Ekaterina Uchikova, MD; Prof. Dr. Elena Dimitrakova, MD;

Prof. Dr. Maya Krasteva, MD;

Department:

Obstetrics and gynecology

□ ANNOTATION

- **The main goal of the course "Obstetrics and Gynecology" is for students to get acquainted with the nature of physiological and pathological obstetrics; of gynecology and oncogynecology. They must acquire during the training in-depth theoretical knowledge and basic practical skills that are necessary for each doctor.**

□ MAIN TASKS OF THE CURRICULUM:

- **To take the anamnesis of the patients hospitalized on the territory of the Clinic of Obstetrics and Gynecology;**
- **To know the anatomical and physiological features of the female genital organs**
- **To know the modern methods for diagnosis of early and late pregnancy;**
- **To know the methods for obstetric and gynecological examination;**
- **To know the normal mechanism of birth; the anatomical and physiological features of the newborn and the first care for it;**
- **To know the basic methods for operative delivery and the complications related to them;**
- **To know the emergencies in obstetrics;**
- **To know the basic obstetric and gynecological pathology;**
- **To know the normal and pathological postpartum period;**
- **To know the most frequently performed gynecological surgical interventions;**

- To know the main groups of causes of acute abdomen in gynecology;
- To know the methods for screening of cancers of the female genital organs and the risk groups of women.

EXPECTED RESULTS

To have the necessary set of theoretical knowledge and practical skills in the discipline of Obstetrics and Gynecology necessary for the practice of any future doctor.

➤ LECTURES - THESIS

LECTURE № 1 - Anatomical and physiological features of the female genital organs. Neuro-hormonal regulation of menstruation. 2 hours

THESIS: Consideration of external and internal female organs and their physiology. Basic levels of menstrual regulation.

LECTURE № 2 - Placenta-anatomy, biology. Amniotic fluid and membranes. Umbilical cord. Fetoplacental unit. 2 hours

THESIS: Peculiarities of the placenta. Functions. Significance of Fetoplacental unit.

LECTURE № 3 - Adaptive changes in the body of a pregnant woman 2 hours

THESIS: Consideration of changes in the systems during pregnancy.

LECTURE № 4 - Diagnosis of pregnancy. Methods. 2 hours

THESIS: Diagnosis of early and late pregnancy. Methods used depending on the trimester.

LECTURE № 5 - Abortions. 2 hours

THESIS: Definition, types, clinical forms, management.

LECTURE № 6 - Normal birth - theories. Stages of birth. Conduct of labor. 2 hours

THESIS: Definition; Theories of birth. Conduct of labor during the different stages.

LECTURE № 7 - Breech presentation. Breech delivery 2 hours

THESIS: Types of breech presentation. Mechanism of birth. Conducting the birth during the different stages.

LECTURE № 8 - Anatomical and physiological features of the newborn. Adaptation syndrome 2 hours

THESIS: The anatomical and physiological features of the newborn by systems, their postnatal adaptation and the adaptation manifestations in the neonatal period are considered.

LECTURE № 9 Premature birth. Premature rupture of the amniotic membranes. 2hours

THESIS: Definition of premature birth. Etiology. Algorithm of management.

LECTURE № 10 - Prolonged pregnancy 2 hours

THESIS: Definition, types. Algorithm of management

LECTURE № 11 - Ectopic pregnancy - clinic, diagnosis, management. Acute abdomen in obstetrics and gynecology 2 hours

THESIS: Definition, clinical forms. Algorithm of management

LECTURE № 12 - Cesarean section. Anesthesia during labor.2 hours

THESIS: Definition, classifications, technique. Indications. Complications.

LECTURE № 13 - Dystocia - functional and mechanical.2 hours

THESIS: Definition, types, management

LECTURE № 14 - Multiple pregnancy. Birth in case of multiple pregnancy.2 hours

THESIS: Multiple pregnancy - types, etiology, risk factors, management.

LECTURE № 15 - Vaginal obstetric operations. Forceps and vacuum extraction. 2hours

THESIS: Conditions, indications, complications.

LECTURE № 16 - Pregnancy and extragenital diseases. Diabetes and pregnancy. Infectious diseases and pregnancy. 2 hours

THESIS: Obstetric behavior in diabetes and infectious diseases during pregnancy.

LECTURE № 17 - Toxicosis of pregnancy.2 hours

THESIS: Classification. Clinical presentation. Risk assessment. Management

LECTURE № 18 - Endangered fetus. Modern methods for diagnosis of endangered fetus. Ultrasound diagnosis of the fetus. Intrauterine asphyxia of the fetus. 2 hours

THESIS: Definition. Classification of the causes. Methods of diagnosis and management.

LECTURE № 19 - Placental insufficiency. Oligohydramnios. Hydramnios. 2 hours

THESIS: - Definition, causes, diagnosis and management.

LECTURE № 20 - Bleeding in the second half of pregnancy. Placenta previa. Premature detachment of the placenta attached to the normal place. 2 hours

THESIS: - Definition, types. Algorithms in management. Differential diagnosis.

LECTURE № 21- Bleeding during childbirth, placental and postplacental stage. 2 hours

THESIS: - Algorithms in management.

LECTURE № 22 - Normal puerperium. 2 hours

THESIS: - Definition, types. Indicators in the early puerperium.

LECTURE № 23 Pathology of the puerperal period. Puerperal infections. 2 hours

THESIS: - Pathological puerperium. Main complications and behavior.

LECTURE № 24 - Birth trauma. Ruptures of the soft birth canal. Rupture of the uterus. 2 hours

THESIS: - Clinic. Behavior.

LECTURE № 25 - Shock in obstetrics. DIC syndrome. 2 hours

THESIS: - Types of shock. Causes of shock in obstetrics. Behavior.

LECTURE № 26 - Prenatal diagnosis. The role of ultrasound in obstetrics. 2 hours

THESIS: Definition, purpose, methods. Biochemical screening - early and late. Fetal morphology.

LECTURE № 27 - Menstrual cycle - regulation, clinical parameters. Abnormalities. 2 hours

THESIS: - Definition. Levels of regulation, main characteristics. Deviations from the norm.

LECTURE № 28 - Colpitis. 2 hours

THESIS: - Definition. Types. Treatment.

LECTURE № 29 - Cardinal symptoms in gynecology. Acute abdomen. 2 hours

THESIS: - Definition. Reasons. Behavior.

LECTURE № 30 - Hemolytic disease of the fetus and newborn. 2 hours

THESIS: - Etiology, types, forms of the disease. Pre- and postnatal diagnosis, treatment, prevention.

LECTURE № 31 - Malignant neoplasms of the cervix. Oncoprophylaxis. 2 hours

THESIS :

- 1. Etiology. Clinic. Diagnosis. Differential diagnosis. Treatment;**
- 2. Pathoanatomy;**
- 3. Classification;**
- 4. Types of prevention.**

LECTURE № 32 - Ovarian tumors. General characteristics. Benign ovarian tumors. 2 hours

THESIS:

- 1. Classification;**
- 2. Main characteristics;**
- 3. Diagnosis and behavior in cases of benign ovarian tumors;**

LECTURE № 33 -Malignant ovarian tumors. Treatment. 2 hours

THESIS:

- 1. Etiology. Clinic. Diagnosis. Differential diagnosis. Treatment;**
- 2. Pathoanatomy;**
- 3. Classification;**

LECTURE № 34 -PCOS.2 hours

THESIS:

Etiology. Criteria for diagnosis. Clinic. Treatment;

LECTURE № 35 -Malignant diseases of the uterine body. Uterine sarcoma. 2 hours

THESIS:

- 1. Etiology;**
- 2. Classification;**
- 3. Clinic .;**
- 4. Diagnosis;**
- 5. Treatment**

LECTURE № 36 -Pelvic inflammatory disease. Sexually transmitted infections. 2 hours

THESIS: Types, treatment.

LECTURE № 37 -Uterine fibroids. Endometriosis. 2 hours

THESIS: Definition, etiology, clinic. Diagnosis. Criteria for surgical treatment. Types of endometriosis, diagnosis, treatment.

LECTURE № 38 - Infertility in the family. New reproductive methods. 2 hours

THESIS: Definition, types. Diagnosis and behavior.

LECTURE № 39 - Pediatric and adolescent gynecology. 2 hours

THESIS: Basic conditions. Behavior.

LECTURE № 40 - Contraception. 2 hours

THESIS: Definition, classification of methods. Main characteristics. Choosing the correct method.

LECTURE № 41 - Menopause. Hormone replacement therapy.2 hours

THESIS: Definition. Hormonal characteristics. "FOR" and "AGAINST" HRT.

LECTURE № 42 - Dysfunctional uterine bleeding. Amenorrhea. Dysmenorrhea.2 hours

THESIS: Classification. Management.

LECTURE № 43 - Abnormalities in the position of the uterus and other genital organs. Descensus and uterine prolapse. 2 hours
THESIS: Classification. Clinic. Management.

LECTURE № 44 - Birth trauma of the newborn. Prevention of birth injuries. 2 hours
THESIS: Causes of birth trauma. Pathogenesis. Types and representatives. Diagnostic and therapeutic approach. Prevention.

LECTURE № 45 -Gynecological operations. Ultrasound in gynecology. 2 hours
THESIS: Types of gynecological operations. Techniques. Ultrasound of the most common gynecological pathologies.

➤ PRACTICALS- THESIS

EXERCISE № 1 - Anatomy and physiology of female reproductive organs. 2 hours
THESIS: External and internal female reproductive organs. Functions of the female reproductive organs.

EXERCISE № 2 - Bone pelvis. Device, planes and diameters. Pelvic floor. 2 hours
THESIS: Bones forming the pelvis. Planes and diameters related to the mechanism of birth. Pelvic floor muscles.

EXERCISE № 3 - Obstetric history. Goals and objectives of obstetric history.2 hours
THESIS: Basic questions and information concerning the prognosis of pregnancy and labor.

EXERCISE № 4 - Diagnosis of pregnancy - early and late. Modern methods for diagnosing pregnancy.2 hours
THESIS: Diagnosis of early and late pregnancy. Methods used depending on the trimester

EXERCISE № 5 - Location of the fetus in the uterus – habitus/ attitude/, situs /lie/, position and presentation.2 hours

THESIS: Definitions.

EXERCISE № 6 - Obstetric examination - Leopold techniques/ manouvers/, mensuration and auscultation.2 hours

THESIS: Description of the methods and their significance in the obstetric examination.

EXERCISE № 7 - Mechanism of birth in anteroposterior presentation and its deviations. 2 hours

THESIS: Stages and moments.

EXERCISE № 8 - Normal birth. Precursors and signs of childbirth. Stages of delivery. 2 hours

THESIS: Definition; Theories of birth. Conducting the birth during the different stages.

EXERCISE № 9 - Conducting the birth during the separate stages.2 hours

THESIS: Definition; Theories of birth. Conducting the birth during the different stages.

EXERCISE № 10 - Maternal birth trauma.2 hours

THESIS: - Clinic. Management.

EXERCISE № 11 - Anatomical and physiological features of the newborn.2 hours

THESIS: The anatomical and physiological features of the newborn by systems, their postnatal adaptation and the adaptation manifestations in the neonatal period are considered.

EXERCISE № 12 - Methods for diagnosing the condition of the fetus - ultrasound and electro-physiological.2 hours

THESIS: Characteristics and interpretation.

EXERCISE № 13 - Mechanism of birth in cases of deflection of the fetal head. Breech presentation. Mechanism of birth and manual assistance.2 hours

THESIS: Stages. Moments.

EXERCISE № 14 - Forceps and vacuum extractor. Indications, conditions, equipment.2 hours

THESIS: Definition, classifications, technique. Indications. Complications.

EXERCISE № 15 - Caesarean section - types, indications.2 hours

THESIS: Conditions. Indications. Complications.

EXERCISE № 16 - Bleeding during the delivery, the placental and postplacental period. 3 hours.

THESIS: Reasons. Algorithms in the management.

EXERCISE № 17 - Bleeding in the second half of pregnancy. Placenta previa and placental abruption.3 hours.

THESIS: Definitions. Differential diagnosis. Management.

EXERCISE № 18 - Early toxicosis of pregnancy.3 hours.

THESIS: Definition. Representatives. Treatment.

EXERCISE № 19 - Preeclampsia and eclampsia. 3 hours.

THESIS: Definition. Classification. Pathogenesis. Clinic. Treatment. Algorithms of the management in cases of eclamptic seizure.

EXERCISE № 20 - Prolonged pregnancy. Endangered fetus and ways to determine the condition of the fetus.3 hours.

THESIS: Definition. Types. Management. Definition of endangered fetus and assessment methods.

EXERCISE № 21 - Normal postpartum period. Caring for the woman in the puerperium. 3 hours.

THESIS: - Definition, types. Indicators in the early puerperium.

EXERCISE № 22 - Pathological puerperium. 3 hours.

THESIS: - Main representatives. Clinic. Treatment.

EXERCISE № 23 - Abortions and premature births. 3 hours.

THESIS: Definition, types, clinical forms, management.

EXERCISE № 24 - Ectopic pregnancy - clinic, diagnosis, differential diagnosis. 3 hours.

THESIS: Definition, clinical presentation, algorithm of management

EXERCISE № 25 - Multiple pregnancy. Management during the pregnancy and labor. 3 hours.

THESIS: Etiology. Risk factors and complications. Obstetric management.

EXERCISE № 26 - Shock in obstetrics. DIC syndrome. 3 hours.

THESIS: - Types of shock. Causes of shock in obstetrics. Management.

EXERCISE № 27 - Gynecological anamnesis and objective examination. Additional methods for gynecological examination. Cardinal symptoms in gynecology. 3 hours.

THESIS: - Basic questions, information from the gynecological examination. Modern methods of diagnosis.

EXERCISE № 28 - Inflammatory diseases of the female genital organs - types, diagnosis and treatment. 3 hours.

THESIS: - Main representatives. Clinic. Basic therapeutic schemes.

EXERCISE № 29 - First care for the newborn. Asphyxia of the newborn. Resuscitation of the newborn in the delivery room. 3 hours.

THESIS: Asphyxia of the newborn - Causes. Degrees. Weight.

Assessment of the condition of the newborn immediately after birth. Resuscitation algorithm. Consequences of asphyxia. First care for the newborn in the Maternity Hospital.

EXERCISE № 30 - Hemolytic disease of the newborn. 3 hours.

THESIS: - Etiology, types, forms of the disease. Pre- and postnatal diagnosis, treatment, prevention.

EXERCISE № 31 - Colpitis - types, diagnosis and treatment. Sexually transmitted diseases. 3 hours.

THESIS: - Definition. Types. Treatment.

EXERCISE № 32 - Uterine fibroids. Clinic, diagnosis and treatment. 3 hours.

THESIS: Definition, etiology, clinic. Diagnosis. Criteria for surgical treatment.

EXERCISE № 33 - Dysfunctional uterine bleeding. 3 hours.

THESIS: Classification. Management.

EXERCISE № 34 - Cervical cancer - localization, clinic, diagnosis, treatment, prevention. 3 hours.

THESIS:

1. Etiology. Clinic. Diagnosis. Differential diagnosis. Treatment;

2. *Pathoanatomy;*
3. *Classification;*
4. *Types of prevention.*

***EXERCISE № 35 - Cancer of the uterine body - clinic, diagnosis, treatment.
3 hours.***

THESIS:

1. *Etiology;*
2. *Classification;*
3. *Clinic;*
4. *Diagnosis;*
5. *Treatment*

EXERCISE № 36 - Ovarian tumors - general characteristics, types, classification.3 hours.

THESIS:

1. *Classification;*
2. *Main characteristics;*
3. *Diagnosis and management in cases of benign ovarian tumors;*

EXERCISE № 37 - Malignant diseases of the ovaries - clinic, diagnosis and treatment.3 hours.

THESIS:

1. *Etiology. Clinic. Diagnosis. Differential diagnosis. Treatment;*
2. *Pathoanatomy;*
3. *Classification;*

EXERCISE № 38 - Static diseases of the female genital organs. Urogynecology.3 hours.

THESIS: Anatomy of the pelvic diaphragm. Classification of the static diseases. Clinical presentation. Methods of treatment.

EXERCISE № 39 - Menopause - clinic, treatment.3 hours.

THESIS: Definition. Hormonal characteristics. "FOR" and "AGAINST" HRT.

EXERCISE № 40 - Family planning. Contraception.3 hours.

THESIS: Definition, classification of the methods. Main characteristics. Choosing the correct method.

EXERCISE № 41 - Acute abdomen in gynecology.3 hours.

THESIS: - Definition. Reasons. Management.

EXERCISE № 42 - Operative gynecology - the most commonly performed gynecological operations. 3 hours.

THESIS: Introducing students to the basic and most commonly used surgical interventions in gynecology.

EXERCISE № 43 - Birth trauma in the newborn. 3 hours.

THESIS: Causes of birth trauma. Pathogenesis. Types and representatives. Diagnostic and therapeutic approach. Prevention.

EXERCISE № 44 - Obstetric operations - manual separation and extraction of the placenta, version - types, indications, conditions, technique; fetal operations. 3 hours.

THESIS: Basic obstetric operations. Typess. Indications. Technique. Complications.

EXERCISE № 45 -Review of operative obstetrics - forceps, vacuum, manual assistance in breech presentation.3 hours.

ABSTRACTS: Examination of the acquired theoretical knowledge and practical skills of the students on a phantom and / or in the Center for Simulation Medicine.

➤ **MAIN LITERATURE SOURCES**

- Lecture course in "Obstetrics and Gynecology" for students of medicine and dentistry, developed by habilitated lecturers in the department;
- Williams Obstetrics
- Williams Gynecology
- NMS Obstetrics and Gynecology 7th edition
- "Handbook of Obstetrics and Gynecology", Medicine and Physical Education, Sofia, 2015.
- Dimitrov A. Obstetrics. ARSO, 2014, Sofia
- Dimitrov. A., Zlatkov V., Gynecology. ARSO, 2013, Sofia
- Uchikova E. Tests in Obstetrics and Gynecology. LAKS BUK, Plovdiv, 2017
- Dimitrakova E. "New aspects in the maternal-fetal relationship in preeclampsia.", Autoprint, Plovdiv 2014.
- Stoilova J., Krasteva M. "Prevention and control of neonatal infections", MU Plovdiv, 2013.

Obstetrics and Gynecology SEMESTER EXAM

V course Medicine

1. Diagnosis of pregnancy – early and late. Modern methods for diagnosis.
2. Vaginal delivery. Early signs. Stages. Management of labor. Mechanism of labor in Occiput Anterior presentation and the other types of occiput presentation – persistent occiput posterior presentation, etc.
3. Breech presentation. Breech delivery – diagnosis, management, mechanism of labor.
4. Fetal distress – methods for diagnosis. Placental insufficiency. Fetal asphyxia. Apgar score. Prolonged pregnancy.
5. Multiple pregnancy.
6. Pregnancy and extragenital diseases.
7. Early toxicosis.

- 8.** Preeclampsia and eclampsia – diagnosis, clinical manifestation and management.
- 9.** Obstetrical hemorrhage. Bleeding during labor, placental stage and post-placental period.
- 10.** Hemorrhage during the second half of pregnancy- Placenta Previa and Placental abruption.
- 11.** Maternal birth trauma. Birth canal trauma. Uterine rupture – types, clinical manifestation, diagnosis and management.
- 12.** Abortion –classification, causes, clinical manifestation, diagnosis and treatment.
- 13.** Premature (Preterm) labor – causes, clinical manifestation, diagnosis and treatment. Signs of prematurity and management of preterm labor. Premature rupture of the amniotic membranes.
- 14.** Physiological puerperium.
- 15.** Pathological puerperium.
- 16.** Cesarean section
- 17.** Forceps and vacuum delivery: indications, prerequisites, technique of application
- 18.** Shock in Obstetrics. DIC syndrome.
- 19.** Gestational trophoblastic disease (GTD)
- 20.** Inflammatory diseases of the female genital organs – Vaginitis - types, symptoms and treatment.
- 21.** Uterine fibroids
- 22.** Endometriosis
- 23.** Cervical cancer
- 24.** Endometrial cancer. Uterine sarcoma.
- 25.** Ovarian tumors – general characteristics
- 26.** Benign ovarian tumors – diagnosis and treatment.
- 27.** Malignant ovarian tumors – diagnosis, treatment. Ovarian cancer.
- 28.** Pelvic inflammatory disease (PID)
- 29.** Pelvic organ prolapse. Uterine prolapse
- 30.** Infertility in the family.
- 31.** Contraception
- 32.** Acute abdomen in gynecology.
- 33.** Ectopic pregnancy – types. Tubal pregnancy – causes, symptoms, differential diagnosis, management.
- 34.** Menopause and premenopause. Hormone replacement therapy.
- 35.** Polycystic ovarian syndrome (PCOS)
- 36.** Pediatric and adolescent gynecology
- 37.** Neuro-hormonal regulation of the menstrual cycle. Dysfunctional uterine bleeding- in the adolescent years(Metrophatia haemorrhagica juvenilis) and climacteric bleeding(Methrophatia haemorrhagica climacterica)

Obstetrics and Gynecology STATE EXAM VI course Medicine

Obstetrics

- 1.Diagnosis of early and late pregnancy.
- 2.Genital and extragenital changes in the organism of the pregnant woman. Pregnancy an extragenital diseases. Diabetes and pregnancy
- 3.Normal delivery - predictors, stages, management.
- 4.Physiological and pathological puerperium. Puerperal cares.
- 5.Traumatism in labor.
- 6.Multiple pregnancy.
- 7.Ectopic pregnancy.
- 8.Abortions – types, clinical signs and management.
- 9.Preterm delivery.
- 10.First cares for the newborn. Premature newborn – signs for prematurity, cares.
- 11.Prolonged pregnancy. Induction of labor
- 12.Trophoblastic disease.
- 13.Polyhydramnios and oligohydramnios. Placental insufficiency
- 14.Early toxicosis of a pregnancy. Hyperemesis gravidarum.
- 15.Preeclampsia and eclampsia.
- 16.Bleeding during the second half of pregnancy.
17. Obstetrical coagulopathies. DIC Syndrome
- 18.Dystocia – definition, types and management.
- 19.Beech presentation. Mechanism of labor. Manual help.
20. Pelvic dystocia. Mensuration
- 21.Bleeding in the placental stage and in the postplacental period.
- 22.Caesarean section and pain management during delivery.
- 23.Operative vaginal deliveries – forceps and vacuum.
- 24.Asphyxia of the fetus and newborn. Hemolytic disease of the newborn.
- 25.Fetal distress – methods for evaluation.
- 26.Pregnancy and extragenital diseases.

27. Ultrasound in obstetrics.

Gynecology

28. Menstrual cycle – hormonal and clinical characteristics.

29. Menstrual abnormalities.

30. Dysfunctional uterine bleeding – adolescent /metropathia haemorrhagica juvenilis/; climacteric /metropathia haemorrhagica climacterica/.

31. Vulvovaginitis.

32. Precancerous and early cancerous lesions of the cervix.

33. Cervical cancer.

34. Endometrial cancer.

35. Myoma of the uterus

36. Endometriosis

37. Ovarian tumors – basic characteristics.

38. Benign ovarian tumors.

39. Malignant ovarian tumors.

40. Pelvic inflammatory disease.

41. Acute abdomen in gynecology. Causes. Diagnosis. Management

42. Sexually transmitted diseases.

43. Pelvic organ prolapse and urogynecology. Types of incontinence

44. Infertility. Classification. Diagnosis.

45. Contraception.

46. Pediatric and adolescent gynecology.

47. Diagnostic methods in gynecology – ultrasound, hysteroscopy and laparoscopy.

48. Polycystic ovarian syndrome – diagnosis and treatment.

49. Menopause. Hormone replacement therapy

Prepared by: Prof. Dr. Ekaterina Uchikova, MD; Prof. Dr. Elena Dimitrakova, MD;

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

DERMATOLOGY AND VENEREOLOGY

FOR MEDICAL STUDENTS

Approved by the Department Council – Protocol №38/20.05.2022

Confirmed by the Faculty Council – Protocol №6/15.06.2022

DERMATOLOGY AND VENEREOLOGY

SYLLABUS

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			4-5 year	
Dermatology and venereology	IX							VIII	IX
		90	30	60	3.0	1.5	4.5	1/2	1/2

DISCIPLINE:

”Dermatology and Venereology”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Required

LEVEL OF QUALIFICATION:

Master /M/

FORMS OF TRAINING:

Lectures, practical lessons, self-study

YEAR OF TRAINING:

IV course (VIII semester) and V course (IX semester)

DURATION OF TRAINING:

Two semesters

ACADEMIC HOURS:

30 hours of lectures and 60 hours of practical lessons

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Classrooms equipped with audiovisual technics. Multimedia presentations, discussions, demonstration of patients with skin diseases and sexually transmitted diseases, solving practical diagnostic and therapeutic tasks, demonstrations of research methods in dermatology - taking a biopsy, making microscopic preparations and cultures for mycological research, performing allergological testing and reporting of skin allergy tests, dermatoscopy, serological tests.

FORMS OF EVALUATION:

Weekly ongoing assessment, online tests, colloquia, practical exam.

EVALUATION CRITERIA:

Mean continuous assessment in each semester.

ASPECTS OF EVALUATION CRITERIA:

Participation in discussions, online, writing and oral exam results.

SEMESTER EXAM:

Yes / Input online test, written and oral exam results.

STATE EXAM:

No

LECTURER:

Academic rank lecturer at the Department of Dermatology and Venereology.

DEPARTMENT:

Dermatology and Venereology

ANNOTATION

The course “Dermatology and venereology” provides an opportunity to acquire knowledge and skills for primary diagnosis, treatment and prevention of the most common dermatological and sexually transmitted diseases.

BASIC AIMS OF THE DISCIPLINE

Acquisition of knowledge and skills for application of all modern methods and tools for primary dermatological diagnostics, treatment and prevention:

1. Taking a history in a patient with skin disease.
2. Investigation of skin eruptions:
 - Physical examination with naked eye
 - Examination with a magnifying glass
 - Glass pressure (Vitropresia)
 - Palpation
 - Scraping the skin lesion surface in squamous dermatoses
3. Physical examination of a patient with skin disease and description of the dermatological status (description of skin eruptions)
4. Testing of dermographism
5. Investigation of diagnostic symptoms in some skin diseases.
6. Interpretation of skin allergy tests:
 - Patch test
 - Scarification test

- Intradermal test
 - prick test
7. Observation of microscopy preparations and culture to demonstrate a mycological disease.
 8. Search for scabies mite and microscopy examination.
 9. Physical examination of a patient with sexually transmitted disease.
 10. Preparation and examination of microscopic slides of gonococci.
 11. Interpretation of serological tests for syphilis.
 12. Prescription of local and systemic therapy in dermatology.

EXPECTED RESULTS

After completion of the dermatology course students should have the following knowledge and skills:

1. To possess skills in taking a history of dermatology diseases.
2. To know the main methods for objective examination of skin eruptions.
3. To be able to make a short description of dermatological status.
4. To know the methods for analysis of dermographism, diagnostic symptoms in psoriasis and pemphigus, capillary fragility.
5. To know the characteristics of skin hypersensitivity tests: patch, scarification, intradermal, prick test.
6. To know the phenomena demonstrated in microscopic slides and culture tests to establish a mycological disease.
7. To know the methods for searching scabies mites and phenomena observed in microscopic slides.
8. To know the methods to examine a patient with sexually transmitted disease and be able to make and examine microscopic slides for gonococci.
9. To know and to be able to interpret the methods for serologic diagnostic of syphilis.
10. To be able to write prescriptions for the most frequently used drugs for local and systemic therapy in dermatology.

LECTURES

LECTURE No1 – 2 hours

INTRODUCTION TO DERMATOLOGY. ANATOMY AND PHYSIOLOGY OF THE SKIN AND VISIBLE MUCOUS MEMBRANES. ABNORMAL CHANGES IN THE EPIDERMIS AND DERMIS. SKIN RASHES.

Anotation

Why we should study dermatology

Basic physiological processes in the skin

Histopathological changes in the skin

Rash elements of the skin

LECTURE No2 – 2 hours

BACTERIAL SKIN INFECTIONS. PARASITIS SKIN INFECTIONS. SKIN TUBERCULOSIS.

Annotation

Bacterial skin infections: Staphylococcal and streptococcal skin infections.

Parasitis skin infections: scabies, pediculosis. Tuberculosis of the skin.

LECTURE No3 – 2 hours

VIRAL SKIN INFECTIONS

Annotation

Viral skin infections of the herpes group: Herpes simplex, herpes zoster.

Viral skin infections caused by human papilloma viruses: common and flat warts, genital warts.

Viral skin infections of smallpox virus and paravaccina virus: molluscum contagiosum, tuberculum mulgentium, ecthyma contagiosum.

Lyme disease.

LECTURE No4 – 2 hours

FUNGAL SKIN INFECTIONS

Annotation

Fungal infections of the skin: dermatomycoses, deep mycoses, candidoses.

LECTURE No5 – 2 hours

ERYTHEMO-PAPULO-SQUAMOUS DERMATOSES

Annotation

Erythemo-papulo-squamous dermatoses: psoriasis, lichen ruber planus, pityriasis rosea.

LECTURE No6 – 2 hours

AUTOIMMUNE BULLOUS DERMATOSES

Annotation

Autoimmune bullous dermatoses: pemphigus vulgaris, bulous pemphigoid, dermatitis herpetiformes.

LECTURE No7 – 2 hours

ERYTHEMATOUS DERMATOSES. SKIN APPENDAGES DISEASES.

Annotation

Erythematous dermatoses: erythema exsudativum multiforme, erythema nodosum.

Diseases of skin appendages: seborrheic dermatitis, acne, rosacea.

Allopecias.

LECTURE No8 – 2 hours

ALLERGIC DERMATOSES

Annotation

Allergic shock, hives, strophulus.

LECTURE No9 – 2 hours

ALLERGIC DERMATOSES

Annotation

Eczema. Dermatitis.

LECTURE No10 – 2 hours

DRUG INDUCED DERMATOSES

Annotation

Skin drug eruptions: Lyell syndrome, medicamentous dermatitis, fixed drug eruption.

LECTURE No11 – 2 hours

AUTOIMMUNE DISEASES OF THE CONNECTIVE TISSUE.

Annotation

Lupus erythematosus. Sclerodermia. Dermatomyositis.

LECTURE No12 – 2 hours

PRECANCEROUS SKIN CONDITIONS. BENIGN AND MALIGNANT TUMORS OF THE SKIN.

Annotation

Precancerous skin condition.

Benign tumors of the skin.

Malignant skin tumors: basal cells carcinoma, squamous cells carcinoma, malignant melanoma.

LECTURE No13 – 2 hours

SYPHILIS.

Annotation

Etiology, epidemiology, general course of th syphilis.

Aquired syphilis – primary, secondary, tertiary stage. Neurosyphilis. Congenital syphilis.

Diagnosis of syphilis. Treatment of syphilis.

LECTURE No14 – 2 hours

GONORRHEA. NON-GONOCOCCICAL INFECTIONS OF GENITAL TRACT.

Annotation

Male gonorrhea. Female gonorrhea. Children gonorrhea.

Non-gonococcal urethritis.

LECTURE No15 – 2 hours

AIDS – SKIN MANIFESTATIONS.

Annotation

HIV infection. Mucocutaneous manifestations of HIV infection. Kaposi sarcoma.

PRACTICES

PRACTICAL LESSON No1 – 2 hours

INTRODUCTION TO DERMATOLOGY

Annotation

Why we need to study skin diseases

Examination of a patient with a skin disease – peculiarities in taking the anamnesis and status..

PRACTICAL LESSON No2 – 2 hours

RASH ELEMENTS OF THE SKIN AND VISIBLE MUCOUS MEMBRANES

Annotation

Macular skin lesions.

Solid skin lesions.

Exudative skin lesions.

Skin lesions due to damaged skin integrity.

Waste skin lesions.

Skin lesions due to atrophy, hypertrophy and scarring.

Features of the rash elements on the visible mucous membranes.

PRACTICAL LESSON No3 – 2 hours

RASH ELEMENTS OF THE SKIN AND VISIBLE MUCOUS MEMBRANES

PRACTICAL LESSON No4 – 2 hours

LOCAL TREATMENT OF SKIN DISEASES. TOPICAL FORMULATIONS.

Annotation

Simple and composite topical formulations.

PRACTICAL LESSON No5 – 2 hours

SYSTEMIC TREATMENT OF SKIN DISEASES

Annotation

Groups of drugs by mechanism of action.

PRACTICAL LESSON No6 – 2 hours

BACTERIAL SKIN INFECTIONS

Annotation

Staphylococcal diseases of the skin – staphylococcal diseases of the hair follicle, of the sweat glands, and of the nails.

Streptococcal diseases of the skin – impetigo, erysipelas, ecthyma.

PRACTICAL LESSON No7 – 2 hours

SKIN TUBERCULOSIS. COLLOQUIUM No1.

Annotation

Skin tuberculosis – primary and secondary forms.

Topics of the colloquium No 1 – Skin lesions. Treatment of skin diseases.

PRACTICAL LESSON No8 – 2 hours

PARASITIC SKIN INFECTIONS

Annotation

Scabies. Pediculosis. Insect bites.

PRACTICAL LESSON No9 – 2 hours

VIRAL SKIN INFECTIONS

Annotation

Herpes simplex. Herpes zoster. Verrucae – common, flat and genital warts.

Ecthyma contagiosum. Tuberculum mulgentium. Molluscum contagiosum.

PRACTICAL LESSON No10 – 2 hours

FUNGAL INFECTIONS OF THE SKIN

Annotation

Pityriasis versicolor. Tinea capitis. Tinea corporis. Tinea manum. Tinea pedis. Tinea of the nails.

PRACTICAL LESSON No11 – 2 hours

CANDIDAMYCOSES. DEEP MYCOSES.

Annotation

Candidoses of the skin and mucous membranes.

Actinomycosis.

PRACTICAL LESSON No12 – 2 hours

ERYTHEMO-PAPULO-SQUAMATOUS DERMATOSES

Annotation

Psoriasis vulgaris, lichen ruber planus, pityriasis rosea.

PRACTICAL LESSON No13 – 2 hours

AUTOIMMUNE BULLOUS DERMATOSES

Annotation

Pemphigus vulgaris, bullous pemphigoid, dermatitis herpetiformis.

PRACTICAL LESSON No14 – 2 hours

ERYTHEMATOUS DERMATOSES. COLLOQUIUM No 2.

Annotation

Erythema multiforme, erythema nodosum.

Topics of the colloquium No 2 – Skin infections. Erythemo-papulo-squamatoous dermatoses.

PRACTICAL LESSON No15 – 2 hours

LYME DISEASE.

Annotation

Lyme disease – clinical stages and treatment.

PRACTICAL LESSON No16 – 2 hours

ALLERGIC DERMATOSES

Annotation

Urticaria – allergic and non-allergic. Strophulus..

PRACTICAL LESSON No17 – 2 hours

DRUG-INDUCED DERMATOSES

Annotation

Allergic shock, Lyell syndrome, Stevens-Johnsson syndrome, medicamentous dermatitis, fixed drug eruption.

PRACTICAL LESSON No18 – 2 hours

ECZEMA. DERMATITIS.

Annotation

Eczema.

Dermatitis – non-allergic and allergic contact dermatitis.

PRACTICAL LESSON No19 – 2 hours

DERMATOSIS CAUSED BY EXTERNAL FACTORS. PHOTODERMATOSIS.

Annotation

Dermatoses caused by low and high temperature.

Dermatoses caused by mechanical factors.

Photodermatosis.

PRACTICAL LESSON No20 – 2 hours

AUTOIMMUNE CONNECTIVE TISSUE DISEASES

Annotation

Lupus erythematosus. Dermatomyositis.

PRACTICAL LESSON No21 – 2 hours

AUTOIMMUNE CONNECTIVE TISSUE DISEASES

Annotation

Systemic and localized sclerosis.

PRACTICAL LESSON No22 – 2 hours

APHTHOUS DISEASE. COLLOQUIUM No 3.

Annotation

Recurrent aphthosis. Bechet's disease. Aphthous disease.

Topics of the colloquium No3 – Allergic and drug-induced dermatoses. Eczema. Dermatitis. Autoimmune diseases of the connective tissue.

PRACTICAL LESSON No23 – 2 hours

SEBORRHOEA AND SEBORRHEIC DISEASES. ACNE. ROSACEA.

Annotation

Seborrhoea. Acne vulgaris. Rosacea.

PRACTICAL LESSON No24 – 2 hours

BENIGN TUMORS OF THE SKIN. PRAECANCEROUS DERMATOSES.

Annotation

Benign tumors of the skin and mucoses. Precancerous skin conditions.

PRACTICAL LESSON No25 – 2 hours

MALIGNANT DISEASES OF THE SKIN AND MUCOSES.

Annotation

Basal cells carcinoma. Squamous cells carcinoma. Malignant melanoma.

PRACTICAL LESSON No26 – 2 hours

SYPHILIS

Annotation

Epidemiology, etiology, clinical presentation and treatment of syphilis.

PRACTICAL LESSON No27 – 2 hours

GONORRHEA

Annotation

Male, female and children gonorrhoea.

PRACTICAL LESSON No28 – 2 hours

HIV-ASSOCIATED SKIN MANIFESTATIONS

Annotation

AIDS – skin manifestations. Kaposi's sarcoma.

PRACTICAL LESSON No29 – 2 hours

NON-GONOCOCCAL GENITAL INFECTIONS. COLLOQUIUM No4.

Annotation

Non-gonococcal genital infections caused by bacteria, viruses, chlamydia, trichomonas, candida.

Topics of the colloquium No 4 – precancerous skin conditions. Benign and malignant skin tumors. Sexually-transmitted diseases.

PRACTICAL LESSON No30 – 2 hours

PRACTICAL EXAM

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http://dermaplovdiv.tripod.com/sample_test_engl%20-%20HtmlExport/index.html

<http://dermaplovdiv.tripod.com/katedra-student-english.htm>

Questionnaire for self preparation in Dermatology and Venereology

<https://www.yumpu.com/en/document/read/63216144/questionnaire-for-self-preparation-in-dermatology-and-venereology>

CONSPECTUS OF DERMATOLOGY AND VENEREOLOGY FOR STUDENTS OF MEDICINE

GENERAL DERMATOLOGY

1. Structure of the epidermis and basement membrane.
2. Structure of the dermis and subcutis.
3. Structure of oral and genital mucosa.
4. Skin appendages – hair, nails, sebaceous and sweat glands.
5. Skin blood and lymphatic vessels. Skin innervation.
6. Skin functions - keratinization, melanogenesis, sweat and sebum secretion.
7. Skin functions – viscoelasticity, thermoregulation, epidermal barrier, skin innervation and immune system.
8. Functions of oral and genital mucosa.
9. Methods of investigation in dermatology.
10. Primary lesions – erythema, pigmentation, petechia, ecchymosis, telangiectasia, purport, papule, nodule, plaque, wheal, lichenification, vesicle, pustule, bulla.
11. Secondary lesions – erosion, excoriation, fissure, ulcer, scale, crust, atrophy, hypertrophy, scar.
12. Characteristics of oral lesions.
13. Histopathological changes in the epidermis, dermis and subcutis.
14. Topical treatment of skin diseases. Types of topical formulations (vehicles).
15. Topical treatment of skin diseases. Types topical agents by mode of action.
16. Systemic treatment of skin diseases.
17. Physical treatment of skin diseases.

SKIN DISEASES

1. Streptococcal skin infections. Impetigo. Erysipelas. Ecthyma.
2. Staphylococcal infections of the hair follicles.
3. Staphylococcal infections of the sweat glands and glabrous skin.
4. Cutaneous tuberculosis. E
5. Pityriasis versicolor.
6. Superficial dermatophyte infections.
7. Deep fungal infections. Actinomycosis.
8. Candidiasis.
9. Scabies
10. Pediculosis.
11. Lyme disease.
12. Herpes simplex virus infections. Herpes simplex.
13. Varicella-zoster virus infections. Varicella. Herpes zoster.
14. Papilloma virus infections. Viral warts.
15. Molluscum contagiosum. Tuberculum mulgentium. Ecthyma contagiosum.
16. Dermatoses due to external factors (physical, chemical and biological).
17. Erythema multiforme.

- 18.Erythema nodosum.
- 19.Psoriasis vulgaris.
- 20.Pityriasis rosea.
- 21.Lichen planus.
- 22.Pemphigus vulgaris.
- 23.Bullous pemphigoid.
- 24.Dermatitis herpetiformis.
- 25.Urticaria (hives). Angioedema. Papular urticaria.
- 26.Dermatitis contacta. Eczema contactum.
- 27.Atopic dermatitis. Atopic eczema.
- 28.Seborrhoeic dermatitis. Seborrhoeic eczema.
- 29.Drug eruptions. Etiopathogenesis. Anaphylactic shock. Urticaria and angioedema.
- 30.Drug eruptions. Toxic epidermal necrolysis (Lyell's disease). Stevens-Johnson syndrome. Fixed drug eruptions.
- 31.Lupus erythematosus.
- 32.Dermatomyositis.
- 33.Systemic sclerosis. Localized scleroderma.
- 34.Acrocyanosis. Perniones. Raynaud's phenomenon.
- 35.Chronic venous insufficiency in the lower limbs.
- 36.Vasculitis. Henoch-Schonlein purpura
- 37.Disorders of pigmentation. Albinism. Vitiligo. Melasma.
- 38.Genodermatoses. Ichthyosis vulgaris. Darier's disease. Epidermolysis bullosa.
- 39.Benign tumours of the skin.
- 40.Premalignant tumours of the skin.
- 41.Basal cell carcinoma.
- 42.Squamous cell carcinoma.
- 43.Malignant melanoma.
- 44.Kaposi's sarcoma.
- 45.Hair diseases.
- 46.Nail diseases.
- 47.Sebaceous glands diseases. Seborrhoea. Acne. Rosacea.
- 48.Aphthosis. (Behcet's disease)
- 49.Diseases of the lips and tongue. Cheilitis and glossitis.
- 50.Diseases of the mouth and gums. Gingivostomatitis.

SEXUALLY TRANSMITTED INFECTIONS

1. Syphilis – etiology, pathogenesis, and general disease course.
2. Primary syphilis.
3. Secondary syphilis.
4. Tertiary syphilis.
5. Neurosyphilis.
6. Congenital syphilis.
7. Laboratory tests for syphilis. Treatment for syphilis.
8. Gonococcal infection in men. Complications. Treatment.
9. Gonococcal infections in women. Complications. Treatment.

10. Pediatric gonorrhoea. Extragenital and disseminated gonorrhoea.
11. Non gonococcal urethritis. Complications. Treatment.
12. Balanitis and balanoposthitis.
13. Vulvitis and vulvovaginitis.
14. AIDS (skin and mucosal manifestations).

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
PSYCHIATRY

Approved by the Department Council on 31.05.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

PSYCHIATRY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
								5 th year
Psychiatry	X	Total	Lectures	Practices	ECTS	1.0	3.0	X
		60	30	30	2.0			2/2

DISCIPLINE:

Psychiatry

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Obligatory

LEVEL OF QUALIFICATION:

EQD „Master’s”

FORMS OF TRAINING:

Lectures, practicals

YEAR OF TRAINING:

Fifth year

DURATION OF TRAINING:

1 semester

ACADEMIC HOURS:

60 hours

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, seminars, discussions, clinical case reports

FORMS OF EVALUATION:

Preliminary assessment of progress: oral and written examination, colloquiums, term-end exam

EVALUATION CRITERIA:

Average grade from the semester and the exam

ASPECTS OF EVALUATION CRITERIA:

Participation in practicals, clinical case reports, participation in discussions

SEMESTER EXAM:

Yes /MCQ, case report, essays, oral exam/

STATE EXAM:

No

LECTURERS:

Prof. Drozdstoy Stoyanov, MD, PhD

Assoc. prof. Sevdalina Kandilarova, MD, PhD

Assoc. prof. Zlatoslav Arabadzhiev, MD, PhD

DEPARTMENT:

Department of Psychiatry and Medical Psychology

ANNOTATION

The Psychiatry training course aims at giving the students theoretical knowledge and practical skills in:

- psychopathological semiotics (symptoms and syndromes in various mental areas)
- assessment of mental state
- psychiatric interview
- etiopathogenesis, epidemiology, genetics, and neurobiology of psychiatric disorders
- approaches to diagnosis / screening and interventions for mental disorders
- course and prognosis of mental illness
- pharmacotherapy, emergency psychiatric measures, psychotherapy, psychosocial rehabilitation)
- somatopsychic and psychosomatic interactions, counseling psychiatry
- interdisciplinary case management
- psychiatric patient communication skills, psychiatric counseling skills
- conducting primary psychological counseling of a patient in general medical practice.

BASIC AIMS OF THE DISCIPLINE

1. To acquire knowledge about:

- etiopathogenesis of mental illness; genetics and epidemiology of mental illness; neurobiology (neurodevelopment, functional neuroanatomy, etc.) of mental illness

- the main signs, symptoms and syndromes in clinical psychopathology; groups of nosological units
- methods for diagnosis and treatment in psychiatry (psychopharmacotherapy, nonpharmacological methods of biological therapy, psychotherapy, psychosocial rehabilitation)
- course and outcome of mental illness, overall functioning, quality of life and rehabilitation in psychiatric disorders
- basic classification systems in psychiatric nosology.

2. To be able to:

- understand the application of clinical interviews and scales used in psychiatry
- recognize the manifestations of the prodromal, active, and stable phase of major mental disorders for the purposes of early diagnosis, differential diagnosis, and screening
- conduct interdisciplinary communication
- conduct a clinical interview, assess the mental state of a psychiatric patient, and build a provisional diagnosis and differential diagnosis
- consider and discuss possible treatment
- conduct primary psychological counseling of patients in general medical practice

EXPECTED RESULTS

Students successfully completed the course are expected to have acquired the following competencies:

- participation in a multidisciplinary team for complex case management in psychiatric practice (with the participation of psychiatrists, other medical professionals, general practitioners, psychiatric nurses, nurses, clinical psychologists, social workers)

LECTURES

1. History of psychiatry. Psychiatric nosology and classification.
2. Patient evaluation. Disturbances of perception.
3. Disturbances of thinking - flow, form, content.
4. Disturbances of emotions and memory.
5. Disturbances of volition, psychomotorics and attention. Disturbances of consciousness. Functional neuroanatomy.
6. Antipsychotics. Tranquilizers. Antidepressants. Mood stabilizers. Psychotherapy.
7. Psychotic disorders - schizophrenia and other psychotic disorders.
8. Mood disorders - bipolar and depressive disorders.
9. Anxiety disorders. Obsessive-compulsive and other disorders.
10. Post-traumatic and stress disorders. Somatic symptoms and other disorders.
11. Eating disorders. Sexuality and sexual disorders.
12. Disorders related to psychoactive substances.
13. Personality disorders. Emergency psychiatry.
14. Psychiatry in old age. Psychiatric examinations.
15. Disorders in neurodevelopment.

PRACTICALS

1. Patient evaluation. Disturbances of perception.

2. Disturbances of thinking - flow, form, content.
3. Disturbances of emotions, memory and intelligence.
4. Disturbances of volition, psychomotorics and attention. Disturbances of consciousness.
5. Colloquium - general psychopathology.
6. Antipsychotics. Tranquilizers. Antidepressants. Mood stabilizers. Psychotherapy, sociotherapy, rehabilitation.
7. Schizophrenia and other psychotic disorders.
8. Bipolar disorders. Depressive disorders.
9. Anxiety disorders. Obsessive-compulsive disorder and similar disorders.
10. Post-traumatic and stress disorders. Disorder with somatic symptoms and similar disorders.
11. Eating disorders. Sexuality and sexual disorders.
12. Disorders related to psychoactive substances. Basic syndromes. Disorders related to specific psychoactive substances.
13. Personality disorders. Emergency psychiatry.
14. Colloquium - special psychiatry.
15. Late psychiatry. Disorders of neurodevelopment.

BIBLIOGRAPHY

Lecture course uploaded in Sharepoint

Akabaliev, V (Ed.), Textbook of Psychiatry, Lax Beech, 2017

Milanova, V (Ed.), Psychiatry for students and specialists, 2013

Piseva, D (Ed.), Psychiatry and Psychology, MI Arso, 2005

Madjirova, N (Ed.), Manual of Psychiatry for GPs, 2009

EXAM SYLLABUS

General psychiatry

1. Patient evaluation.
2. Disturbances of perception.
3. Disturbances of thinking - flow and form
4. Disturbances of thinking - content.
5. Disturbances of emotions.
6. Disturbances of memory.
7. Disturbances of volition, psychomotorics and attention.
8. Disturbances of consciousness.
9. Antipsychotics. Tranquilizers.
10. Antidepressants. Mood stabilizers.
11. Psychotherapy, sociotherapy, rehabilitation.
12. Psychiatric nosology - classifications and nomenclature.

Special psychiatry

13. Disorders of neurodevelopment - I.
14. Disorders of neurodevelopment - II.
15. Mental disorders due to somatic disease.
16. Psychotic disorder. Schizophrenia.
17. Other psychotic disorders.
18. Bipolar disorders.
19. Depressive disorders.
20. Anxiety disorders.
21. Obsessive-compulsive disorder and similar disorders.
22. Post-traumatic and stress disorders.
23. Disorder with somatic symptoms and similar disorders.
24. Eating disorders.
25. Sexuality and sexual disorders.
26. Disorders related to psychoactive substances. Basic syndromes.
27. Disorders related to specific psychoactive substances.
28. Psychiatry of late age.
29. Personality disorders.
30. Emergency psychiatry.
31. Psychiatric expertise.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
Medical Psychology

Approved by the Department Council on 31.05.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

**Medical Psychology
Syllabus**

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
								2 nd year
Medical Psychology	IV	Total	Lectures	Practices	ECTS	1.0	2.0	IV
		30	15	15	1.0			1/1

DISCIPLINE:

Medical Psychology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Obligatory

LEVEL OF QUALIFICATION:

EQD “Master’s”

FORMS OF TRAINING:

Lectures, practicals

YEAR OF TRAINING:

Second year

DURATION OF TRAINING:

1 semester

ACADEMIC HOURS:

30

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentation, seminars, discussions

FORMS OF EVALUATION:

Preliminary assessment of progress: oral examination, colloquiums, term-end exam

EVALUATION CRITERIA:

Average grade from the semester and the exam

ASPECTS OF EVALUATION CRITERIA:

Participation in practicals and discussions

SEMESTER EXAM:

YES/oral examination/

STATE EXAM:

No

LECTURER:

Prof. Drozdstoy Stoyanov, MD, PhD

Assoc. prof. Sevdalina Kandilarova, MD, PhD

Assoc. prof. Zlatoslav Arabajiev, MD, PhD

DEPARTMENT:

Department of Psychiatry and Medical Psychology

ANNOTATION

The objectives of the medical psychology course include:

- acquainting medical students with the basic psychological constructs related to both mental and physical health such as mental systems, emotions, personality
- gain knowledge and communication skills in the conditions of medical practice
- building basic knowledge in the areas of stress, occupational cremation, health attitudes and disease behavior
- introduction to the approaches and methods for clinical-psychological assessment.

BASIC AIMS OF THE DISCIPLINE

1. To acquire knowledge about:

- the basic principles of medical normopsychology and pathopsychology
- the role and importance of psychosomatic and somatopsychic problems in modern medicine; the complex mechanisms and peculiarities of the behavior of the disease;

- the content of the concepts and categories used to denote the phenomena, actions and processes related to communication skills and techniques stress management techniques, burnout prevention and conflict resolution
- the principles of structuring complex, group and socially based prevention programs.

2. To be able to:

- apply modern methods of prevention and diagnosis in the field of mental health
- conduct primary psychological counseling of patients in general medical practice
- assess the individual risk of developing cremination syndrome among health professionals;

EXPECTED RESULTS

Students successfully completed the course are expected to have acquired the following competences:

- participation in a multidisciplinary team for complex case management in medical practice

LECTURES

1. Introduction and approaches in medical psychology. Mental systems
2. Methods for Assessment in psychology. Medical interview.
3. Emotions. Happiness - principles of progress and adaptation. Frustration. Intelligence.
4. Personality. Personality development.
5. Work, psychological climate and Burnout.
6. Stress. Post-traumatic growth. Late age - grief, bereavement, death. Euthanasia.
7. Models of Illness. Health Attitude. Behavior of illness.
8. Iatrogenesis. Placebo. Informed consent. Psychological counseling. Ethical principles.

PRACTICES

1. Medical interview. Methods for Assessment in psychology.
2. Emotions, happiness - principle of progress / adaptation, frustration.
3. Personality. Personality development
4. Work, psychological climate, burnout.
5. Stress. Post-traumatic growth. Late age, death, grief. Euthanasia
6. Models of Illness. Health Attitude. Behavior during illness. Iatrogenic, placebo. An informed consent.
7. Colloquium

BIBLIOGRAPHY

1. Lecture course uploaded in Sharepoint.
2. Akabaliev, V. (Ed), Stoyanov, D. (Ed), Textbook of Medical Psychology, Lax Beech 2017
3. Madjirova, N (Ed), Psychology and Medicine, MPI Raykov, 2011

CONSPECTUS

1. Introduction. Approaches.
2. Methods for Assessment in Psychology.
3. Mental systems.
4. Emotions. Happiness - Progress and Adaptation Principles. Frustration.
5. Intelligence.
6. Personality.
7. Development of Personality. Freud, Erikson, Maslow.
8. Work. Psychological Climate. Burnout.
9. Stress. Posttraumatic growth.
10. Old Age. Grief. Bereavement. Death. Euthanasia.
11. Models of Illness.
12. Health Attitude. Behavior of Illness.
13. Medical Interview.
14. Iatrogenesis. Placebo. Informed Consent.
15. Psychological Counselling in Medicine. Ethical Principles.

MEDICAL UNIVERSITY PLOVDIV
MEDICAL FACULTY

SYLLABUS

IN

RHEUMATOLOGY

Cycle of Internal Medicine Part I

Approved by the Department council on 28.04.2022

Approved by the Faculty council - Protocol №6/15.06.2022

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			IV year	
Rheumatology	VIII								
		30	10	20	10.0	5.3	15.3*	2/4	

*As per the whole Module Internal Medicine part I

DISCIPLINE: Rheumatology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: 600

LEVEL OF QUALIFICATION: Master /M/

FORMS OF TRAINING: Lectures, Practical classes, Self-training

YEAR OF TRAINING: IV course

DURATION OF TRAINING: One semester

ACADEMIC HOURS: 10 hours lectures, 20 hours practical classes

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: – study books, Self-training materials:

- Textbooks and teaching aids in Rheumatology for medical students
1. Rheumatic diseases - a short course. Sheitanov, J., S., CIM, 1988, 206 p.
 2. Practical guide to rheumatology. Rashkov, R. and J. Sheitanov., S., CIM, 2002, 238 p.
 3. Rheumatoid arthritis. Sheitanov, J. and I. Sheitanov. S., CIM, 2002, 164
 4. Modern aspects in the pathogenesis of rheumatoid arthritis. Kolarov, Zl., S., UI “St. Kl. Ohridski”, 1999, 175 p.
 5. Practical approaches in rheumatology. Sheitanov, J. and T. Andreev. St. Zagora, Knowledge, 1995, 55 p.
 6. Systemic connective tissue diseases / collagenosis /. Sheitanov, J. and R. Rashkov. S., CIM, 1999, 235 p.
 7. Systemic vasculitis. Sheitanov, J, S., CIM, 1997, 126 p.
 8. Sjögren's syndrome. Panchovska, M. and J. Sheitanov. S., CIM, 2001, 120 pp.
 9. Osteoarthritis. Sheitanov, J. S., CIM, 1996, 124 p.

10. Gout. Kanev, K., S., Med. and Phys., 1989, 114 p.
11. Osteoporosis. Sheitanov, J., S., CIM, 2000, 120 p.
12. Extraarticular soft tissue diseases / soft tissue rheumatism /. Dinev, D., S., Diagnosis Press, 2003, 72 p.
13. Internal diseases. Ed. K. Chernev, volume II, 2003
14. Rheumatic diseases. Ed. V.A. Носоной, H.B. Bunchuka., M., "Medicine" 199715. Arthritis and Allied Conditions. Ed.Koopman, W. J., 13-th Ed., vol. 1 and 2, 1997.
16. Textbook of Rheumatology, Fifth Ed., Editors: W.Kelley, S.Ruddy, E.Harris and C.Sledge, vol 1 и 2, 1997.
17. Primer on the Rheumatic Diseases, Edition 15, 2010.
18. Rheumatology - Journal of the Scientific Society of Rheumatology
19. Ann. Rheum Dis. - Journal of the European League for Rheumatism / EULAR /
20. Arthritis and Rheumatism - a journal of the American College of Rheumatology

Self-training and extracurricular work of the student

The independent work is managed by the assistant, who guides the student both in the literary sources and in the methods of their mastering. They also provide training tests, incl. on line, for independent work and exercises of students.

Cooperation between teachers and students, which is expressed in:

- Commitment of the teacher to the student and his preliminary preparation, current difficulties in mastering the material and opportunities with an individual learning program to achieve more knowledge.
- Use of consultation hours.
- Involvement of students in teams for research tasks, research, projects, etc.

FORMS OF EVALUATION:

Forms of grading:

Through current assessments and final examination assessment as part of the overall assessment of Internal Medicine 1 part

The current grades provided for in the curriculum of the course are given for:

- a. The student's results in seminars, course and individual assignments, the student's work with the lecturer on research and projects, etc .;
- b. Tests or student work.

EVALUATION CRITERIA:

Formation of the grade: The grade is one and is the result of the average value of all components of the exam - grade from a practical exam, test, written answer to two questions, oral examination, provided that none of them the student has received a poor grade.

The final grade determines the extent to which the student has achieved the learning goal set at the beginning. It is multicomponent and includes a colloquium assessment in the fifth and sixth semesters, a written final exam, an oral final exam assessment, a practical exam and the assessments from the current control.

The components involved in the formation of the assessment and the coefficients of significance of the discipline are determined by the Academic Council with the adoption of this academic standard of the discipline.

ASPECTS OF EVALUATION CRITERIA:

Clear standards for evaluation have been developed. An average grade is formed from each semester, the conducted colloquia, from the written theoretical exam (after a successful entrance test with a limit of 65%) and the practical exam.

- Weak (2) receives a student with scarce knowledge that cannot serve as a basis for the next levels of education in other clinical disciplines.

- Intermediate (3) is given to a student who reproduces the knowledge in a "ready-made scheme", missing the main points of the developed topic; there is no readiness for independent use of the acquired knowledge and professional competencies; the terminology is not mastered satisfactorily, the presentation is characterized by poor language; only some basic practical skills have been mastered.

- Good (4) receives a student who develops the topic descriptively, reproductively, has limited independence in using the acquired knowledge and acquired professional competencies, in the presentation, although there is a good language culture, inaccuracies in the concepts used; who has mastered basic practical skills but not to the full and has some gaps.

- Very good (5) gets a student who develops the topic independently productively, non-standard, looking for a new algorithm and analysis of the used literature data; makes an attempt to present and substantiate his thesis; adequately uses the concepts from the scientific field of the studied discipline, has a good language culture; handles very well practically to the bed of the patient with small gaps.

- Excellent (6) is awarded to a student who independently, logically, with the presence of a creative element brings out the topic; reasonably and originally uses and interprets the literature related to the revealed issue; is well informed and ready to use the acquired knowledge and professional competencies; has the accuracy and rich linguistic culture of the exhibition, practically handles perfectly to the patient's bed. At the beginning of the academic year of the lectures and exercises the students get acquainted with the assessment standards, the procedures for conducting current control and the opportunities for receiving feedback on their progress during the semester.

SEMESTER EXAM: Yes /Test, written theoretical exam and practical exam/

STATE EXAM: Yes, as a part of Internal Medicine

LECTURER: Assoc. Prof. Karalilova,

DEPARTMENT: Propedeutics of internal medicine

ANNOTATION

The main goal of the training in Rheumatology is to build theoretical and practical training of future doctors on the recognition, diagnosis, conservative treatment, as well as rehabilitation and prevention of diseases of the musculoskeletal system and connective tissue. A distinctive feature of the specialty is the presence of overlapping areas with a significant number of other internal medicine, surgery and therapeutic specialties. During the course in rheumatology students learn about the adequate behavior in emergencies in rheumatology - gout, acute monoarthritis, vasculitis and others.

BASIC AIMS OF THE DISCIPLINE

The main tasks of the medical specialty Rheumatology are the prevention, diagnosis, treatment and rehabilitation of patients with the following rheumatic diseases: inflammatory and degenerative joint diseases, connective tissue diseases, bone diseases, soft tissue diseases, diseases caused by crystals, and hereditary diseases of the musculoskeletal system.

The principles of training are consistent with:

- the mission and the concept for the Medical University, Plovdiv
- the volume and the credit rating of the course (according to the ECTS system), according to the curriculum;
- the qualification characteristic of the specialty;

The purpose of the training in Rheumatology is in accordance with the place of the discipline in the training in medicine and with the chronology in the curriculum.

Course content The content of the topics for lectures and exercises is presented sequentially so that the lecture and related exercises unite specific disease units. Knowledge from previously and in parallel studied disciplines such as anatomy, pathoanatomy, physiology, pathophysiology, pharmacology, radiology, surgical diseases is applied. 3. Prerequisites for training in internal medicine. Students study their knowledge of anatomy, histology, physiology, pathophysiology and pathoanatomy, propaedeutics of internal diseases while studying rheumatology.

Academic resources

The academic staff of Rheumatology training for medical students includes

2 habilitated lecturers - with a specialty in Internal Medicine and Rheumatology,

2 lecturers with a scientific degree "Doctor" specialist in Internal Medicine and Rheumatology

3 non-habilitated lecturers with specialty Rheumatology.

The lectures are delivered by a habilitated lecturer (associate professor or professor) with an acquired scientific degree in the respective doctoral program. Up to 10% of the lectures are assigned to non-habilitated lecturers with a scientific degree in a relevant doctoral program in Internal Medicine.

The practical exercises are led by habilitated and non-habilitated lecturers (professor, associate professor, chief assistant, assistant). The non-habilitated lecturers have a master's degree in medicine and are appointed after a competition.

Material resources

The training in rheumatology is conducted in the Department of Propaedeutics of Internal Medicine at MU-Plovdiv. The exercises are held in the Rheumatology Clinic, Kaspela University Hospital (100% of the groups in Bulgarian and English), at the patient's bedside or in seminar rooms. One of the halls is provided with equipment for multimedia presentation. The technical means applied in the training include - video films, multimedia presentations, collections of ECG recordings, radiographs, joint ultrasound.

The most modern methods for instrumental diagnostics are provided - high-frequency ultrasound devices - 3 pieces, MRI, Densitometer, Capillaroscope, Polarizing microscope - 2 pieces.

Lecture training. The lectures are prepared and delivered in the form of multimedia presentations. The volume and format of the lectures are subordinated to the respective for the semesters plan - program.

Practical exercises Conducted in groups. Methodical instructions, manuals and teaching aids are provided for the exercises. Each student is given individual tasks. The following is checked: - the student's self-preparation on the topic of each exercise - the results (acquired knowledge and skills) from the specific exercise. As a methodological form, preference is given to the independent work of each student. Discussions are held with groups of students, before which the reporting student substantiates his thesis on specific clinical cases.

Information resources. Basic literature. Sites

Rheumatology training for medical students is subject to the curriculum. At the beginning of each school year, students are informed about the main recommended literature in Rheumatology. From the lecturers and the assistants in the course of the educational process data are supplemented for Internet resources with appropriate materials for the training. Textbooks and teaching aids.

EXPECTED RESULTS

The main results of the training in Rheumatology as part of the Course in Internal Medicine are related to the purpose and objectives of the training - acquiring theoretical and practical training of future physicians for comprehensive care of the patient suffering from rheumatic disease, including thorough history taking, proper use of the basic physical and instrumental methods of examination, diagnosis and differential diagnosis and acquisition of skills for assessing the need for specialized counseling of a patient suffering from the most common rheumatic diseases.

LECTURES

Rheumatology Topics

1	27.11.19	Rheumatoid arthritis – definition, etiology, pathogenesis, clinical presentations/clinical forms, disease course; Diagnosis and differential diagnosis. Treatment. Remission criteria. Prognosis and disability assessment. .
2	4.12.19	Seronegative spondyloarthropathies – ankylosing spondylitis, psoriatic arthritis, reactive arthritis.
3	11.12.19	Crystal arthropathies – gout - definition, prevalence, localization, etiology, pathogenesis, clinical presentation/clinical forms, disease course, diagnosis, differential diagnosis, management. Pseudogout.
4	18.12.19	Systemic lupus erythematosus - definition, prevalence, etiology, pathogenesis, clinical presentation/clinical forms, disease course, diagnosis, differential diagnosis, management. Secondary antiphospholipid syndrome – diagnosis, active and supportive treatment.
5	25.12.19	Osteoarthritis - definition, prevalence, localization, etiology, pathogenesis, clinical presentation/clinical forms, disease course, diagnosis, differential diagnosis, management.

PRACTICES

№	Topic	HOURS
1.	Semiotics in rheumatic patients. Taking history of a rheumatic patient. Physical examination of musculoskeletal system. Interpretation of main arthritis syndromes.	2
2.	Drug therapy of rheumatic patients.	2
3.	Rheumatoid arthritis - complete physical exam. Clinical manifestations.	2
4.	Rheumatoid arthritis – treatment.	2
5.	Seronegative spondyloarthropathies. Physical examination of patients with AS. Specific radiographic changes. Management and physical therapy.	2

6.	Psoriatic arthritis - clinical picture, management. Reactive arthritis. Reiter's syndrome - definition, etiology, pathogenesis, clinical picture and therapy. Arthritis in Patients with Inflammatory Bowel Disease	2
7.	Systemic lupus erythematosus. Diagnostic criteria. Clinical manifestations. Therapeutic strategies.	2
8.	Scleroderma, Dermato/polymyositis, Vasculitis - etiology, pathogenesis, clinical picture, investigations and management.	2
9.	Gout. Clinical picture and investigations. Management of acute and chronic gout. Osteoarthritis, osteoporosis - clinical picture and management.	2
10.	EXAM - rheumatic diseases.	2

BIBLIOGRAPHY

1. Rheumatic diseases - a short course. Sheitanov, J., S., CIM, 1988, 206 p.
2. Practical guide to rheumatology. Rashkov, R. and J. Sheitanov., S., CIM, 2002, 238 p.
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17. Primer on the Rheumatic Diseases, Edition 15, 2010.

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19. Ann. Rheum Dis. - Journal of the European League for Rheumatism / EULAR /
20. Arthritis and Rheumatism - a journal of the American College of Rheumatology

CONSPECTUS

CONSPECT FOR INTERNAL MEDICINE IV YEAR INTERNAL MEDICINE PART I

1. Heart glucosides.
2. Rhythm and conduction disorders.
3. Antiarrhythmic agents.
4. Congestive heart failure, hemodynamic classification, treatment.
5. Acute heart failure.
6. Cardiogenic shock.
7. Rheumatism.
8. Chronic pulmonary heart.
9. Infectious endocarditis.
10. Acquired defects of the mitral valve.
11. Acquired defects of the aortic valve.
12. Diseases of the myocardium. Myocarditis.
13. Diseases of the myocardium. Cardiomyopathies.
14. CHD. Classification, etiology, risk factors.
15. Antianginal agents.
16. Stable angina.
17. Unstable angina.
18. Myocardial infarction - etiology, pathogenesis, risk factors, clinic.
19. Myocardial infarction - complications, DD, treatment.
20. Arterial hypertension.
21. Congenital heart defects.
22. Pericarditis.
23. Rheumatoid arthritis.
24. Lupus erythematosus.
25. Gout.

C O N S P E C T

INTERNAL DISEASES FOR MEDICAL STUDENTS – STATE EXAM

1. Chronic Obstructive Pulmonary Disease – COPD
2. Bronchial asthma
3. Pneumonias
4. Pulmonary embolism, Pulmonary infarction
5. Pulmonary tuberculosis
6. Pleuritis. Dry and exudative. Adhesive pleuritis
7. Infective endocarditis
8. Mitral valve stenosis
9. Mitral valve insufficiency / regurgitation/
10. Aortic stenosis
11. Aortic regurgitation
12. Idiopathic Arterial hypertension. Symptomatic arterial hypertension.
13. Ischemic heart disease.
14. Myocardial infarction
15. Myocarditis. Cardiomyopathies
16. Rhythm and conduction disturbances
17. Pericarditis
18. Acute and chronic heart failure
19. Rheumatoid arthritis
20. Osteoarthritis
21. Systemic lupus erythematosus
22. Gout, Uric acid crystal induced arthritis
23. Acute and chronic glomerulonephritis
24. Nephrotic syndrome and nephropathy
25. Acute and chronic pyelonephritis
26. Nephrolithiasis
27. Acute and chronic renal failure
28. Acute and chronic gastritis
29. Ulcer disease
30. Chronic ulcerative colitis and Chron's disease
31. Bowel cancer, colorectal carcinoma
32. Chronic hepatitis
33. Liver cirrhosis and liver failure, Hepatic coma
34. Cholelithiasis. Cholecystitis
35. Chronic pancreatitis
36. Iron deficiency anemia
37. Megaloblastic anaemia, Vit B12 deficiency anaemia
38. Haemolytic anaemias
39. Acute (blastic) leukoses
40. Chronic myeloleukosis and Chronic lympholeukosis
41. Morbus Hodgkin (lymphogranulomatosa malignum)
42. Multiple myeloma
43. Polycythemia vera
44. Thrombocytopenia
45. Capillarotoxicosis. Schonlein- Hennoch disease.

46. Thyroiditis
47. Thyrotoxicosis. Graves' disease
48. Myxoedema
49. Acromegaly
50. Hypercorticism. Cushing disease.
51. Hypocorticism. Addison's disease.
52. Hypoparathyroidism. Hyperparathyroidism
53. Diabetes mellitus
54. Antibiotic therapy, Principles of treatment with antibiotics
55. Cytostatic agents, Treatment with cytostatic and immunosuppressive agents
56. Glucocorticoids and adrenocorticotrophic hormone (ACTH), Classification of
Glucocorticoids and treatment with Glucocorticoids
57. Treatment of coronary artery disease (Ischemic heart disease)
58. Treatment of Rhythm and conduction disturbances
59. Heart glycosides and diuretics

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

PULMONOLOGY AND PHTISIATRICS
FOR MEDICAL STUDENTS

Approved by the Department Council on 06.07.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

**PULMONOLOGY AND PHTISIATRICS TRAINING CURRICULUM
FOR MEDICAL STUDENTS**

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			I st year	
Pulmonology and Phtisiatics	VIII	60	20	40	10.0	5.3	15.3*	2/4	2/4

*As per the whole module Internal Diseases Part I

DISCIPLINE: PULMONOLOGY AND PHTISIATRICS

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS: CORE MEDICAL COURSE

LEVEL OF QUALIFICATION: MASTER OF SCIENCE

FORMS OF TRAINING: postgraduate formal lectures, practice skill training, self-directed learning

YEAR OF TRAINING: Fourth year medical students, VII and VIII semester.

DURATION OF TRAINING: 10 weeks

ACADEMIC HOURS: 2 academic hours per week lectures, 4 academic hours per week practical training

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: multimedia presentations, case scenario discussions, clinical skills training as history taking and physical examination, basics in pulmonary X-ray imaging and interpretation, introduction to medical documentation, attendance of bronchoscopy procedures functional testing and thoracentesis, topic presentations.

FORMS OF EVALUATION: written and oral examination, teaching observation, clinical evaluation practices, topic presentations

EVALUATION CRITERIA: integrated assessment of trainees' progression based on their average performance during the semester

ASPECTS OF EVALUATION CRITERIA: discussion participation, cases scenario discussions, topic presentations, chest X-ray interpretation, clinical quiz taking.

SEMESTER EXAM: practical and theoretical examination as part of the integral internal medicine exam.

STATE EXAM: practical and theoretical examination as part of the integral internal medicine exam

LECTURER: PhD level supervisor from Pulmonology and Phthisiatrics Section

DEPARTMENT: First Internal Medicine Department

ANNOTATION

BASIC AIMS OF THE DISCIPLINE: Pulmonology and Phthisiatrics discipline is focused on lung diseases – their etiology, pathogenesis, clinical features, diagnosis, and treatment

Program content and objectives:

- Acquisition of theoretical and practical competencies in the field of lung structure and function as well as in the area of related lung disorders, their diagnosis, differential diagnosis, treatment, and prophylaxis.
- Development of clinical skills in the area of internal medicine conditions, with a focus on lung pathology
- Relating clinical knowledge to radiology and x-ray imaging, analysis of biochemical, microbiological, cytological, and morphological tests.
- Acquisition of knowledge and performance of manipulations specific to pulmonology as: tuberculin skin test, routine functional testing, bronchodilation tests, nebulization

- Acquisition of theoretical knowledge and practical skills of the clinical features, diagnosis, treatment and prophylaxis of lung disorders, history taking and physical examination.

EXPECTED RESULTS:

Upon completion of training, trainees are required to have knowledge and practical skills in:

- epidemiology, etiology, pathogenesis, and histopathology of the basic lung disorders
- to be familiar with the harmful effect of smoking and the methods of smoking cessation
- to have knowledge of the clinical features and diagnostic methods of basic lung disorders
- to be able to differentiate among the basic lung disorders as well as distinguish them from disorders of other organs, presenting with similar clinical features
- to be able to perform the tuberculin skin test
- to be able to perform routine functional testing and interpret their basic parameters
- to be able to perform nebulization
- to be able to recognize and interpret the X-ray features of the main lung conditions
- to be familiar with blood – gas analysis
- to be familiar with the basic therapeutic agents in pulmonology and phthisiatrics
- to have knowledge and be able to recommend preventive measures and prophylaxis in the area of lung disorders

LECTURES:

LECTURE COURSE – ESSENTIAL AREAS OF TRAINING

Lecture 1 – 2 hours

TUBERCULOSIS

1. Epidemiology
2. Etiology
3. Pathogenesis
4. Classification
5. Assessment methods
6. Clinical forms
7. Present trends in the clinical course of tuberculosis

Lecture 2 – 2 hours

TREATMENT AND PROPHYLAXIS OF TUBERCULOSIS

1. Current treatment of tuberculosis
 - 1.1. DOTS strategy
 - 1.2. First line anti-tuberculosis agents
 - 1.3. Second line anti-tuberculosis agents
2. Latent tuberculosis and prophylaxis of tuberculosis

Lecture 3 – 2 hours

PNEUMONIAS

1. Epidemiology
2. Etiology
3. Pathogenesis
4. Classification
5. Assessment methods
6. Differential diagnosis
7. Treatment of pneumonias

Lecture 4 – 2 hours

FUNCTIONAL LUNG TESTING

1. Spirometry
2. Diffusion
3. Blood- gas analysis

Lecture 5 – 2 hours

COPD

1. Epidemiology
2. Etiology

3. Pathogenesis
4. Classification
5. Assessment methods
6. Differential diagnosis
7. Treatment of COPD

Lecture 6 – 2 hours

BRONCHIAL ASTHMA

- 1 Epidemiology
- 2 Etiology
- 3 Pathogenesis
- 4 Classification
- 5 Assessment methods
- 6 Differential diagnosis
- 7 Treatment of asthma

Lecture 7 – 2 hours

SMOKING CESSATION STRATEGIES

1. Epidemiology of smoking
2. Smoking cessation strategies

Lecture 8 – 2 hours

LUNG CANCER

- 1 Epidemiology
- 2 Etiology
- 3 Pathogenesis
- 4 Classification
- 5 Assessment methods
- 6 Differential diagnosis
- 7 Treatment of pneumonias

Lecture 9 – 2 hours

PULMONARY EMBOLISM

1. Epidemiology
2. Etiology
3. Pathogenesis
4. Classification
5. Assessment methods
6. Diagnostic algorithm
7. Differential diagnosis
8. Treatment algorithm

Lecture 10 – 2 hours

PLEURAL EFFUSIONS

- 1 Epidemiology
- 2 Etiology
- 3 Pathogenesis
- 4 Classification
- 5 Assessment methods
- 6 Differential diagnosis
- 7 Treatment

PRACTICES:

Practical Sessions

Session 1 – 2 hours

Diagnostic methods in patients with tuberculosis – part 1

1. History taking
2. Physical examination
3. Imaging techniques
4. Microbiological methods

Session 2 – 2 hours

Diagnostic methods in patients with tuberculosis – part 2

1. Immunological methods
2. Clinical and laboratory methods
3. Invasive diagnostic procedures

Session 3 – 2 hours

Forms of primary tuberculosis

1. Primary tuberculosis complex
2. Tuberculous broncho adenitis

Session 4 – 2 hours

Hematogenous disseminated tuberculosis

1. Acute miliary tuberculosis
2. Subacute hematogenous disseminated tuberculosis
3. Chronic hematogenous disseminated tuberculosis

Session 5 – 2 hours

Secondary lung tuberculosis - part 1

1. Focal tuberculosis
2. Infiltrative pulmonary tuberculosis

Session 6 – 2 hours

Secondary lung tuberculosis- part 2

1. Tuberculoma of the lungs
2. Cavernous tuberculosis
3. Fibrous- cavernous tuberculosis
4. Differential diagnosis with pulmonary abscess

Session 7 – 2 hours

Complication in pulmonary tuberculosis

1. Hemoptysis
2. Pneumothorax
3. Treatment of tuberculosis

Session 8 – 2 hours

Treatment and prophylaxis of tuberculosis

1. DOTS strategy
2. Treatment of latent tuberculosis
3. BCG vaccination

Session 9 – 2 hours

Pleural effusions

1. Diagnosis of pleural effusions
2. Case scenario discussion
3. Thoracentesis attendance

Sessions 10 – 2 hours

Tuberculosis competence assessment

Session 11 – 2 hours

Basic methods of assessment in pulmonology

1. History taking
2. Physical examination
3. Imaging techniques
4. Microbiological methods
5. Immunological methods
6. Clinical and laboratory methods
7. Invasive diagnostic methods
8. Pulmonary function testing
10. Other methods

Session 12 – 2 hours

Pneumonias - part 1

1. Classification, diagnosis and differential diagnosis of pneumonias
2. Case scenarios

Session 13 – 2 hours

Pneumonias - part 2

- 1 Treatment of community acquired pneumonias
- 2 Treatment of hospital acquired pneumonias
- 3 Case scenarios

Session 13 – 2 hours

Bronchial asthma

1. Classification, diagnosis, differential diagnosis
2. Case scenarios
3. Attendance of nebulization procedures

Session 15 – 2 hours

Bronchial asthma – treatment

1. Basic groups of therapeutic agents in Asthma
2. Treatment of asthma attacks
3. Treatment of stable asthma

Session 16 – 2 hours

COPD

1. Diagnosis and severity assessment
2. Exacerbations
3. Differential diagnosis of broncho obstructive disorders
4. Case scenarios

Session 17 – 2 hours

COPD – treatment

1. Basic groups of therapeutic agents in COPD
2. Treatment of stable COPD
3. Treatment of exacerbations
4. Respiratory failure

Session 18 – 2 hours

Lung cancer

1. Diagnosis of lung cancer

2. Case scenarios
3. Bronchoscopy attendance

Session 19 – 2 hours

Pulmonary embolism

1. Risk factors, diagnosis, differential diagnosis
2. Treatment of PE
3. Prophylaxis
4. Case scenarios

Session 20 – 2 hours

Competence assessment in pulmonology

BIBLIOGRAPHY:

Pulmonary Diseases, Textbook in Internal Medicine. Editor Prof. F. Nikolov, Medicine Publishing House VAP, Plovdiv, 2017, ISBN 978-954-8326-68-1

New Manual for Pulmonary Diseases and Tuberculosis. Editor Pof. Iankova, Sofia, 2012, ISBN 978-954-9318-16-6

Dyspnea. Pathophysiology, Nosology, Diagnostics and Treatment Approach. Editors Prof. S. Kostianev, Prof. Iluchev

Global Initiative for Asthma Management and Prevention in Adults and Children under 5 Years. (GINA), Global Strategy for the Diagnosis, Management and Prevention of COPD (COLD), Guidelines for Treatment of Pneumonias and Pulmonary Embolism

Bulgarian Consensus Treatment of Pulmonary Embolism

Bulgarian Consensus Treatment of Community Acquired Pneumonias
Harrison 'Principles of Internal Medicine

Tuberculosis Coalition for Technical Assistance. International Standards for Tuberculosis Care (ISTC). 2nd edition, The Hague, Tuberculosis Coalition for Technical Assistance, 2014

Tuberculosis Coalition for Technical Assistance. International Standards for Tuberculosis Care (ISTC). 2nd edition, The Hague, Tuberculosis Coalition for Technical Assistance, 2009

TUBERCULOSIS, A Manual for Medical Students *By Nadia Ait-Khaled and Donald A. Enarson*

Tuberculosis 2007 - From basic science to patient care, Juan Carlos Palomino, Sylvia Cardoso Leão, Viviana Ritacco

Toman's tuberculosis case detection, treatment, and monitoring : questions and answers edited by T. Frieden. – 2nd ed.

CONSPECTUS

1. Pneumonias – pathogenesis , classification, clinical features, differential diagnosis
2. Empirical therapy of community acquired pneumonias
3. Treatment of hospital acquired pneumonias
4. COPD – classification, diagnosis, clinical course
5. Treatment of COPD
6. Bronchial asthma – pathogenesis, clinical features, asthma severity scoring , diagnosis
7. Bronchial asthma – management of asthma attacks, treatment of stable asthma
8. Differential diagnosis between COPD and Asthma – clinical and functional parameters.
9. Purulent diseases of lungs – lung abscess, necrotizing pneumonia
10. Lung cancer - clinical features, diagnosis, treatment
11. Pulmonary embolism
12. Pleural diseases - classification, diagnosis and treatment
13. Respiratory failure
14. Antibiotics in the pulmonology
15. Classification, pathogenesis and diagnosis of tuberculosis
16. Primary tuberculosis complex. Tuberculous bronchadenitis
17. Miliary tuberculosis. Acute tuberculosis sepsis
18. Sub-acute and chronic blood disseminated tuberculosis
19. Focal and infiltrative – pneumonic tuberculosis
20. Tuberculoma of the lungs
21. Fibrous- cavernous tuberculosis
22. Treatment of tuberculosis

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

Cardiology

Part of Internal diseases part I

Passed at Department Council – Protocol №2/21.04.2022

Approved at the Faculty Council – Protocol №6/15.06.2022

Cardiology

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non- auditorium classes	ECTS total	Academic hours in years and semesters	
								IV year	
		Total	Lectures	Practices	ECTS			VII	VIII
Cardiology	VIII	105	30	75	10.0	5.3	15.3*	2/5	2/5

*For the whole module „Internal diseases part I”

DISCIPLINE:

Cardiology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Obligatory

LEVEL OF QUALIFICATION:

Master /M/

FORMS OF TRAINING:

Lectures, practical lessons, seminars, self-training

YEAR OF TRAINING:

4th year

DURATION OF TRAINING:

One semester

ACADEMIC HOURS:

30 hours of lectures and 75 hours of practical lessons

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Mulmedia presentations, presentation of patients with cardiovascular diseases; independent work with patients, reading of

electrocardiograms, participation in echocardiography studies, reading of 24-hour Holter ECGs, participation in veloergometry studies.

FORMS OF EVALUATION:

Current control, tests, colloquiums, writing essays.

EVALUATION CRITERIA:

Average current mark for every semester

ASPECTS OF EVALUATION CRITERIA:

Independent work with patient, participation in seminars, test, colloquiums

SEMESTER EXAM:

Yes /practical exam and theoretical exam - written and oral/

STATE EXAM:

Yes /practical and theoretical exam - written and oral/

LECTURERS:

Habilitated lecturers form the section of Cardiology

DEPARTMENT:

First department of internal diseases

Section of Cardiology

ANNOTATION

The scientific discipline Cardiology studies cardiovascular diseases – their etiopathogenesis, clinical presentation, diagnostics and treatment.

BASIC AIMS OF THE DISCIPLINE

Acquisition of theoretical knowledge and practical skills about the structure and function of the heart, the pathological processes related to them, their diagnosis, differential diagnosis, treatment and prophylaxis.

- Building of clinical skills in the field of internal diseases and in particular - cardiac pathology.
- Mastering electrocardiography in norm and pathology
- Acquiring basic knowledge in the field of echocardiography in norm and pathology

- Acquisition of theoretical knowledge and practical skills for the clinical presentation, diagnosis, treatment and prevention of heart disease.

EXPECTED RESULTS

Upon completion of the training, students are expected to have the following knowledge and skills:

- to know the epidemiology, etiology, pathogenesis and histomorphology of the most common heart diseases
- to know the clinical presentation and methods for diagnosis of the most common heart diseases
- to be able to differentiate between the most common heart diseases, as well as to make a differential diagnosis with diseases of other organs and systems with a similar clinical presentation
- to be able to record and read an electrocardiogram
- to be able to interpret the basic elements of echocardiography
- to know the basic medications used for treatment in cardiology
- to know and recommend measures for heart diseases prophylaxis

Teaching content of the discipline:

The priority goals of cardiology training include: The development of students' personal qualities, encouraging their initiative, creating habits of sustainable self-education and the ability to learn on their own, acquiring "transferable" knowledge, key competencies and skills. This is reflected in the curriculum of the course.

LECTURES

1. Chronic heart failure – classification, hemodynamics, treatment – 2h
2. Acute heart failure – 1h. Cardiogenic shock – 1h.
3. Rhythm and conduction disturbances – 2h.

4. Pulmonary thromboembolism – 1h. Chronic cor pulmonale – 1h.
5. Rheumatic heart disease – 1h. Infective endocarditis – 1h.
6. Mitral valve disease – 2h.
7. Aortic valve disease – 2h.
8. CAD – classification, etiology, risk factors – 1h. Antiischaemic drugs – 1h.
9. Stable angina – 1h. Unstable angina – 1h.
10. Acute myocardial infarction – etiology, pathogenesis, risk factors, clinical characteristics – 2h.
11. Acute myocardial infarction – complications, differential diagnosis, treatment – 2h.
12. Arterial hypertension – 2h.
13. Diseases of the myocardium - myocarditis - 1h. Cardiomyopathies - 1h.
14. Diseases of the pericardium - 1h. Congenital valvular disease – 1h.
15. Atherosclerosis – primary and secondary prevention – 2h.

PRACTICES

1. Methods for cardiac investigation
2. Chronic Heart Failure – hemodynamics, classification, clinical characteristics
3. Chronic Heart Failure – treatment
4. Acute HF – cardiac asthma, acute pulmonary edema, cardiogenic shock
5. Arrhythmias – supraventricular
6. Arrhythmias – ventricular
7. Conduction disturbances
8. Treatment of arrhythmias
9. Colloquium – HF, arrhythmias
10. Chronic cor pulmonale
11. Rheumatic heart disease
12. Infective endocarditis
13. Mitral stenosis
14. Mitral regurgitation

15. Aortic stenosis
16. Aortic regurgitation
17. Colloquium – valvular heart diseases.
18. CAD – classification, etiology, risk factors
19. Antiischemic drugs
20. Stable angina
21. Unstable angina
22. Myocardial infarction – pathogenesis, clinical manifestation, diagnosis
23. Myocardial infarction – complications, differential diagnosis
24. Treatment
25. Colloquium – CAD
26. Arterial hypertension – etiology, pathogenesis, clinical manifestation
27. Arterial hypertension – treatment
28. Diseases of the myocardium. Myocarditis
29. Cardiomyopathies
30. Pericardial diseases

ABSTRACTS OF THE LECTURES AND PRACTICAL LESSONS IN CARDIOLOGY

Congestive heart failure. Presentation of the essence of the clinical syndrome of heart failure, classification of heart failure - left and right, congestive and low-output, hemodynamics of heart failure, treatment of the various types of heart failure.

Acute heart failure. Etiology and hemodynamic changes. The treatment of acute heart failure is discussed. **Cardiogenic shock** is presented in its multiorgan involvement, hemodynamics and treatment.

Rhythm and conduction disturbances. The essence of the action potential is presented. The various supraventricular and ventricular arrhythmias are discussed. In the context of the action potential, anti-rhythm drugs are

discussed. The methods for diagnosis of rhythm and conduction disorders are presented. New methods of treatment are also given – ablation.

Pulmonary thromboembolism. The risk factors for PTE are presented. Virchow's triad. Clinical forms of PTE. Diagnosis of PTE – clinical presentation, paraclinical findings, laboratory tests. Treatment of PTE **Chronic pulmonary heart.** Definition. The three etiological forms are presented. Hemodynamics. Clinical presentation with right heart failure. Changes in blood gas analysis, chest X-ray. Treatment

Rheumatic fever. Etiology. Pathogenesis. Clinical presentation of first and consequent attacks. Differential diagnosis. Treatment. Infective endocarditis. Etiological factors. Portals of entry. Clinical presentation. Paraclinical presentation. Treatment

Acquired mitral valve diseases. Etiological factors. Hemodynamics. Clinical presentation. Diagnosis and differential diagnosis. Treatment - conservative and indications for surgical treatment

Acquired aortic valve diseases. Etiological factors. Hemodynamics. Clinical presentation. Diagnosis and differential diagnosis. Treatment - conservative and indications for surgical treatment.

Ischemic Heart Disease. Essence. Ten clinical forms. Classification, etiology, risk factors. Antianginal agents - the groups of drugs are presented and divided into those that alleviate the symptoms and those that change the prognosis.

Stable angina. The stable atherosclerotic plaque. Clinical characteristics. Diagnosis. Differential diagnosis. Treatment - conservative, invasive and operative.

Unstable angina. Characteristics of the unstable atherosclerotic plaque. Clinical classification according to Braunwald. Diagnosis and differential diagnosis. Treatment - conservative, interventional and operative.

Myocardial infarction. Etiology of acute coronary syndrome, pathogenesis of coronary artery occlusion, risk factors, clinical presentation.

Myocardial infarction. Complications - early and late, differential diagnosis of thoracic pain. Treatment of myocardial infarction - prehospital and hospital treatment.

Atherosclerosis. Successful and unsuccessful vascular aging. Lipid theory. Stages of atherosclerotic plaque formation. Types of dyslipidemia. Therapy of different types of dyslipidemias. Primary and secondary prevention.

Arterial hypertension. Essence. Pathogenetic mechanisms. Types of arterial hypertension - essential and secondary. Clinical presentation. Diagnosis. Differential diagnosis. Treatment - groups of antihypertensive drugs and modern aspects of treatment.

Myocardial diseases. Myocarditis. Etiology Classification. Clinical presentation. Diagnosis. Differential diagnosis. Treatment.

Myocardial diseases. Types of cardiomyopathies. Clinical presentation. Diagnosis. Differential diagnosis. Treatment.

Congenital heart defects. Classification. Cyanotic and acyanotic defects. Diagnosis and differential diagnosis. Treatment.

Pericarditis. Classification. Clinical presentation. Diagnosis. Differential diagnosis. Treatment.

BIBLIOGRAPHY

1. Cardiology. Edited by M. Tokmakova. Lax book, 2013
2. The Oxford Handbook of Cardiology
3. Harrison's Principles of Internal Medicine, 20e.
4. Lectures from the theoretical course

CONSPECTUS

TOPICS FOR THE SEMESTER EXAM IN CARDIOLOGY

(part of the semester exam in Internal diseases part I)

1. Cardiac glycosides.
2. Rhythm and conduction disorders.
3. Antiarrhythmic drugs.
4. Congestive heart failure – hemodynamics, classification, treatment.
5. Acute heart failure.
6. Cardiogenic shock.
7. Rheumatic fever.
8. Cor pulmonale.
9. Infective endocarditis.
10. Mitral valvular heart disease.
11. Aortic valvular heart disease.
12. Diseases of the myocardium. Myocarditis.
13. Cardiomyopathies.
14. CAD – classification, diagnosis, etiology, risk factors.
15. Antianginal drugs.
16. Stable angina.
17. Unstable angina.
18. Acute myocardial infarction – etiology, pathogenesis, risk factors, clinical presentation.
19. Acute myocardial infarction – complications, differential diagnosis, treatment.
20. Arterial hypertension.
21. Congenital heart disease.
22. Pericarditis.

**TOPICS FOR THE STATE EXAM IN INTERNAL DISEASES,
THE FIRST DEPARTMENT OF INTERNAL DISEASES
(Cardiology part)**

1. Rhythm disturbances.
2. Conduction disturbances.
3. Congestive heart failure. Hemodynamic classification, treatment.
4. Acute heart failure. Cardiac asthma. Pulmonary edema. Cardiogenic shock.
5. Chronic cor pulmonale (Chronic pulmonary heart disease).
6. Infective endocarditis.
7. Acquired mitral valve diseases.
8. Acquired aortic valve diseases.
9. Diseases of the myocardium. Myocarditis. Cardiomyopathies.
10. Ischemic heart disease. Classification, etiology, risk factors, pathogenesis.
11. Stable and unstable angina.
12. Myocardial infarction.
13. Arterial hypertension.
14. Pericarditis.

MEDICAL UNIVERSITY OF PLOVDIV

MEDICAL FACULTY

FIRST DEPARTMENT OF INTERNAL MEDICINE

SECTION OF HEMATOLOGY

SYLLABUS
IN
HEMATOLOGY

Approved by the Department Council – Protocol №3/06.07.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

MEDICAL UNIVERSITY - PLOVDIV
MEDICAL FACULTY

Education Plan

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								4 th year	
Hematology	VIII	Total	Lectures	Practices	ECTS	5.3*	15.3*	I	II
		210	60	150	10.0*			105	105

*For the whole module “Internal Medicine-I”

Name of the discipline:

"Hematology"

Type of discipline:

Mandatory

Level of training:

Master / M /

Forms of training:

Lectures, clinical practice, seminars, self-preparation.

Duration of training:

One semester

Chorary:

30 hours of lectures, 75 hours of clinical practice per semester

Teaching methods:

Multimedia Presentations, Demonstration of Patients with Blood Diseases, Self-Training with Patients, Direct and Videomonitoring Microscopy of Bone Marrow and Peripheral Blood Smears, Atlases and Clinical Albums with Own Clinical Material

Forms of assessment:

Current evaluation, tests, colloquiums, elaboration of a paper.

Formation of the assessment:

Mean of the assessments during the semester.

Assessment aspects:

Individual work with a patient, participation in seminar discussions, tests, colloquiums, elaboration of a paper.

Semester examination:

Yes / Practical Exam, Entry Test, Written Exam /

State Examination:

Yes / practical and written /

Main Lecturer: Prof Vesselina Goranova-Marinova, MD, PhD

Department:

Department of Internal Medicine -I

Section of Hematology

ANNOTATION

Clinical hematology is a medical specialty and scientific discipline of integrative nature that studies blood and haematopoietic organs in norm and pathology. It has specific methodology and therapeutic activity in the following key areas:

- Clinical hematology: benign and malignant, congenital and acquired blood disorders, as well as haematological complications in diseases of other organs and systems
- Haematological laboratory diagnosis
- Thrombosis and haemostasis
- Hematopoietic Stem Cell Transplantation
- Transfusion medicine

OBJECTIVE OF CLINICAL HEMATOLOGY

The main objective of the medical specialty "Clinical Hematology" is complex knowledge and competence of blood and hematopoietic organs in norm and pathology, provision of early diagnosis, prognosis of disease progression, adequate therapy, traceability, medical expertise, effective primary and secondary prevention and dispensary of the patients with hematological diseases

MAIN TASKS OF THE CURRICULUM PROGRAM

IN CLINICAL HEMATOLOGY

1. Acquisition of knowledge and competence of contemporary perceptions of epidemiology, etiology, pathophysiology, clinical features, diagnosis, prognosis and therapeutic approaches to inborn and acquired diseases of blood and hematopoietic organs.
2. Acquisition of knowledge, competence and practical skills for the indications and interpretation of sensitivity, specificity and informative value of the laboratory tests in hematology: cytomorphology, immunohematology, flow cytometry, cytogenetic analysis, molecular analysis, imaging methods for blood and hematopoietic examination in norm and pathology.
3. Acquiring knowledge, competence and practical skills for diagnosis of hematological malignancies, benign diseases of hematopoiesis, overall assessment of the coagulation system in norm and pathology, control of the clinical and biological evolution of hematological diseases, the possibility of secondary neoplasias, early and late complications of the treatment as well and the impact of occupational and environmental environments on the epidemiology of hematological diseases.
4. Knowledge and competence of the main therapeutic methods of congenital and acquired diseases of blood and blood-forming organs, behavior in emergency and life-threatening hematological conditions, control of congenital and acquired disorders of blood clotting, transplantation of hematopoietic stem cells, clinical implications of blood and blood products transfusion and adequate management of the adverse reactions. Impact of the occupational factors and the environment on the epidemiology of hematological diseases.

COMPULSORY LEVELS OF KNOWLEDGE AND COMPETENCE OF THE CURRICULUM in CLINICAL HEMATOLOGY

1. Theoretical knowledge

- Major pathogenetic mechanisms of the neoplastic transformation of hematopoiesis
- Classifications, diagnostic methods, diagnostic criteria for congenital and acquired, benign and malignant diseases of blood and hematopoietic organs
- Basic principles of management and therapeutic methods of hematological malignancies
- Basic knowledge about haemostasis and laboratory monitoring

2. Competence and practical skills

- History and physical status of a patient with haematological disease
- Laboratory minimum for diagnosis of haematological disease
- Working with an Immersion Microscope. Differential blood count.
- Blood groups and blood transfusion tests
- Interpretation of quantitative and qualitative variations in CBC and DBC;
- Interpretation of blood clotting assays
- Interpretation of cytological and cytochemical results of materials from blood, bone marrow, cerebrospinal fluid, effusions in serous cavities;
- Interpretation of tests for cellular and humoral immunity;
- Interpretation of immunochemical and immunohistochemical studies;
- Interpretation of reports from cytogenetic and molecular analyses
- Interpretation of imaging and isotope tests in haematological diseases
- Interpretation of kinetic studies of isotopically-labeled platelets, erythrocytes, circulating blood volume
- Therapeutic response to emergency conditions in haematology: severe anemic conditions, haemorrhagic diathesis, pain syndrome, hypercalcemia, hyperviscous syndrome, tumor-lysis syndrome, haemolysis in incompatible blood transfusion, anaphylactic and post-transfusion reactions, decompressive abdominal and pleural puncture.

PLAN OF THE LECTURES IN HEMATOLOGY

IV –th Course, Medicine, VII/VIII semester

№	THEME	HOURS
1.	Introduction to Clinical Hematology. Hematopoiesis. Anemia. Iron metabolism. Iron Deficiency anemia	2
2.	Metabolism of vit B12 and folates. Megaloblastic anemias. Hypo- and aplastic conditions. Aplastic anemia	2
3.	Haemolytic anemias. Inherited haemolytic anemias.	2
4.	Acquired haemolytic anemias. Immune, autoimmune and drug – induced immune haemolytic anemias.	2
5.	Malignant hematological diseases. Major Pathogenetic Mechanisms of Neoplastic Growth. Classification of malignant diseases of hematopoiesis. Acute leukemia.	2
6.	Myelodysplastic syndromes	2
7.	Chronic myeloproliferative neoplasms. Chronic myeloid leukemia Ph +. Polycythemia Vera. Essential Thrombocythaemia. Myelofibrosis.	2

8.	Chronic lymphoproliferative disorders. Classification. Chronic lymphocytic leukemia	2
9	Hodgkin's Lymphoma. Differential diagnosis of lymphadenomegaly	2
10	Non-Hodgkin's lymphomas. Differential diagnosis of splenomegaly	2
11	Multiple myeloma. AL - amyloidosis	2
12	Methods for the treatment of hematological malignancies: surgical treatment, radiotherapy, chemotherapy. Target Therapy. Immunomodulators. Hematopoietic Stem cell Transplantation	2
13	Bleeding Disorders. Basic Laboratory Diagnostics. Congenital coagulation disorders .	2
14	Disorders of the platelets. Immune thrombocytopenia	2
15	Disseminated intravascular coagulation	2

Total 30 hours

THESES OF THE LECTURE COURSE IN HEMATOLOGY

Introduction to Clinical Hematology. Hematopoiesis. Anemia. Iron Metabolism. Iron Deficiency Anemia.

Investigation of patients with blood diseases. Hematopoiesis. Stages in hematopoietic development. Cell Differentiation. Distribution of cell populations. Anemia. Classification. Degrees of anemic state. Iron Metabolism. Iron deficiency anemia. Definition. Classification. Pathogenesis. Clinical features - major syndromes. Laboratory tests. Diagnostic criteria. Differential Diagnosis. Treatment. Prognosis. Anemia in Chronic Diseases.

Metabolism of Vitamin B12 and Folate. Megaloblastic anemias. Hypo- and aplastic anemias. Aplastic anemia.

Metabolism of vit B12. Metabolism of folic acid. Megaloblastic anemias. Classification. Pernicious anemia. Pathogenesis. Clinical features - major syndromes. Laboratory tests. Diagnostic criteria. Differential diagnosis. Treatment. Prognosis.

Hypo- and aplastic anemias. Pathogenesis. Classification. Aplastic anemia. Definition. Incidence. Pathogenesis. Diagnostic criteria. Differential Diagnosis Treatment. Prognosis.

Haemolytic anemias. Congenital haemolytic anemias.

General data. Mechanism of hemolysis and hemolytic laboratory panel for intravascular and extravascular hemolysis. Congenital haemolytic anemias. Membranopathic haemolytic anemias. Microspherocytosis. Clinical Features. Diagnostic criteria. Differential diagnosis. Treatment. Enzymopathic haemolytic anemias. Glucose - 6 phosphate dehydrogenase deficiency. Clinical features. Diagnostic criteria. Differential diagnosis. Treatment. Hemoglobinopathies. Structure of hemoglobin. Hemoglobinoses. Sickle Cell Anemia Clinical features. Diagnostic criteria. Differential diagnosis. Treatment. Thalassemia. Homozygous Beta – Thalassemia. Clinical Features. Diagnostic criteria. Laboratory monitoring of iron overload. Differential diagnosis. Treatment. Heterozygous beta-thalassemia.

Acquired haemolytic anemias. Immune, autoimmune and drug-induced immune haemolytic anemias. General data. Pathogenesis of the immune hemolytic process. Haemolytic disease of the newborn. Key mechanisms. Clinical manifestation. Diagnostic criteria. Differential diagnosis. Treatment. Prophylaxis. Post-transfusion haemolytic anemias. Autoimmune haemolytic anemias. Overall characteristic of cold and heat agglutinines. Autoimmune hemolytic anemia with warm antibodies. Clinical features. Diagnosis Treatment Autoimmune hemolytic anemia with cold antibodies. Cold Agglutinine disease. Clinical Features. Diagnosis. Treatment Indications for blood transfusion in autoimmune haemolytic anemias. Drug - induced immune haemolytic anemias

Malignant Diseases of the Blood and Hematopoietic organs. Major Pathogenetic Mechanisms of Neoplastic Growth. Classification of malignant diseases of the blood and hematoplastic organs. Acute leukemias. Mechanisms of neoplastic growth (oncogenesis). Classification of hematological malignancies. Acute myeloblastic leukemia. Classification. Risk Factors. Clinical manifestation. Diagnostic methods and diagnostic criteria. Differential diagnosis. Principles of treatment, treatment phases, therapeutic response. Prognosis. Acute lymphoblastic leukemia. Principal differences from myeloblastic leukemias. Classification. Clinical manifestation. Diagnostic methods and diagnostic criteria. Differential diagnosis. Prognostic factors. Principles of treatment, treatment phases, therapeutic response. Prognosis.

Subacute myeloproliferative disorders - myelodysplastic syndromes Definition. Pathogenesis. Classification. Clinical manifestation. Diagnostic methods and diagnostic criteria. Differential diagnosis. Prognostic factors. Principles of therapy, therapeutic response, prognosis.

Myeloproliferative Neoplasms. Chronic myeloid leukemia, Ph +. Polycythemia Vera. Essential thrombocythaemia. Primary myelofibrosis General characteristic. Classification. Chronic myeloid leukemia Ph +. Pathogenesis. Clinical features. Phases of the disease. Diagnostic methods and diagnostic criteria. Differential diagnosis. Prognostic factors Contemporary treatment. Tyrosine kinase inhibitors Therapeutic Response and Monitoring. Polycythemia vera. Pathogenesis. Clinics. Phases of the disease. Diagnostic methods and diagnostic criteria. Differential diagnosis. Prognostic Factors. Treatment. Prognosis. Essential Thrombocythaemia. Pathogenesis. Clinics. Phases of the disease. Diagnostic methods and diagnostic criteria. Differential diagnosis. Prognostic Factors Treatment. Prognosis. Primary Myelofibrosis Pathogenesis. Clinics. Phases of the disease. Diagnostic methods and diagnostic criteria. Differential diagnosis. Prognostic Factors Treatment. Prognosis.

Non-Hodgkin's Lymphomas. Classification. Common data on lymphopoiesis and diagnostic methods of lymphoproliferative diseases. T-lymphocytes. B-lymphocytes. Natural killer cells. Chronic lymphocytic leukemia. Definition. Etiology. Pathogenesis. Clinic Staging Systems for CLL. Diagnostic criteria. Differential Diagnosis. Transformation. Treatment Monoclonal Antibodies Prognosis.

Non-Hodgkin's lymphomas. Classification. Definition. Pathogenesis. Cellular origin Histological variants. Immunohistochemical and flow cytometric panels. Ann Arbor Staging system. Clinic Prognostic Systems. Methods for Diagnosis and Staging. Differential diagnosis. Treatment. Prognosis. Follicular Lymphoma. Diffuse B-Large Cell Lymphoma. Lymphoplasmocytic lymphoma. Hairy Cell Leukemia. MALT - lymphomas. Mantle cell lymphoma.

Hodgkin's Lymphoma. Definition. Pathogenesis. Cellular origin Histological variants. Ann-Arbor Staging system. Clinical manifeststion. Prognostic Factors. Methods for Diagnosis and Staging. Differential diagnosis. Treatment. Prognosis.

Plasma Cell Neoplasms. Multiple myeloma. AL-amyloidosis. Definition Monoclonal immunoglobulins (paraproteins) Diagnostic methods. Multiple Myeloma. Definition Pathogenesis. Staging systems Durie & Salmon and International Staging System. Clinical manifestation - Major Syndromes. Prognostic Systems. Diagnostic Criteria. Differential diagnosis. Treatment. Prognosis. Light chain deposition disease. Definition. Pathogenesis Clinical manifestation. Diagnostic criteria Differential diagnosis. Treatment. AL-Amyloidosis. Definition. Pathogenesis. Clinical manifestation. Diagnostic criteria. Differential diagnosis. Treatment

Principles of therapy of hematological malignancies: surgical treatment, radiotherapy, chemotherapy. Cytostatics. Target therapy. Immunomodulators. Hematopoietic stem cell Transplantation. Surgical methods - Indications. Radiotherapy - Indications Cytostatics. Classification. Mechanism of action. Side effects. Target therapy. Mechanism of action. Classification. Deffinitions of Therapeutic response. Hematopoietic stem cell transplantation. Autologous – SCT. Methodology. Indications. Disadvantages of the method. Allogeneic - SCT Methodology. Indications. Disadvantages of the method .Side effects . Therapeutic response Post-transplantation monitoring.

Hemostasis. Bleeding diatheses. Mechanisms of hemostasis. Laboratory diagnostics, clotting assays. Congenital bleeding disorders (coagulopathies). Definition. Classification. Clinical Characteristics of haemorrhagic diathesis. Hemophilia A and Hemophilia B. Pathogenesis. Clinical manifestation. Classification. Diagnostic criteria Prenatal diagnosis. Treatment. Prophylactic strategy. Treatment of Haemophilia with Inhibitors. Von Villebrand's disease. Definition Pathogenesis Clinic Classification Diagnostic criteria Treatment

Thrombocytopathies and thrombocytopenias. Classification. Thrombocytopathies Definition. Classification. Hemostasis laboarotory tests. Clinical manifestation. Treatment. Immune thrombocytopenia (ITP) . Pathogenesis. Clinical manifestation. Diagnostic Criteria. Treatment Spplenectomy. Thrombopoietin receptor agonists. Hemostatis in Surgical Interventions. Management of ITP in Pregnancy

Disseminated intravascular coagulation. Definition. Ethioopathogenesis. Phases. Clinical manifestation. Clinical forms. Diagnostic criteria. Differential diagnosis. Treatment Monitoring.

**PROGRAM
FOR CLINICAL PRACTICE IN HEMATOLOGY
STUDENTS IV-th MEDICAL COURSE, VII/VIII SEMESTER
Horarium 75 hours / semester**

WEEK	CLINICAL PRACTICE - THEMES	HOURS
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Week 1	Methods for examination of a hematological patient	3
	Erythrocyte series - cytogenesis, morphology, function	2
Week 2	Iron deficiency anemia	3
	Megaloblastic anemia	2
Week 3	Congenital hemolytic anemias - Membranopathic and Enzymopenic	3
	Congenital haemolytic anemias - Thalassemia and Sickle cell anemia	2
Week 4	Acquired haemolytic anemias - isoimmune, autoimmune.	3
	Bone marrow failure. Aplastic anemia. Stem cell transplantation	2
Week 5	Test "Anemia". Transfusion of blood and blood products.	3
	Granulocyte series - cytogenesis, cytochemistry, morphology	2
Week 6	Acute myeloid leukemia- classification, clinic, diagnosis.	3
	Acute myeloid leukemia - treatment	2
Week 7	Myelodysplastic syndromes	3
	MPNs. Chronic Myeloid Leukemia, Ph ⁺	2
Week 8	MPNs. Polycythemia vera, essential thrombocytemia, myelofibrosis	3
	Test "Myeloid malignancies"	2
Week 9	Therapeutic methods of hematological malignancies.	3
	Lymphocyte series - cytogenesis, cytochemistry, morphology, function	2
Week 10	Acute lymphoblastic leukemia	3
	Hodgkin's lymphoma - diagnosis, staging, clinics, treatment	2
Week 11	Chronic lymphocytic leukemia	3
	NHL - Indolent	2
Week 12	NHL - Aggressive	3
	Multiple myeloma	2
Week 13	AL-amyloidosis	3
	Test "lymphoproliferative disorders"	2
Week 14	Hemostasis. Disseminated intravascular coagulation	3
	Congenital coagulation disorders	2
Week 15	Immune thrombocytopenia.	3
	Test "Bleeding disorders"	2

LITERATURE:

1. Hoffbrand's Essential Hematology. A.Victor Hoffbrandt. Paul A.H. Moss. Seventh Edition.
2. Oxford Hadbook of Clinical Hematology - 4-th edition. Drew Provan, Trevor Baglin, Inderjeet Dokal and Johannes de Vos

CONSPECT FOR SEMESTRIAL EXAM IN HEMATOLOGY

No	THEME
1	Anemia - classification. Iron deficiency anemia
2	Megaloblastic anemia - classification. Pernicious anemia
3	Congenital haemolytic anemias . Microspherocytosis and Enzymopathies
4	Congenital haemolytic anemias – sickle cell disease and thalassemia
5	Autoimmune haemolytic anemias
6	Aplastic anemia
7	Acute myeloid leukemia
8	MPN - classification. Chronic myelogenous leukemia
9	MPN. Polycythemia Vera
10	MPN. Essential Thrombocythemia and Myelofibrosis
11	Acute lymphoblastic leukemia
12	Chronic lymphocytic leukemia
13	Hodgkin's Lymphoma
14	Non-Hodgkin's Lymphomas. Diffuse Large B-cell Lymphoma
15	Multiple Myeloma
16	Differential diagnosis of enlarged lymph nodes and splenomegaly
17	Classification of bleeding disorders. DIC - Syndrome
18	Coagulations disorders - classification. Hemophilia A and B
19	Thrombocytopenia - classification. Immune thrombocytopenia

CONSPECTUS FOR STATE EXAM IN INTERNAL MEDICINE (HEMATOLOGY IS A PART OF INTERNAL MEDICINE – I)

1. Rhythm disturbances.
2. Conduction disturbances.

3. Congestive heart failure. Hemodynamic classification, treatment.
4. Acute heart failure. Cardiac asthma. Pulmonary edema. Cardiogenic shock.
5. Chronic cor pulmonale (Chronic pulmonary heart disease).
6. Infective endocarditis.
7. Acquired mitral valve diseases.
8. Acquired aortic valve diseases.
9. Diseases of the myocardium. Myocarditis. Cardiomyopathies.
10. Ischemic heart disease. Classification, etiology, risk factors, pathogenesis.
11. Stable and unstable angina.
12. Myocardial infarction.
13. Arterial hypertension.
14. Pericarditis.
15. COPD.
16. Bronchial asthma.
17. Pneumonias.
18. Pulmonary abscess and pulmonary gangrene.
19. Pulmonary carcinoma. Early diagnosis.
20. Pulmonary embolism. Pulmonary infarction.
21. Pulmonary tuberculosis.
22. Pleuritis.
23. Iron deficiency anemias. Vitamin B12 and folic acid deficiency anemias.
24. Congenital and acquired hemolytic anemias.
25. Acute leukemias.
26. Chronic myelogenous leukemia.
27. Chronic lymphocytic leukemia.
28. Lymphomas.
29. Multiple myeloma.
30. Polycythemia vera
31. Bleeding disorders. Immune thrombocytopenia.
32. Bleeding disorders . Haemophilia.
33. Rheumatoid arthritis.
34. Bekhterev's disease.
35. Disseminated lupus erythematosus.
36. Systemic vasculitis.
37. Gout.
38. Acute and chronic glomerulonephritis.
39. Nephrotic syndrome.
40. Acute and chronic pyelonephritis.
41. Acute and chronic kidney failure.
42. Ulcer.
43. Stomach cancer.

44. Ulcerative colitis.
45. Chronic hepatitis.
46. Liver cirrhosis.
47. Cholelithiasis. Cholecystitis.
48. Liver failure.
49. Chronic pancreatitis.
50. Thyrotoxicosis.
51. Myxedema.
52. Acromegaly.
53. Diabetes insipidus.
54. Hypercorticism.
55. Addison's disease.
56. Hypoparathyroidism. Hyperparathyroidism.
57. Diabetes mellitus – etiology, pathogenesis, clinical presentation.
58. Diabetes mellitus – complications and treatment.
59. Pheochromocytoma.
60. Differential diagnosis of coma.

NOTE: In the written exam, a whole topic or a part of a topic is written.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

Nephrology

Approved by the Department Council on 25.05.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

Nephrology
Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								V	
		Total	Lectures	Practices	ECTS			IX	X
Internal diseases 2 part Section Nephrology Section Endocrinology Section Gastroenterology	X	210	60	150	7.0	4.0	11.0*	30/75	30/75

*For the whole module Internal Diseases Part II

DISCIPLINE: Nephrology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master's degree

FORMS OF TRAINING:

Lectures, Practices, Seminars, Self preparation

YEAR OF TRAINING:

5

DURATION OF TRAINING:

10 weeks

ACADEMIC HOURS:

20h lectures, 50h practices = 70h x 3 cycles =210h

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, schemes, slides for diagnosis and treatment of individuals diseases of the excretory system, demonstration of excretory ultrasound system, puncture kidney biopsy.

FORMS OF EVALUATION:

An average running score is formed for each 10-week cycle

EVALUATION CRITERIA:

Current control - incoming test at the beginning of the exercise cycle in nephrology, weekly during the practical exercises, oral examination, exit test upon completion of the exercise cycle.

Final - entrance test, case study, oral interview to form the final grade.

ASPECTS OF EVALUATION CRITERIA:

Level of theoretical preparation for each exercise, bedside work skills of the patient, participation in the practical exercises and in the discussion of patients, solving tests and cases.

SEMESTER EXAM:

Yes /practical exam, case study, oral interview/, jointly with gastroenterology and endocrinology

STATE EXAM:

Yes / practical, written and oral exam /

LECTURER:

Qualified teachers from the department:

Prof. E. Kumchev, MD,

Associate Professor E. Tilkiyan, MD,

Associate Professor D. Nikolov, MD

DEPARTMENT: Second department Internal diseases – Nephrology section

ANNOTATION

The main goal of the discipline Nephrology, part of Internal Medicine, is mastering modern knowledge and practical skills for diagnostics and treatment of diseases of the urinary system, conducting. Renal replacement therapy: non-renal cleansing methods and renal transplantation.

BASIC AIMS OF THE DISCIPLINE

The main tasks of the study program in Nephrology aim to be realized all prerequisites for quality acquisition of the necessary knowledge and skills for examination of patients with diseases of the urinary-excretory system through basic physical methods, laboratory tests, instrumental studies and kidney biopsy to establish an accurate diagnosis, conducting adequate modern treatment and determining the prognosis of the disease. The implementation of the main tasks of teaching Nephrology is carried out through a certain horary for theoretical and practical training, which carried out by 3 qualified persons and 8 assistants.

EXPECTED RESULTS

Mastering knowledge about the etiology, pathogenesis, clinical picture, differential diagnosis and treatment of excretory diseases system. Mastering knowledge about applied modern extrarenal purification methods and conducting kidney transplantation. Acquisition of practical skills for the diagnosis and treatment of diseases of the excretory system and extrarenal methods cleansing.

LECTURES

1. MOST COMMON ELEMENTS OF NEPHROLOGIC SYNDROMES. GLOMERULONEPHRITIS. PATHOGENESIS, CLASSIFICATION. ACUTE POSTINFECTIONOUS GN.
2. RAPIDLY PROGRESSIVE GLOMERULONEPHRITIS. IDIOPATHIC NEPHROTIC SYNDROME. MINIMAL CHANGE DISEASE. MESANGIOPROLIFERATIVE GN. FOCAL AND SEGMENTAL GLOMERULAR SCLEROSIS.
3. MEMBRANOUS GN. MEMBRANOPROLIFERATIVE GN.
4. IgA NEPHROPATHY. KIDNEY DAMAGE IN SYSTEMIC VASCULITIS.
5. DIABETIC NEPHROPATHY. AMILOIDOSIS.
6. RENAL INVOLVEMENT IN SYSTEMIC LUPUS ERYTHEMATOSUS
7. TUBULO-INTERSTITIAL DISEASES OF THE KIDNEY. DRUG INDUCED NEPHROPATHIES. CONTRAST INDUCED NEPHROPATHY. ACUTE INTERSTITIAL NEPHRITIS.
8. URINARY TRACT INFECTIONS. ACUTE AND CHRONIC PYELONEPHRITIS. POLYCYSTIC RENAL DISEASE. NEPHROLITHIASIS.
9. ACUTE KIDNEY INJURY /ACUTE KIDNEY FAILURE/.
10. CHRONIC KIDNEY DISEASE /CHRONIC KIDNEY FAILURE/. PREDIALYSIS TREATMENT. EXTRARENAL REPLACEMENT THERAPY. KIDNEY TRANSPLANTATION.

PRACTICES

1. Main syndromes in nephrology. Functional tests and laboratory results. Diagnostic kidney imaging. Renal biopsy-indications and contraindications. 3h.
2. Classification of glomerulonephritis. Acute postinfectious glomerulonephritis. 2h.
3. Rapidly progressive glomerulonephritis.. 3h.
4. Idiopathic nephrotic syndrome. 2h.
5. IgA glomerulonephritis. 3h.
6. Membranous glomerulopathy. 2h.
7. Membranoproliferative (mesangiocapillary) glomerulonephritis. C3 nephropathy. 3h.
8. Focal and segmental glomerulosclerosis. Amiloidosis. 2h.
9. Kidney damage in systemic vasculitis. 3h.
10. Diabetic nephropathy. 2h.
11. Renal involvement in SLE. 3h.
12. Acute interstitial nephritis. Chronic interstitial nephritis. 2h.
13. Urinary tract infections. Acute and chronic pyelonephritis. Urinary tract infections and pregnancy. 3h.
14. Hypertensive kidney disease. 2h.
15. Polycystic kidney disease. Nephrolithiasis. Renal involvement in gout. 3h.
16. Acute kidney injury. 2h.
17. Chronic kidney disease. 3h.
18. Renal replacement therapy-indications. Vascular access. Hemodialysis. 2h.
19. CAPD. Complications. Carboperfusion. Plasmapheresis. 3h.
20. Kidney transplantation. Tests for the donor and the recipient. Complications. Treatment of transplanted patients. 2h.

BIBLIOGRAPHY

I. Basic literature – textbooks, manuals:

1. **Lecture course in Nephrology - for Bulgarian students and students of English language training.**
2. **Tests and case studies in nephrology, endocrinology and gastroenterology for self-training in Bulgarian**
3. **Internal diseases. In order. Prof. F. Nikolov, Laxbook, 2020**
4. **Nephrology, edited by Prof. E. Paskalev; 2015, Ed. Bulgarian Resource;**
5. **Acute and rapidly progressing glomerulonephritis**
E. Kumchev, E. Tilkiyan
Laksbuk Publishing House, Plovdiv, XII, 2017.
6. **COMPREHENSIVE CLINICAL NEPHROLOGY. Sixth Edition, Editors: Richard J. Johnson, John Feehally, Jorgen Floege, 2019, Saunders, an imprint of Elsevier Inc.**
7. **Oxford Textbook of Clinical Nephrology, 4th Ed. Editors: Neil Turner, Norbert Lameire, David J Goldsmith, Christopher G. Winearls, Jonatan Himmelfarb, Giuseppe Remuzzi, 2016, Oxford University Press.**
8. **Brenner and Rector's The Kidney- 10th edition; Barry M. Brenner – 2016. Elsevier, Inc.**

II. Additional reading for preparation

1. **Diseases of the Kidney and urinary tract. 9th Edition.**
Robert W. Schrier; 2013.
2. **Evidence-based Nephrology, 1st ed. Donald A. Molony, Jonathan C. Craig – 2009**

CONSPECTUS

1. Clinical syndromes in nephrology: nephrotic and nephritic syndrome
2. Glomerulonephritides: classification, etiology and pathogenesis of immune-mediated glomerulopathies.
3. Acute post-infectious and post-streptococcal glomerulonephritis
4. Rapidly progressive glomerulonephritides.
5. Minimal change disease and IgM nephropathy.
6. Focal and segmental glomerulosclerosis.
7. Membranous nephropathy.
8. Membranoproliferative glomerulonephritis.
9. IgA nephropathy. The kidney in Henoch-Schönlein purpura.
10. The kidney in systemic vasculitides.
11. Lupus nephritis.
12. Diabetic nephropathy.
13. Renal amyloidosis.
14. Acute tubulointerstitial nephritis – etiology, pathogenesis, classification. Drug-induced nephropathies.
15. Chronic tubulointerstitial disease. Analgesic nephropathy. Balkan endemic nephropathy. Renal impairment in gout.
16. Urinary tract infection – etiology, pathogenesis and classification. Acute pyelonephritis – clinical presentation and treatment.
17. Urinary tract infection – etiology, pathogenesis, classification. Chronic pyelonephritis – etiology, pathogenesis, clinical presentation, treatment and prophylaxis.
18. Autosomal dominant polycystic kidney disease.
19. Nephrolithiasis.
20. Acute kidney injury.
21. Chronic kidney disease. Classification, etiology, pathogenesis and clinical presentation.
22. Renal replacement therapies. Hemodialysis. Peritoneal dialysis.
23. Kidney transplantation. Pre-transplant work-up and basic transplant immunology. Immunosuppression in the transplanted patient. Complications.

MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF MEDICINE
DEPARTMENT OF ENDOCRINOLOGY

SYLLABUS
IN
ENDOCRINOLOGY

Approved by the Department Council on — Protocol №2/14.06.2022

Confirmed by the Faculty Council – Protocol №7/13.07.2022

MEDICAL UNIVERSITY – PLOVDIV, FACULTY OF MEDICINE

DEPARTMENT OF ENDOCRINOLOGY

Syllabus

Discipline	Final exam/ semester	Academic hours				Academic hours in years and semesters	
						5 th year	
Endocrinology	10 th	Total	Lectures	Practices	ECTS	9 th sem.	10 th sem.
		210	60	150	11.0*	7 h weekly	7 h weekly

***For the whole module Internal Diseases Part II**

DISCIPLINE: „Endocrinology and metabolic diseases”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master degree /M/

FORMS OF TRAINING:

Lecture courses, practical courses, self-training.

YEAR OF TRAINING:

5th year - 9th /10th semester

DURATION OF TRAINING:

10 weeks

ACADEMIC HOURS:

20 hours of the lecture course, 50 hours of the practical course

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Practical work with patients at the patient's bedside (anamnesis, clinical status, diagnostic and treatment plan, medical research, interpretation of biochemical, hormonal, immunological, etc. tests and imaging tests, visitation); multimedia presentations - theoretical presentations and clinical cases; discussions; solving tests and cases

FORMS OF EVALUATION:

ongoing evaluation - tests, clinical cases; oral examination

EVALUATION CRITERIA

Final evaluation – practical and theoretical examination; scores 2-6.

ASPECTS OF EVALUATION CRITERIA

Participation in practical exercises; ability to solve tests and clinical cases, knowledge of basic principles in endocrinology.

SEMESTER EXAM:

Yes /test, practical and oral examination/ after 10th semester as a component of the semester exam in Internal diseases – second part.

STATE EXAM:

Yes (part of the Internal Diseases examination)

LECTURER:

Professor habilitated in Endocrinology and metabolic diseases -
Prof. Maria M. Orbetzova - Head of the Department

DEPARTMENT: Department of Endocrinology

ANNOTATION

The aim of the training in Endocrinology and Metabolic Diseases is to provide:

1. Understanding of the subject of Endocrinology as a medical specialty that studies the endocrine system, uniting the endocrine glands in the human body, and disorders associated with them;

2. Understanding of the nature and characteristics of hormones produced in the human body as substances secreted by specific cells, which are transported by blood or formed locally, and have highly specific effects in target cells and tissues;

3. Knowledge of major endocrine disorders and diseases as follows:

Hypothalamic-pituitary system - characteristics, regulation; hypothalamic and pituitary hormones, feedback principle in endocrinology. Hypothalamic syndromes, generalized hypothalamic syndrome. Diseases of the adenohypophysis - nonactive pituitary tumours and hormone-secreting adenomas; prolactinoma; acromegaly and gigantism, Cushing's disease, adenomas secreting TRH, LH, FSH and alpha subunit. Hypopituitarism - characteristics, Sheehan's syndrome. Diseases of the neurohypophysis - diabetes insipidus; syndrome of inappropriate ADH secretion. Diseases of the adrenal cortex - primary adrenal insufficiency (Addison's disease); hyperfunction of the adrenal cortex - Cushing's syndrome, hyperaldosteronism, congenital adrenal hyperplasia. Hormonal production and diseases of the adrenal medulla - pheochromocytoma. Endocrine function of testicles and ovaries, gonadal diseases - hypogonadism, hypergonadism. Autoimmune polyglandular syndromes. Multiple endocrine neoplasia. Disorders of carbohydrate metabolism and diseases of the endocrine pancreas - diabetes and pre-diabetic conditions, insulinoma, hypoglycemia. Acute complications of diabetes mellitus - diabetic ketoacidosis, hyperosmolar hyperglycemic nonketotic coma, hypoglycemia. Late vascular degenerative complications of diabetes mellitus - diabetic microangiopathy (diabetic retinopathy, diabetic nephropathy), diabetic macroangiopathy, diabetic neuropathy, diabetic foot. Disorders of lipid metabolism. Obesity, metabolic syndrome. Diseases of the thyroid gland - endemic and sporadic goiter, hypothyroidism, hyperthyroidism and thyrotoxicosis, thyroiditis, thyroid carcinoma. Diseases of the parathyroid glands and bone-mineral metabolism - markers of bone metabolism, hypoparathyroidism, hyperparathyroidism, osteoporosis.

4. Knowledge of modern methods for biochemical, hormonal and imaging diagnostics of endocrine disorders and diseases;
5. Knowledge of modern and innovative methods of treatment of major endocrine disorders and diseases.

BASIC AIMS OF THE DISCIPLINE

1. Acquisition of theoretical knowledge on the etiology, pathogenesis, clinical picture, diagnosis, differential diagnosis, treatment, follow-up and prognosis of major endocrine diseases, as well as rare endocrinopathies.
2. Acquisition of practical skills for taking anamnesis and physical endocrine status; formation of specific symptom complexes and syndromes; drawing up a differential diagnostic plan; interpretation of imaging and hormonal tests; building a therapeutic approach in endocrine patients.

EXPECTED RESULTS

After the training is finished, students must have the following knowledge and skills:

- ability to recognize the mechanisms of action of hormones and the consequences of deviations in their levels;
- knowledge of the epidemiology, etiology, pathogenesis and clinical picture of major endocrine disorders and diseases;
- knowledge of the basic principles of hormonal diagnosis;
- knowledge of the visualization methods for morphological assessment of the endocrine glands;
- knowledge of modern methods and tools for prevention and treatment of endocrine disorders and diseases.

Lectures

TOPIC № 1. – 2h.

Diseases of the hypothalamus and the pituitary gland. Principles of the hormonal diagnosis and the feed-back mechanisms in endocrinology. Hypothalamic syndromes – generalized hypothalamic syndrome. Diseases of the adenohypophysis. Hormonally active and inactive tumors. Prolactinoma and hyperprolactinaemia. Acromegaly and gigantism.

TOPIC № 2. – 2h.

Hypopituitarism – definition, causes, forms, pathogenesis, clinical presentation, syndromes, isolated forms – hyposomatotropism, hypogonadism. Panhypopituitarism – Sheehan's syndrome. Basic principles and types of replacement therapy. Hormones of the neurohypophysis – biosynthesis and release. Diseases of the neurohypophysis. Diabetes insipidus – causes, pathogenesis, clinical presentation, types of diabetes insipidus, differential diagnosis and treatment. Syndrome of inappropriate antidiuretic hormone secretion (SIADH).

TOPIC № 3. – 2h.

Hormones of the adrenal cortex, regulation and biological effect. Hyperfunction of the adrenal cortex. Hyperglucocorticism – ACTH-dependent and independent forms. Cushing's disease – etiology, pathogenesis, clinical presentation, diagnosis, differential diagnosis, treatment. Ectopic ACTH syn-

drome. Cushing's syndrome (primary hyperglucocorticism) - clinical presentation, diagnosis, differential diagnosis and treatment.

TOPIC № 4 – 2h.

Primary hyperaldosteronism (Conn's syndrome) – etiopathogenesis, clinical presentation, diagnosis, differential diagnosis and treatment. Biosynthesis and metabolism of catecholamines. Diseases of the adrenal medulla: pheochromocytoma – incidence, pathogenesis, classification, clinical presentation, diagnosis, differential diagnosis and treatment. Multiple endocrine neoplasia (MEN) – types, clinical presentation, diagnosis and treatment.

TOPIC № 5. – 2h.

Congenital adrenal hyperplasia – characteristics, forms. Diseases of the adrenal cortex – primary adrenal insufficiency (Addison's disease) - causes, pathogenesis, clinical presentation, diagnosis, differential diagnosis and treatment. Autoimmune polyglandular syndromes (APS) – autoimmune characteristics, clinical presentation, diagnosis and treatment.

TOPIC № 6. – 2h.

Disorders of the metabolism of carbohydrates and the endocrine pancreas – diabetes mellitus and prediabetes, metabolic syndrome. Diabetes mellitus - etiology, pathobiochemistry, classification, clinical presentation, diagnosis and differential diagnosis. Treatment of diabetes mellitus - education, diet, oral therapy, insulin therapy.

TOPIC № 7. – 2h.

Acute complications of diabetes mellitus – diabetic ketoacidosis, hyperosmolar hyperglycemic nonketotic coma, hypoglycemia. Late vascular degenerative complications of diabetes mellitus – diabetic microangiopathy (diabetic retinopathy, nephropathy), diabetic macroangiopathy, diabetic neuropathy, diabetic foot.

TOPIC № 8. – 2h.

Thyroid diseases. Endemic and sporadic goiter – incidence, etiology, clinical presentation, diagnosis and treatment. Hypothyroidism – types, etiology, pathogenesis, clinical presentation, diagnosis, differential diagnosis and treatment. Acute infectious, subacute, granulomatous, chronic lymphocytic, silent, fibrous thyroiditis - etiology, clinical presentation, diagnosis, differential diagnosis and treatment.

TOPIC № 9. – 2h.

Hyperthyroidism and thyrotoxicosis. Graves' disease - etiology, pathogenesis, clinical presentation, course, clinical forms and complications (TAO, thyrotoxic crisis), treatment. Toxic adenoma - etiology, pathogenesis, clinical presentation, diagnosis, differential diagnosis and treatment. Toxic multinodular goiter - etiology, pathogenesis, clinical presentation, diagnosis, differential diagnosis and treatment. Carcinoma of the thyroid gland – incidence, etiology, classification, clinical presentation, differential diagnosis and treatment.

TOPIC № 10 – 2h.

Parathyroid and diseases of bone and mineral metabolism – regulation of metabolism. Hypoparathyroidism – types, acute and chronic forms, clinical presentation, diagnosis, differential diagnosis and treatment. Primary hyperparathyroidism - etiology, pathogenesis, pathological morphology, clinical presentation, diagnosis, differential diagnosis and treatment. Osteoporosis.

Practices

PRACTICAL EXERCISE №1 – 2 hours: Introduction to endocrinology. Examining an endocrine patient. Examining the hypothalamus-pituitary system. Principles of hormonal diagnosis. Tumors of the hypothalamic-pituitary system - general data.

PRACTICAL EXERCISE №2 – 3 hours: Hypothalamic disorders. Male and female hypogonadism – primary and central forms. Diagnosis guidelines and treatment.

PRACTICAL EXERCISE №3 – 2 hours: Acromegaly. Prolactinoma, hyperprolactinaemia.

PRACTICAL EXERCISE №4 – 3 hours: Hypopituitarism. Sheehan's syndrome.

PRACTICAL EXERCISE №5 – 2 hours: Diabetes insipidus. Water-electrolyte disorders.

PRACTICAL EXERCISE №6 – 3 hours: Hyperglucocorticism – clinical presentation. Principles of differential diagnosis of the ACTH-dependent and ACTH-independent forms (Dexamethasone suppression tests). Treatment.

PRACTICAL EXERCISE №7 – 2 hours: Endocrine hypertension. Pheochromocytoma. Mineral-corticoid hypertension – Conn's syndrome.

PRACTICAL EXERCISE №8 – 3 hours: Congenital adrenal hyperplasia. Primary adrenal hypocorticism – Addison's disease.

PRACTICAL EXERCISE №9 – 2 hours: Diabetes mellitus – classification, diagnosis, characteristics of the main types. Prediabetes. Metabolic syndrome.

PRACTICAL EXERCISE №10 – 3 hours: Diabetes mellitus – acute metabolic complications: hypoglycaemia, diabetic ketoacidosis, hyperosmolar hyperglycemic nonketotic coma.

PRACTICAL EXERCISE №11 – 2 hours: Diabetes mellitus – late vascular degenerative complications. Micro- and macroangiopathy – prevention, clinical characteristics and therapy.

PRACTICAL EXERCISE №12 – 3 hours: Diabetes mellitus – education of the patients. Diet and physical activity as part of the therapy. Oral antidiabetic medications.

PRACTICAL EXERCISE №13 – 2 hours: Diabetes mellitus – insulin treatment. Types of insulin preparations. Insulin regimens.

PRACTICAL EXERCISE №14 – 3 hours: Examining the thyroid gland – clinical, functional and morphological examination, imaging. Immune testing. Endemic and sporadic goiter.

PRACTICAL EXERCISE №15 – 2 hours: Thyrotoxicosis – clinical presentation. Classification (Graves' disease, toxic multinodular goiter, toxic adenoma etc.). Differential diagnosis. Therapy.

PRACTICAL EXERCISE №16 – 3 hours: Thyroidites - Acute infectious, subacute, granulomatous, chronic lymphocytic, silent, fibrous thyroiditis. Carcinoma of the thyroid gland. Principles of the management and follow-up of the nodular goiter.

PRACTICAL EXERCISE №17 – 2 hours: Hypothyroidism – classification, clinical presentation, differential diagnosis, treatment.

PRACTICAL EXERCISE №18 – 3 hours: Hypoparathyroidism -- etiology, pathogenesis, pathological morphology, clinical presentation, diagnosis, differential diagnosis and treatment.

PRACTICAL EXERCISE №19 – 2 hours: Hyperparathyroidism - etiology, pathogenesis, pathological morphology, clinical presentation, diagnosis, differential diagnosis and treatment. Osteoporosis – characteristics, classification, diagnosis, differential diagnosis.

PRACTICAL EXERCISE №20 – 3 hours: Autoimmune polyglandular syndromes. Multiple endocrine neoplasia. Test (colloquium).

Bibliography

1. Lecture course
2. E-learning materials in Office 365 Platform, Faculty of Medicine, Department of Endocrinology.
3. Greenspan's Basic & Clinical Endocrinology, Tenth Edition Copyright © 2018 by McGraw-Hill Education, ISBN 978-1-259-58928-7.
4. Alexis Labhart. Clinical Endocrinology: Theory and Practice 2nd compl. rev. ed. Edition. ISBN-13: 978-3540154624
5. Harrison's Principles in Internal Medicine. Twentieth Edition (Vol.1 & Vol.2): ISBN-13: 978-1259644030.

In Bulgarian:

- ✓ Раздел „Ендокринология” В «Учебник по Вътрешни болести». Ред. Ф. Николов. Издателство «Лакс Бук» 2020. ISBN: 978-954-8326-68-1.
- ✓ Орбецова М. Захарен диабет – класификация, диагноза, клинични характеристики и усложнения. В „Фармакотерапия и проблеми на клиничната фармация“. Ред. В. Караиванова. Изд. Софтрейд 2014; Раздел 3; стр. 251-266. ISBN:978-954-334-160-3.
- ✓ Орбецова М. Лечение на захарния диабет. В „Фармакотерапия и проблеми на клиничната фармация“. Ред. В. Караиванова. Изд. Софтрейд 2014; стр.267-289. ISBN:978-954-334-160-3.
- ✓ Раздел „Ендокринология” В “Актуални аспекти на общата медицинска практика. Том 2”. Ред. Л. Деспотова-Толева. Медицинско издателство „БАП” Пловдив, 2011; ISBN 978-954-8326-29-2.
- ✓ Раздел „Ендокринология” в В “Клиника и терапия на вътрешните болести. Нефрология; гастроентерология; ендокринология”. Ред. Д. Димитраков. Издателство МУ – Пловдив, 2006; ISBN 954-9549-13-5.

Conspectus

1. Hypothalamic syndromes, generalized hypothalamic syndrome
2. Diseases of the adenohypophysis. Pituitary tumours – diagnosis of nonactive pituitary tumours.
3. Hyperprolactinaemia. Prolactinoma - diagnosis, clinical picture, treatment
4. Acromegaly and gigantism - diagnosis, clinical picture, treatment, criteria of remission.
5. Diseases of neurohypophysis. Diabetes insipidus.
6. Hypopituitarism
7. Thyroid diseases – Goiter (endemic; sporadic)
8. Hypothyroidism – definition; classification; diagnosis, clinical picture, treatment.
9. Hyperthyroidism - definition; classification; diagnosis, clinical picture, treatment. Thyrotoxicosis. Graves' disease
10. Toxic multinodular goiter, toxic thyroid adenoma
11. Thyroid carcinoma.
12. Thyroidites – classification. Acute infectious and subacute thyroiditis of De Querven.
13. Thyroidites – classification. Chronic autoimmune thyroiditis of Hashimoto.
14. Hypoparathyroidism - definition; classification; diagnosis; clinical picture, treatment.
15. Hyperparathyroidism - definition; classification; diagnosis; clinical picture, treatment.
16. Addison's disease– clinical picture; treatment.
17. Cushing's disease– classification; diagnosis; clinical picture; treatment.
18. Cushing's syndrome – classification; diagnosis; clinical picture; treatment.

19. Hypermineralocorticism - definition, clinical picture; treatment of Conn adenoma.
20. Congenital adrenal hyperplasia – characteristics, forms.
21. Pheochromocytoma – diagnosis; differential diagnosis; clinical picture; treatment.
22. Multiple endocrine neoplasia (MEN) – types, clinical presentation, diagnosis and treatment.
23. Autoimmune polyglandular syndromes (APS) – types, clinical presentation, diagnosis and treatment.
24. Diabetes mellitus – etiology, pathogenesis, types; diagnosis, clinical characteristics.
25. Diabetes mellitus diagnosis, differential diagnosis, prediabetes
26. Acute metabolic complications of diabetes – hypoglycaemia,
27. Acute metabolic complications of diabetes – ketoacidosis, nonketotic hyperosmolar coma.
28. Diabetes mellitus – oral treatment.
29. Diabetes mellitus – insulin treatment.
30. Chronic complications of diabetes - microangiopathy (retinopathy; nephropathy).
31. Chronic complications of diabetes - macroangiopathy.
32. Chronic complications of diabetes - diabetic neuropathy; diabetic foot.

MEDICAL UNIVERSITY - PLOVDIV
MEDICAL FACULTY

SYLLABUS
IN
GASTROENTEROLOGY

Approved by the Department Council № 49 on May, 25th 2022

Confirmed by the Faculty Council – Protocol №7/13.07.2022

Syllabus

Disci- pline	Final exam /semester/	Auditorium classes				ECTS non- auditorium classes	ECTS total	Academic hours in years and semesters	
								V th year	
		Total	Lectures	Practices	ECTS			IX	X
II nd part ID Gastro- entero- logy	X	210	60	150	7.0	4.0	11.0*	2/5	2/5

***For the whole module Internal Diseases Part II**

DISCIPLINE:

Gastroenterology - IInd part of Internal Diseases

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master's Degree

FORMS OF TRAINING:

Lectures, practices, self preparation

YEAR OF TRAINING: Vth course

DURATION OF TRAINING:

English educated students - 2 semesters - IX and X semester

The education is hold in 3 cycles of 10 weeks, during the two semesters.

ACADEMIC HOURS:

English educated students – each cycle of 10 weeks – 20 h lectures, 50 h practices.

For the three cycles, total /IX-X semesters/ - 60h lectures, 150h exercises

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, schedules, slides on diagnostics and treatment of the different diseases of the gastrointestinal system, liver, bile ducts and the pancreatic gland, training in abdominal ultrasound, blind liver biopsy, thin needle aspiration biopsy, upper and lower endoscopy.

FORMS OF EVALUATION:

Current control – a test at the beginning of the cycle of exercises in gastroenterology and hepatology, checking of knowledge during practices, oral examination, a test at the end of the cycle of exercises.

Final control – a test, a clinical case, an oral exam for calculation of the final mark.

EVALUATION CRITERIA:

A mean ongoing assessment for each cycle of 10 weeks

ASPECTS OF EVALUATION CRITERIA:

Assessment of the theoretic preparation for the exercise, acquired skills in managing the patient, participation in practices and when discussing on patients, tests and clinical cases.

SEMESTER EXAM:

Yes / test, clinical case, oral examination /

STATE EXAM:

Yes / written and oral exam /

LECTURER:

Ass. Prof. Daniel Doykov

DEPARTMENT:

IInd Department of Internal Diseases

ANNOTATION

Diseases of the gastrointestinal tract, hepatobiliary system and the pancreas. Main nosologic units. Etiology, pathogenesis, classifications. Clinical signs, clinical forms, diagnosis, differential diagnosis of the diseases of the gastrointestinal tract, hepatobiliary system and the pancreas. Treatment principles. Dietary regimens. Drug therapy. Conservative treatment of the complications. Consensuses for the treatment of the main nosologic units.

BASIC AIMS OF THE DISCIPLINE

The main task of the discipline – acquiring of knowledge and skills in the diagnostics and treatment of the diseases of the gastrointestinal tract, hepatobiliary system and the pancreas.

Assimilation of knowledge and skills, necessary for the examination of patients with gastrointestinal diseases, applying the main physical methods, establishment of diagnosis and prescribing of therapy, estimation of the disease prognosis. Getting familiar to the indications and possibilities of the basic paraclinical methods for investigation and confirmation of the diagnosis.

EXPECTED RESULTS

Acquisition of knowledge in the etiology, pathogenesis, clinical signs, differential diagnosis and treatment of the diseases of the gastrointestinal tract, hepatobiliary system and the pancreas.

Acquisition of practical skills in the diagnostics and treatment of the diseases of the gastrointestinal tract, hepatobiliary system and the pancreas.

LECTURES IN GASTROENTEROLOGY

WEEK	LECTURE
1 week	Diseases of the esophagus – 2h
2 week	Gastritis – chronic gastritis – 2 h
3 week	Ulcer disease of the stomach and the duodenum – 2 h
4 week	Gastric cancer – 2 h
5 week	Enterocolitis– 2h
6 week	Ulcerative colitis. Crohn disease - 2 h
7 week	Chronic hepatitis – 2 h
8 week	Liver cirrhosis – 2 h
9 week	Gallstone disease – 2 h
10 week	Pancreatitis. Pancreatic cancer – 2 h

EXERCISES IN GASTROENTEROLOGY

WEEK	EXERCISES
1 week	1. Examination of a gastroenterologic patient. Main symptoms – 3 h 2. Examination of the stomach. GORD. Acute gastritis – 2h
2 week	1. Chronic gastritis – 3 h 2. Chronic gastritis - treatment – 2 h
3 week	1. Ulcer disease of the stomach and the duodenum – clinical signs, complications – 3 h 2. Ulcer disease of the stomach and the duodenum – 2 h
4 week	1. Stomach cancer. Early diagnostics – 3 h 2. Functional disorders of the stomach – 2 h
5 week	1. Enteritis – 3 h 2. Enteropathies /Spru/. Crohn disease – 2 h
6 week	1. Chronic colitis. Ulcerative colitis – 3 h

	2. Large bowel cancer – 2 h
7 week	1. Examination of the liver –3 h 2. Chronic hepatitis – 2 h
8 week	1. Liver cirrhosis – clinical signs, complications – 3 h 2. Liver cirrhosis – treatment – 2 h
9 week	1. Gall - stone disease – 3 h 2. Chronic inflammation of the gall bladder – 2 h
10 week	1. Chronic pancreatitis – 3 h 2. Pancreatic gland and bile ducts cancer – 2 h

COURSE OF LECTURES IN GASTROENTEROLOGY AND HEPATOTLOGY

Lecture № 1- 2 hours

DISEASES OF OESOPHAGUS. DISEASES OF STOMACH. GASTRITIS

Definition of the term gastritis. Classification of gastritis. The Sydney System. Histomorphology of acute and chronic gastritis. Etiology and pathogenesis of gastritis. Clinical signs of gastritis. Clinical forms (according to severity). Chronic gastritis of the corpus (type A). Chronic gastritis of the antrum (type B). Special forms of gastritis. Diagnostics and differential diagnosis of gastritis.

Lecture № 2- 2 hours

TREATMENT OF GASTRITIS

Functional examination of stomach. Treatment of gastritis – acute and chronic. Etiological treatment of gastritis. Special features of the treatment of chronic gastritis of the corpus (chronic gastritis type A) and chronic gastritis of the antrum (chronic gastritis type B). Substitutional therapy.

Lecture № 3 - 2 hours

ULCER DISEASE

Definition of the term ulcer disease and peptic ulcer. Classification of ulcer disease. Etiology of the disease: endogenic and exogenic factors. Pathogenesis: acido-peptic theory – aggressive factors, cellularity and stomach secretion in ulcer disease of the stomach (UDS) and ulcer disease of the duodenum (UDD). Cellular mechanisms of stomach secretion. Pathogenic significance of *H. pylori* in UDS and UDD. Mucous barrier and recurrent diffusion of H^+ conceptions. Protective mechanisms of the stomach mucosa. Clinical picture of the ulcer disease of the stomach and the duodenum. Conservative treatment of the ulcer disease.

Lecture № 4 - 2 hours

STOMACH CANCER. EARLY DIAGNOSIS

Definition of the term early cancer. Frequency and social significance of the disease. Etiology and pathogenesis. Pathology and classification of stomach cancer. Clinical picture of the early stomach cancer. Endoscopic signs and types of the early stomach cancer. X-ray diagnostics of the early and the advanced stomach cancer. Immuno-diagnostics – tumor markers and their significance. Differential diagnosis. Differential diagnosis between the benignant and malignant stomach ulcer. Prophylaxis. Conservative treatment.

Lecture № 5 - 2 hours

ENTEROCOLITIS

Definition of the term acute and chronic enterocolitis. Etiology: predisposition and causative factors. Pathogenesis – significance of prostaglandin's and leucotriens. Pathological changes. Classification of the chronic non-specific enterocolitis. Clinical features of chronic enterocolitis. Diagnosis. Coprological and microbiological tests. Diagnostic tests. X-ray examination of the small intestine. Treatment of enterocolitis.

Lecture № 6 - 2 hours

ULCERATIVE COLITIS

Definition of the term ulcerative colitis. Etiology and pathogenesis. Basic theories. Immune factors. Pathologic anatomy. Forms of the disease according to localisation of the process. Clinical signs. Clinical forms. Basic syndromes. Diagnosis and differential diagnosis. Complications: local and general. Treatment. Diet. Salazopyrin and 5-ASA deviates. Corticotropin, corticosteroids, immune suppressers, etc.

Lecture № 7 – 2 hours

CHRONIC HEPATITIS

Definition of the term chronic hepatitis. Classifications. Etiology. Viral markers. Pathogenesis. Pathogenesis of the chronic viral hepatitis. Histopathology of chronic hepatitis. Histological forms. Chronic viral hepatitis. Clinical features of chronic hepatitis. Chronic autoimmune hepatitis. Diagnosis and differential diagnosis of chronic hepatitis. Treatment: diet, drug therapy of chronic hepatitis.

Lecture № 8 – 2 hours

LIVER CIRRHOSIS

Definition of the term liver cirrhosis. Classifications. Etiology. Pathogenesis of liver cirrhosis. Macroscopic and histomorphological features. Clinical signs of micro- and macronodular cirrhosis. Laboratory manifestations. Instrumental methods of examination. Treatment of liver cirrhosis. Dietary regimen. Drug therapy. Treatment of the complications.

Lecture № 9 – 2 hours

GALLSTONE DISEASE

Definition of the term cholelithiasis and choledocholithiasis. Etiology. Pathogenesis of cholesterol and bilirubin cholelithiasis. Clinical signs. Clinical forms. Development and complications of cholelithiasis. Choledocholithiasis. Evolution and complications. Diagnostics of cholelithiasis and choledocholithiasis. Instrumental methods. Treatment of

gallstone disease. Dietary regimen. Drug therapy. Endoscopic methods of treatment of chole- and choledocholithiasis.

Lecture № 10 – 2 hours

PANCREATITIS. BILE DUCTS' AND PANCREATIC CANCER

Definition of the term pancreatitis. Marseille's classification of pancreatitis. Etiology and pathogenesis. Clinical picture. Clinical syndromes. Complications of pancreatitis. Diagnosis and differential diagnosis of pancreatitis. Treatment of chronic pancreatitis: dietary, substitutional and symptomatic. Pancreatic cancer.

**PRACTICAL EXERCISES
IN GASTROENTEROLOGY AND HEPATOLOGY**

Exercise №1 - 3 hours

Examination of a patient with gastrointestinal disease. Basic symptoms in gastroenterology - Examination of a patient, a brief oral exam

Exercise № 2 - 2 hours

Examination of the stomach. Acute gastritis - Examination of a patient, a brief oral exam, de-monstration of upper GI endoscopy

Exercise № 3 - 3 hours

Chronic gastritis - Examination of a patient, a brief oral exam, demonstration of upper GI endo-scopy

Exercise № 4 - 2 hours

Treatment of gastritis - Examination of a patient, prescription of therapy, a brief oral exam, pre-paration of a dietary regimen

Exercise № 5 - 3 hours

Ulcer disease of the stomach and the duodenum – clinical signs, complications - Examination of a patient, a brief oral exam, demonstration of upper GI endoscopy

Exercise № 6 - 2 hours

Ulcer disease of the stomach and the duodenum – treatment - Examination of a patient, a brief oral exam, prescription of therapy, preparation of a dietary regimen

Exercise № 7 - 3 hours

Stomach cancer. Early diagnosis - Examination of a patient, a brief oral exam, demonstration of upper GI endoscopy

Exercise № 8 - 2 hours

Functional diseases of the stomach - Examination of a patient, a brief oral exam, preparation of a dietary regimen

Exercise № 9 - 3 hours

Enterocolitis - Examination of a patient, a brief oral exam, prescription of therapy, preparation of a dietary regimen

Exercise № 10 - 2 hours

Disorders of the small intestine (Celiac disease). Crohn disease - Examination of a patient, a brief oral exam, demonstration of lower GI endoscopy

Exercise № 11 - 3 hours

Ulcerative colitis - Examination of a patient, a brief oral exam, demonstration of lower GI endoscopy, prescription of therapy, preparation of a dietary regimen

Exercise № 12 - 2 hours

Colorectal cancer - Examination of a patient, a brief oral exam, demonstration of lower GI endoscopy

Exercise № 13 - 3 hours

Examination of the liver - Examination of a patient, demonstration of abdominal ultrasonography

Exercise № 14 - 2 hours

Chronic hepatitis - Examination of a patient, a brief oral exam, prescription of therapy, preparation of a dietary regimen, demonstration of abdominal ultrasonography, or blind needle biopsy, if available

Exercise № 15 - 3 hours

Liver cirrhosis – clinical signs, complications - Examination of a patient, a brief oral exam, evacuation of ascites by abdominal paracentesis

Exercise № 16 - 2 hours

Liver cirrhosis – treatment. Liver cancer - Examination of a patient, a brief oral exam, prescription of therapy, preparation of a dietary regimen

Exercise № 17 - 3 hours

Gallstone disease - Examination of a patient, a brief oral exam, demonstration of abdominal ultrasonography, preparation of a dietary regimen, prescription of therapy

Exercise № 18 - 2 hours

Chronic cholecystitis - Examination of a patient, a brief oral exam, demonstration of abdominal ultrasonography

Exercise № 19 - 3 hours

Chronic pancreatitis - Examination of a patient, a brief oral exam, preparation of a dietary regimen, prescription of therapy

Exercise № 20 – 2 hours

Bile ducts' and pancreatic cancer - Examination of a patient, a brief oral exam, demonstration of abdominal ultrasonography, or thin needle biopsy, if available

TEXTBOOKS:

1. Clinics and Therapy of Internal Diseases – Dimitrakov and Auth., part II p. 289 – 410, Plovdiv, Polygraphia, 1998, ISBN 954-9529-23-1
Chapter „Diseases of the Gastrointestinal Tract, Hepatobiliary System and The Pancreas – Iv. Stanchev” – translated in English by E. Cholakova
2. “Clinics and Therapy of Internal Diseases – Nephrology, Endocrinology, Gastroenterology – Dimitrakov and Auth., 2006
3. Oxford Handbook of Gastroenterology and Hepatology, authors Stuart Bloom, George Webster, Daniel Marks; publisher – OXFORD UNIVERSITY PRESS
4. Manual of tests in Gastroenterology;
5. Course of lectures

Authors of the Program: Ass. Prof. Vl. Andonov; Ass. Prof. D. Doykov, E. Cholakova

CONSPECTUS IN GASTROENTEROLOGY
Vth medical course

1. Diseases of the esophagus – achalasia, hiatal hernias, cancer of the esophagus.
2. Gastroesophageal reflux disease / GERD/. Functional /non-ulcer dyspepsia.
3. Gastritis. Acute and special forms. Acute gastritis.
4. Chronic gastritis.
5. Ulcer disease – etiology and pathogenesis.
6. Ulcer disease of the stomach.
7. Ulcer disease of the duodenum.
8. Ulcer disease – treatment.
9. Complications of ulcer disease.
10. Stomach cancer.
11. Enterocolitis.
12. Crohn disease.
13. Chronic ulcerative colitis.
14. Irritable bowel syndrome.

15. Diverticular disease of the large bowel.
16. Cancer of the rectum and the large bowel.
17. Chronic hepatitis – classification, etiology and pathogenesis.
18. Chronic hepatitis –clinical signs, diagnosis and treatment.
19. Chronic autoimmune hepatitis.
20. Liver cirrhosis – classification, etiology and pathogenesis.
21. Liver cirrhosis – clinical signs, complications, diagnosis, differential diagnosis.
22. Liver cirrhosis – treatment.
23. Primary biliary cirrhosis.
24. Liver cancer.
25. Gallstone disease – etiology, pathogenesis, clinical signs.
26. Gallstone disease – complications, diagnosis, differential diagnosis, treatment.
27. Cholangitis and cholangiohepatitis.
28. Cancer of the gall bladder and the extrahepatic bile ducts.
29. Hepatic /liver/ encephalopathy. Hepatic coma.
30. Pancreatitis. Chronic pancreatitis.
31. Pancreatic cancer.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF PHARMACY

SYLLABUS
IN
CLINICAL LABORATORY
SPECIALTY MEDICINE

Approved by the Department Council on 12.05.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF PHARMACY

CLINICAL LABORATORY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								3 rd year	
		Total	Lectures	Practices	ECTS			V	VI
Clinical laboratory	VI	60	30	30	2.0	1.0	3.0		2/2

DISCIPLINE:

“Clinical Laboratory”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master’s degree /M/

FORMS OF TRAINING:

Lectures, Practical Exercises

YEAR OF TRAINING:

3rd year

DURATION OF TRAINING:

One semester

ACADEMIC HOURS:

30 hours of lectures, 30 hours of practical exercises

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia, computers, microscopes and collections of smears, tables, diagrams, charts, albums, prints of the analysers and the laboratory information system (LIS); documented quality control data

FORMS OF EVALUATION:

Semester exam

EVALUATION CRITERIA:*Current control:*

Written tests, tasks or presentation on a specific theme at least twice during the semester. Participation in discussions, solving clinical laboratory cases. The final semester grade is formed on the basis of all current tests and tasks.

Theoretical final exam: written form

ASPECTS OF EVALUATION CRITERIA:

The final grade is formed by the semester and exam grade, according to the academic standard of the discipline.

SEMESTER EXAM: Yes

STATE EXAM: No

LECTURER:

Habilitated lecturer from the Department of Clinical Laboratory

DEPARTMENT:

Clinical Laboratory

ANNOTATION

Clinical laboratory is an independent medical specialty and scientific discipline, which through quantitative and qualitative methods provides the necessary information for early diagnosis, control of the dynamics of the disease process and the effects of treatment and prevention.

The training in a clinical laboratory is carried out in three directions:

1. Pathobiochemical: explains theoretically and experimentally the cause and mechanism of various diseases at the molecular level; shows the relationship between physiological and pathological processes and changes in the cellular and chemical composition of the biological specimens.
2. Analytical: introduce methods of analysis; exercising control in the pre-analytical, analytical, and post-analytical stage.
3. Clinical and diagnostic: the information for test indications and clinical significance; interpretation of the results independently and in correlation

BASIC AIMS OF THE DISCIPLINE

To organize and implement optimum education in clinical laboratory to provide medical students preparation of the discipline for a complete, successful and effective work in the medical profession by:

1. Implementation and observing the requirements for preanalytical preparation of the patient and biological material, providing results with high reliability. To know and

- eliminate errors in preanalytical stage and the possible interference (pharmaceutical, diagnostic and therapeutic procedures) on the results of clinical laboratory analysis.
2. Creating skills to fully use the capacity of clinical laboratory diagnostics for correct choice of parameters, taking into account the economic aspects of laboratory activities.
 3. Creating skills for correct and complete interpretation of the results of clinical laboratory analysis, knowledge of their diagnostic reliability, the correlation between parameters in different diseases, allowing the selection of the most informative combination of indicators.
 4. Learning of close practical skills to perform basic clinical laboratory activities (analysis of urine, microscope smears of peripheral blood, bone marrow).
 5. Learning the rules for using tests for express diagnostics. Acquiring skills for solving clinical laboratory tasks after learning the reference range and the correlation between parameters.

EXPECTED RESULTS

Theoretical knowledge and practical skills of the student:

1. The result in clinical laboratory

- Be aware of the theoretical basis and practical application of the term “reference limits”. Be able to use the reference intervals for interpretation of results.
- To assimilate main groups of clinical laboratory parameters. To properly select, order the necessary analysis through hospital information system (HIS).
- To be aware of the possible sources of preanalytical and postanalytical errors in clinical laboratory analysis and the measures to limit them.
- To know the basic and special requirements for preparing the patient for clinical laboratory testing and be able to apply them in practice.
- To know the interference from medical procedures and medicines on clinical laboratory results and to apply in practice the measurements for control of this effect.
- To know and apply the basic rules and requirements, to observe basic procedures and avoid sources of errors in taking of biological material for analysis.
- To know the requirements for storage and transport of biological material, different types of closed systems for biological material. Selection of the proper tubes for analysis.
- To be aware of the principles and rules of internal quality control and external quality assessment.
- Have theoretical knowledge and practical skills for dealing with dry tests for qualitative and semi-quantitative analysis of urine.
- To know the principles of rational ordering of clinical laboratory tests in diagnosis and monitoring of treatment and be able to apply them in practice.

2. Urine. Physical characteristics, chemical tests

- To know the rules and requirements for urine collection - single portion and diuresis urine, reference limits, informative value.
- To be able to correctly select the necessary parameter for chemical testing - pH, glucose, protein, ketones, bilirubin, urobilinogen, blood - qualitative, quantitative analysis.
- To know the rules for operation and storage of urine express tests.

3. *Electrolytes and trace elements in blood serum*

- To know the basic macro- and micronutrients, their biological meaning, metabolism, regulation, indications for analysis. To properly select parameters for assessment of water electrolyte balance.
- To know the reference ranges of main parameters. To properly interpret the results.

4. *Hematological parameters*

- To know the hematological parameters, specimen collection, indications for examination and the reference ranges. To be able to correctly interpret the results.
- To know the normal cell composition in the bone marrow.
- To know the main indicators of CBC and their reference ranges, indications for examination, clinical significance. To be able to interpret of the results.
- To know the morphological characteristics of leukocytes in DBC and to recognize them microscopically.
- To know the morphological characteristics of erythrocytes and to be able to microscopically distinguish a normal from a pathological form.

5. *Red blood cells disorders*

- To know and be able to make a choice of clinical and laboratory indicators in diseases of the red blood line: iron deficiency, post-haemorrhage, pernicious and haemolytic anemia.
- To know and be able to recognize the microscopic characteristics of red blood cells on a swab of peripheral blood and bone marrow in different types of anemia.
- To know the laboratory constellations and to be able to make a differential diagnosis between different anemias

6. *White blood cells disorders*

- To know and be able to make a choice of clinical and laboratory indicators in diseases of the white blood line: acute and chronic leukemia, leukemoid reaction.
- To know and be able to recognize the microscopic characteristics of blast cells on a of peripheral blood and bone marrow smear in acute blast leukemia.
- To know the laboratory constellations and to be able to make a differential diagnosis between different leukemias.

7. *Hemostasis*

- To know the key phases in the process of blood coagulation, plasma factors and inhibitors, laboratory parameters and reference ranges. To be able to interpret the results.
- To know the factors and inhibitors of fibrinolysis. To be able to appoint the necessary indicators for its research. To interpret the obtained results.
- To know the informative content and the clinical significance of screening tests.

- To know the main clinical and laboratory parameters and for control of treatment with direct and indirect anticoagulants.
- To know the laboratory constellations in DIC syndrome, thrombophilia, haemorrhagic diathesis.

8. Disorders of the carbohydrate metabolism

- To know the informative importance of the basic, extended and specialized tests in patients with diabetes mellitus.
- To know the clinical significance of the “fasting glucose”. To know the rules for patient preparation. To know the clinically significant reference values and correctly to interpret the obtained results.
- To know the rules for conducting glucose overload tests, their clinical significance and interpretation.
- To know glycated proteins as indicators for diagnosis and treatment control of diabetes mellitus. To be able to correctly select the appropriate parameters for monitoring hyperglycaemia for a previous period of time.

9. Serum proteins

- To know the methods for fractionation of serum proteins (electrophoresis and immunoelectrophoresis), their informative value, way of conducting advantages, disadvantages. To be able to distinguish normal from pathological electrophoresis.
- To know the changes in the protein fractions obtained by electrophoresis, the basic terminology and its interpretation. To be able to connect them with the main groups of diseases.
- To know the proteins of the acute phase, to be able to list the positive and negative reactants, their clinical and biological significance. To be able to make a choice of laboratory parameters in inflammatory and neoplastic diseases.
- To know the essence of hyperimmunoglobulinemia. Be able to distinguish between polyclonal and monoclonal hyperimmunoglobulinemia by electrophoresis.
- To know the immunoglobulins, their structure, biological significance, classification, dynamics, synthesis, indications for analysis, reference values. To be able to specify the groups of diseases in which to assign them and to correctly interpret their values.
- To be able to evaluate the results of serum protein testing in the main groups of liver and kidney, autoimmune and malignant diseases.

10. Enzymes.

- To know the main cellular and secretory enzymes. Be able to make constellations of laboratory parameters and interpret increased blood levels according cell and organ pathology.
- To know organ and subcellular localization of enzymes (ASAT, ALAT, AP, LDH, HBDH, Amylase, GGT, Cholinesterase, indications for analysis, required biological material, reference ranges. Be able to evaluate results of their analysis in cardiovascular, liver and malignant diseases.

11. Bile pigments

- To know the bile pigments in blood and urine, their pathobiochemistry, indications for analysis, reference ranges. To be able to make differential diagnosis between haemolytic, mechanical and parenchymal icterus by the results obtained.
- Be able to interpret the results of bile pigments analysis in main liver and non-liver diseases.

12. Non-protein nitrogen containing compounds.

- To know the informative value of urea, creatinine and uric acid. To be able to make proper selection and interpretation of these laboratory parameters in renal diseases.
- To know the advantages and the way to avoid their disadvantages by examination of renal function.

13. Lipid parameters.

To know the requirements for analysis of lipid parameters, risk levels and sources of errors. To be able to distinguish the main types hyperlipidemia using laboratory results.

14. Hormonal parameters

- To know the main laboratory hormonal indicators and the correlations between them; methods, indications for research and interpretation

15. Tumor markers

- To know the tumor markers of first and second choice and their clinical significance in malignant diseases.

LECTURES

LECTURE №1 – 2 hours: The analysis and the result in clinical laboratory. Clinical laboratory parameters.

1. The clinical laboratory in the field of medical sciences. Subject and tasks.
2. Analytical reliability of the methods in the clinical laboratory.
3. Reference ranges – populational and individual.
4. Diagnostic reliability of clinical laboratory parameters. Requirements and criteria for diagnostic reliability of clinical laboratory parameters in different diseases.

LECTURE №2 – 2 hours: The clinical laboratory result and its reliability.

1. Reliability of clinical laboratory results.
2. Basic groups of factors affecting the clinical laboratory results. Mechanism of action.
3. The clinical laboratory investigations in the diagnostic process.

LECTURE №3 – 2 hours: Clinical laboratory parameters for evaluation of water-electrolyte exchange.

1. Body water and its distribution in the human body.
2. Osmolality and osmolarity. Methods of investigation. Reference ranges. Result interpretation.
3. Water-electrolyte balance disturbance and its evaluation.

4. Sodium and chloride. Analytical methods, indication of investigation, interferences, reference ranges, result interpretation.
5. Potassium. Analytical methods, indication of investigation, interferences, reference ranges, result interpretation.

LECTURE №4 – 2 hours: Steps and approaches for choice of clinical laboratory parameters and their interpretation in red blood cell disorders.

1. Basic and extended laboratory tests.
2. Specialized laboratory tests.
3. Assessment of clinical laboratory results in different types of anemia.

LECTURE №5 – 2 hours: Steps and approaches for choice of clinical laboratory parameters in white blood cell disorders.

1. Basic, extended and specialized laboratory tests.
2. Flow cytometry – immunophenotyping of cells in leukemias and lymphomas.

LECTURE №6 – 2 hours: Clinical laboratory parameters' evaluation of the results of hormonal analysis.

1. Hormonal distribution and analysis. Biological meaning – classification of hormones, interactions and correlations.
2. Pituitary and adrenal (suprarenal) glands hormones' – methods of analysis, indications for investigation, patient preparation.
3. Valuation of laboratory data and correlations in pituitary and adrenal glands disorders.
4. Thyroid hormones. Methods of analysis, indications for investigation, patient preparation.
5. Valuation of laboratory data and correlations in thyroid gland disorders.
6. Hormones of reproductive system – evaluation of the results of the laboratory analysis.

LECTURE №7 – 2 hours: Clinical laboratory evaluation of the tumour markers investigation.

1. Definition and classification of the tumor markers.
2. Laboratory methods of analysis.
3. The “perfect” tumor marker.
4. The significance of tumor marker investigation in the follow-up and treatment of malignant diseases.

LECTURE №8 – 2 hours: Choice of laboratory parameters for evaluation of hemostasis disturbances.

1. Basic, extended and specialized laboratory tests parameters for evaluation of haemostasis disturbances.
2. Choice of clinical laboratory parameters and their consideration in bleeding tendency (haemorrhagic diatheses).

3. Selection of clinical laboratory parameters and their consideration in disorders leading to thrombosis.
4. Selection of clinical laboratory parameters in disseminated intravascular coagulation.

LECTURE №9 – 2 hours: Clinical laboratory evaluation of carbohydrate metabolism.

1. Blood sugar (glucose). Concentration in the blood. Regulation.
2. Pathobiochemical changes in diabetes mellitus disturbed carbohydrate metabolism:
 - pathobiochemistry of hyperglycaemia and glucosuria
 - pathobiochemistry of changes of the lipid fractions
 - pathobiochemistry of ketoacidosis
 - pathobiochemistry of changes ketoacidosis in changes of acid-alkaline and electrolyte equilibrium
 - pathobiochemistry of glycated proteins and microalbuminuria.

LECTURE №10 – 2 hours: Clinical laboratory parameters evaluation of carbohydrate metabolism disturbance.

1. Selection of clinical laboratory parameters in detecting and follow-up of disturbance in patients with diabetes mellitus:
 - basic laboratory tests
 - extended laboratory tests
 - specialized laboratory tests
2. Control of diabetes mellitus patient's treatment – glycated hemoglobin.
3. Screening for microalbuminuria in patients with diabetes mellitus.

LECTURE №11 – 2 hours: Clinical laboratory evaluation of porphyrins and bile pigments in the blood.

1. Laboratory parameter for demonstration of destroyed hem synthesis – principle of methods, indications for investigation, specimen, reference values, results' interpretation.
2. Bilirubin in the serum – pathobiochemistry, principle of the methods, indications for investigation, results' interpretation.
3. Bile pigments in the serum and urine. Hyperbilirubinemia from different reasons. Correlation with other laboratory parameters.

LECTURE №12 – 2 hours: Clinical laboratory evaluation of serum proteins.

1. Changes in protein fractions – basic terminology and its interpretation.
2. Construction of appropriate strategy for clinical laboratory tests ordering for serum proteins evaluation.
3. Monoclonal and polyclonal hypergammaglobulinemia.
4. Selection of clinical laboratory parameters and their consideration in inflammatory and neoplastic diseases.

LECTURE №13 – 2 hours: Choice and evaluation of clinical laboratory parameters in liver and biliary diseases.

1. Basic pathobiochemical changes in liver diseases.
2. Special features of clinical laboratory diagnosis of destroyed liver function.
3. Basic, extended and specialized laboratory tests parameters.
4. Evaluation of the laboratory results from bile pigments, enzymes, serum proteins in the different groups of liver diseases.
5. Prognostic laboratory tests and parameters showing hepatocellular carcinoma development.

LECTURE №14 – 2 hours: Choice and evaluation of clinical laboratory parameters in heart (myocardial) diseases.

1. Clinical laboratory risk factors in ischemic myocardial diseases (IMD)
2. Early and late laboratory parameters for myocardial ischemia.
3. Clinical laboratory changes in IMD
4. Future perspectives for clinical laboratory diagnosis.

LECTURE №15 – 2 hours: Steps and approaches for clinical laboratory parameters in renal diseases.

1. Evaluation of changes in values of pH, Osmolality and 24-hours diuresis in the course of renal diseases diagnostics.
2. Evaluation of proteinuria – glomerular and tubular. Sequences of procedures in explanation of proteinuria.
3. Evaluation of haematuria. Sequences of procedures in its explanation.
4. Kidney functional tests and result interpretation.

PRACTICES

EXERCISE №1- 2 hours: The result in the clinical laboratory.

1. Introduction to the structure and work process of the clinical laboratory. The main groups of clinical and laboratory indicators. Appointment of clinical and laboratory indicators - LIS. Basic methods and equipment in the clinical laboratory. Internal and external evaluation of the quality of laboratory results.
2. Influence of laboratory results in the preanalytical stage. Basic rules and requirements. Venous or capillary blood for examination.
3. Basic procedures and sources of errors in taking biological material for analysis and sending it to the clinical laboratory. Closed system for taking biological material.
4. Demonstration of impact on the results of changes in the biological material (hemolysis, clot, lipemia, etc.)

EXERCISE №2 – 2hours: Urine. General characteristics and chemical tests.

1. Rules and requirements for urine collection– random urine and diuresis.
2. Urine - general characteristics, reference ranges, results interpretation.
3. Chemical analysis - pH, glucose, protein, ketone bodies, bilirubin, urobilinogen, blood – quality and quantity analysis.

4. Presentation of samples of different color and transparency.
5. Getting to know the rules of processing and storage of express urine tests.

EXERCISE №3 2hours: Evaluation of the laboratory results of micro- and macroelements in human serum.

1. Inorganic Phosphorus, Calcium, Magnesium - total and ionized: laboratory methods, indications for investigation, reference ranges, results interpretation.
2. Serum Iron and Iron Binding Capacity. Laboratory methods, interferences, indications for investigation, reference ranges, results interpretation.

EXERCISE №4 – 2 hours: Evaluation of the laboratory results of hematological parameters.

1. Basic hematological parameters - CBC, DBC, RSR, reference ranges.
2. Indications for research, interpretation of results.
3. Normal and pathological morphology of erythrocytes in peripheral blood.

EXERCISE №5 - 2 hours Clinical laboratory parameters in red blood cell disorders.

1. Post-hemorrhagic anemia, iron deficiency, pernicious, hemolytic, etc.
2. Evaluation of the results of hematological parameters examination.
3. Microscopy of peripheral blood smear in different types of anemia.
4. Discussion of the clinical cases.

EXERCISE №6 – 2 hours: Clinical laboratory parameters in white blood cell disorders.

1. Diseases of the white blood cell - acute and chronic leukemia, leukemoid reactions.
2. Evaluation of the results of hematological parameters examination.
3. Specialized tests in acute and chronic leukemias.
4. Discussion of the clinical cases.

EXERCISE №7 – 2 hours: Microscopic observation of bone marrow and venous blood smears

EXERCISE №8 – 2 hours: Clinical laboratory evaluation of hemostasis.

1. The hemostasis as an integrated functional system. The action of vessels' wall, platelets and blood plasma in the hemostasis.
2. Coagulation. Key phases in the process of coagulation.
3. Plasma factors of coagulation and them inhibitors– necessity and opportunity for investigation.
4. Fibrinolysis – factors and inhibitors - necessity and opportunity for investigation.

EXERCISE №9 – 2 hours: Clinical laboratory evaluation of hemostasis

1. Clinical laboratory parameters for evaluation of hemostasis – test principles, sources of errors, patient preparation, specimen, indications for investigation.
2. Screening tests for evaluation of hemostasis. Results interpretation
3. Tests for investigation of activity and concentration of individual plasma factors of coagulation and fibrinolysis. Results interpretation.

4. Specialized analysis for evaluation of hemostasis.
5. Control of anticoagulant therapy.
6. Discussion of the clinical cases.

EXERCISE №10 – 2 hours: Clinical laboratory parameters for evaluation disturbance of carbohydrate metabolism.

1. Glucose in the blood – definition, interferences, indications for investigation, reference ranges, results interpretation.
2. Tests with overload – two-hour postprandial test and oral glucose tolerance test - indications for investigation, reference ranges.
3. Evaluation of glycaemia for preceded period of time - test principles (demonstration), sources of errors, patient preparation, specimen, reference ranges, indications for investigation.
4. Discussion of the clinical cases.

EXERCISE №11 – 2 hours: Clinical laboratory parameters for evaluation of serum proteins.

1. Total serum protein: principle of determination methods - sources of errors, drug interference, test indications, patient preparation, biological material, reference limits, interpretation of results.
2. Methods for serum protein fractionation - types, principles, disadvantages and advantages.
3. Discussion of electrophoresis results in different diseases

EXERCISE №12 – 2 hours: Clinical laboratory parameters for evaluation of serum proteins.

1. Individual proteins – biological characteristics. Results interpretation.
2. Immunoglobulins – quantity measurement, methods, specimen, reference ranges, indications for investigation, results interpretation in patients with disturbed immunoglobulin synthesis.
3. Demonstration of cases and finding of different types of myeloma multiplex and other diseases with hyperimmunoglobulinemia.
4. Discussion of the clinical cases.

EXERCISE №13 – 2 hours: Clinical laboratory parameters for evaluation of serum enzymes.

1. Enzymes in the serum. Mechanisms of hyperenzymemia. Advantages and disadvantages of enzyme analysis.
2. Cell and secretory enzymes in the serum - test principles, sources of errors, reference ranges, indications for investigation, results interpretation.
3. Discussion of the clinical cases.

EXERCISE №14 – 2 hours: Clinical laboratory parameters for evaluation of nonprotein nitrogen containing substances

1. Urea – common data, principle of analytical methods, sources of errors, drug interference in laboratory testing, patient preparation, specimen, reference ranges, indications for investigation, results interpretation.
2. Creatine and creatinine – common data, principle of analytical methods, sources of errors, drug interference in laboratory testing, patient preparation, specimen, reference ranges, indications for investigation, results interpretation.
3. Uric acid and ammonia – common data, principle of analytical methods, sources of errors, drug interference in laboratory testing, patient preparation, specimen, reference ranges, indications for investigation, results interpretation.
4. Discussion of the clinical cases.

EXERCISE №15 – 2 hours: Clinical laboratory evaluation of lipid parameters and lipoproteins.

1. Basic classes of lipoproteins.
2. Basic clinical and laboratory indicators for assessment of lipid metabolism - methods, indications for examination, patient preparation, risk values.
3. Stages and approaches for selection of clinical and laboratory indicators in disorders of lipid metabolism.
4. Discussion of the clinical cases.

BIBLIOGRAPHY

Basic:

1. Bishop M., E. Fody, L. Schoeff. Clinical chemistry: principles, techniques, and correlations. 7th ed. Edited by Lippincott Williams&Wilkins. 2013
2. Extended theses of lectures and exercises
3. Theml H., H. Diem, T. Haferlach. Color Atlas of Hematology. Practical Microscopic and Clinical Diagnosis. 2th revised ed. Thieme, Stuttgart, 2004

Additional:

1. Henry's Clinical Diagnosis and Management by laboratory methods, 21st ed., edited by Richard Mcpherson and Matthew Pincus
2. Kaplan LA, Pesce AJ (ed). Clinical Chemistry. Theory, analysis, and correlation. 3th edition. St. Louis, Missouri, Mosby-Year Inc., 1996
3. Burtis CA, Ashwood ER&DEBruns (ed). Tietz Textbook of Clinical Chemistry and molecular diagnostics. 4th ed. Elsevier Saunders, 2006
4. Mcpherson R. and M. Pincus. Henry's Clinical diagnosis and Management by laboratory methods, 21st ed.
5. S. K. Strasinger, M. Sch. Di Lorenzo. Urinalysis and Body Fluids. 5th ed. E. A. Davis Company-Philadelphia, 2008

CONSPECTUS

1. Reference ranges – populational constructed (definition, reference groups, reference status, reference condition, choice of statistical method, performance, disadvantages) individual (performance, advantages).

2. Diagnostic reliability of clinical laboratory parameters – criteria. Requirements to the criteria of diagnostic reliability of clinical laboratory tests in different group of diseases.

3. Permanent, long-term, and short-term acting factors on the biological variation of the results – examples.

4. Influence of medical procedures and medicines on the clinical laboratory results (chemical and pharmacological interferences). Instructions for control of medicinal effects on the clinical laboratory investigations.

5. Specimen collection for clinical laboratory investigation – basic rules and requirements. Venous and capillary blood for analysis? Closed system for biological samples collection –advantages for the clinic, advantages for the laboratory.

6. Venous blood collection clinical laboratory investigation – basic procedures and sources of errors.

7. Storage of the biological samples for analysis and transportation to the laboratory – requirements and sources of errors. Criteria for rejection of the specimen for laboratory analysis.

8. Urine for clinical laboratory investigation – basic rules and requirements for urine collection, storage, and transportation to the laboratory. Sources of errors. Cerebrospinal fluid, body fluids and stool - basic rules and requirements for urine collection, storage, and transportation to the laboratory. Sources of errors.

9. Body water and its distribution in the human body. Osmolality and osmolarity - methods of investigation, reference ranges, result interpretation.

10. Water-electrolyte balance disturbance. Clinical laboratory parameters for evaluation of water-electrolyte balance.

11. Sodium and chloride – common data for the parameters, indications for investigation, principles of the analytical methods, reference ranges, result interpretation.

12. Potassium - common data for the parameter, indications for investigation, principles of the analytical methods, reference ranges, result interpretation.

13. Total and ionized calcium, total and ionized magnesium - common data for the parameters, indications for investigation, principles of the analytical methods, reference ranges, result interpretation.

14. Inorganic phosphate - common data for the parameter, indications for investigation, principles of the analytical methods, reference ranges, result interpretation.

15. Serum Iron and Iron Binding Capacity - common data for the parameters, indications for investigation, principles of the analytical methods, reference ranges, result interpretation.

16. Diabetes mellitus – metabolism disturbance of: glycolysis, gluconeogenesis, glycogenolysis and glycogen synthesis, ketogenesis, ketonuria, glucosuria, osmotic diuresis, polyuria.

17. Glucose in the blood - common data for the parameters, indications for investigation, principles of the analytical methods, reference, borderline and pathological ranges, result interpretation.

18. Glucose in the blood - tests with overload: two-hour postprandial test and oral glucose tolerance test (GTT) - indications for investigation and contraindications, implementation of the tests, source of errors, reference ranges, results interpretation.

19. Evaluation of glycaemia for preceded period of time: glycated proteins - glycated hemoglobin HbA1; HbA1c and fructosamine: common data for the parameters, indications for investigation, patient preparation, specimen, reference ranges, informative content and results interpretation.

20. Selection of clinical laboratory tests in detecting and monitoring disturbance of carbohydrate metabolism in patients with diabetes mellitus - basic, extended and specialized laboratory tests (glycated proteins, microalbuminuria) and their discussion.

21. Total protein - common data for the parameters, principles of the analytical methods and interferences, indications for investigation, patient preparation, reference ranges, result interpretation.

22. Major protein fractions – electrophoreses: indications for investigation, result interpretation, informational value.

23. Individual proteins – proteins of the acute phase – types, analytical methods for investigation, indications for investigation, patient preparation, reference ranges, results interpretation.

24. Immunoglobulins in the serum – common data for the parameters, classification, dynamic in prenatal and early postnatal period, methods of investigation, results' interpretation.

25. Selection of clinical laboratory tests and their discussion in inflammatory and neoplastic diseases: white blood cells, differential count, hemoglobin, red blood cells, proteins of acute phase, ESR, serum proteinogram, specific laboratory parameters.

26. Urea - common data for the parameter, principles of the analytical methods, source of errors, indications for investigation, patient preparation, reference ranges, result's interpretation.

27. Creatinine - common data for the parameter, principles of the analytical methods, source of errors and interference, indications for investigation, patient preparation, specimen, reference ranges, result's interpretation.

28. Uric acid - common data for the parameter, principles of the analytical methods, source of errors and interference, indications for investigation, patient preparation, specimen, reference ranges, result's interpretation.

29. Selection of clinical laboratory tests in renal diseases. Evaluation of the results of a study of non-protein nitrogen containing substances – advantages and disadvantages.

30. Transaminases in serum – general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.

31. Alkaline and acid phosphatase in serum - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.

32. Lactate dehydrogenase and creatine phosphokinase in serum - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.

33. Amylase, gamma glutamyltransferase and cholinesterase - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.

34. Choice and evaluation of clinical laboratory parameters in myocardial diseases.

35. Cholesterol in serum and its fractions - general information, analytical methods, interferences, risk limits, interpretation of results.

36. Triglycerides in serum general information, analytical methods, interferences, risk limits, interpretation of results.

37. Serum bilirubin and fractions – metabolism, methods, interferences, reference ranges, interpretation of results.

38. Choice and evaluation of clinical laboratory parameters in hepatic and bile diseases.

39. Hemostasis as a complex functional system – phases and factors.

40. Blood coagulation and fibrinolysis – factors and inhibitors.

41. Clinical laboratory parameters for evaluation of hemostasis.

42. Choice and discussion of laboratory parameters in hemorrhagic diathesis.

43. Choice and discussion of laboratory parameters in thrombophilia.

44. Choice and discussion of laboratory parameters in DIC syndrome.

45. Choice and assessment of clinical laboratory parameters in renal diseases – basic, extended and specialized analysis.

46. Evaluation of changes in the values of pH, osmolality 24-hour diuresis in the course of diagnosis of renal diseases. Evaluation and procedures for clarifying of hematuria.

47. Choice of clinical laboratory parameters in renal diseases – sequence of procedures for clarifying and assessment of proteinuria – mainly glomerular and mainly tubular proteinuria. Mechanism of appearance, diagnostic significance.

48. Tumor markers. Markers of the first and second choice.

49. Choice and assessment of clinical laboratory parameters in iron deficiency anemias.

50. Choice and assessment of clinical laboratory parameters in megaloblastic anemias.

51. Choice and assessment of clinical laboratory parameters in hemolytic anemias.

52. Choice and assessment of clinical laboratory parameters in white blood cell line disorders. Cytochemical and immunophenotype characteristics of leukocytes in acute leukemia.

53. Choice and assessment of clinical laboratory parameters in white blood cell line disorders. Cytochemical and immunophenotype characteristics of leukocytes in chronic leukemias (lymphocytic and granulocytic).

54. Hormones - biological material and patient preparation. Groups of laboratory parameters.

55. Hormones of thyroid gland. Evaluation of laboratory data and correlations in thyroid diseases.

Approved: Assoc. Prof. Tanya Deneva, MD, PhD
/Head of Department of Clinical laboratory /

MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
CLINICAL IMMUNOLOGY

Adopted by the Department Council - Protocol №6/13.06.2022

Approved by the Faculty Council - Protocol №6/15.06.2022

CLINICAL IMMUNOLOGY

Curriculum

Discipline	Exam in semester	Classroom employment				Extracurricular credits	Total credits	Hours by year and semester	
		Total	Lectures	Practical exercises	Credits			IV year	
Immunology	VII/VIII							VII	VIII
		36	18	18	1.2	0.6	1.8	18/18	18/18

DISCIPLINE DESCRIPTION: Clinical immunology

TYPE OF COURSE ACCORDING TO USR: Compulsory

EDUCATIONAL DEGREE: Master / M /

FORMS OF EDUCATION: Regular

COURSE OF TRAINING: IV year: VII semester – Bulgarian-speaking students;

VIII semester – English-speaking students

DURATION OF DISCIPLINE: 1 semester

HOURS: 18 hours of lectures, 18 hours of practical exercises

TEACHING AIDS:

- multimedia
- demonstration materials
- lectures
- textbook
- electronic platforms (MS Office 365, Zoom, etc.)

FORMS OF ASSESSMENT: Exam

FORMATION OF THE FINAL EXAM GRADE:

The final grade is multicomponent and includes the grades from the written final exam and the following components:

- the average grade from current control (colloquium, MCQ tests)
- grade from the oral final exam

If one of the components of the final grade is Weak 2, then the final grade is necessarily Weak 2.

ASPECTS OF THE FINAL GRADE FORMATION:

For each component participating in the final assessment, a significance factor (0 to 1) is determined, and the total sum of the coefficients must always be 1. The final grade is obtained as the sum of the scores on a six-point scale from the various components multiplied by the respective coefficients of significance.

Q final grade = K1 **Q** grade from current control + K2 **Q** grade from written exam + K3 **Q** grade from oral exam

K1 = 0.20; K2 = 0.50; K3 = 0.30

Semester exam: Yes

State exam: No

Main lecturer:

Habilitated lecturer

Prof. Dr. Mariana Murdzheva, MD, PhD

Department: Medical Microbiology and Immunology "Prof. Dr. Elisei Yanev"

ANNOTATION

The main goal of the training in the discipline of clinical immunology is in-depth acquaintance of medical students with the characteristics of innate and adaptive immunity, immunopathology (infectious immunopathology, immunodeficiency, allergies, autoimmunity, autoaggression and autoimmune diseases, tumor immunology), transplant immunology, reproductive immunology, immunological diagnostics and immunomodulation.

The goal is coordinated with:

- the volume and the credit rating of the course (according to the ECTS system), visible from the curriculum available on the website of MU - Plovdiv;
- the qualification characteristics of the specialty;
- educational degree (master's degree).

The aim is consistent with the place of the discipline of clinical immunology in the specialty Medicine in its importance and in chronology in the curriculum. As a fundamental discipline, clinical immunology serves the next stages of the medical students education.

MAIN TASKS OF THE CURRICULUM

The main tasks of the curriculum in "Clinical Immunology" are:

1. Providing information on immunomediated diseases such as immune deficiencies, allergies, autoimmune diseases, tumor processes, transplant rejection processes, reproductive failures with immune genesis.
2. Providing knowledge to students to study the immune system of a person in health and pathology, by applying specific immunological methods and their interpretation.
3. Determining the indicators for monitoring the activity of the disease process affecting the immune system, as well as the indications for immunomodulatory therapy and drug monitoring.
4. Gaining experience in experimental immunology.

EXPECTED RESULTS

After completing the course in clinical immunology, medical students should be familiar with the factors and mechanisms of natural resistance and adaptive immunity in health and pathology, the causes of immunopathogenesis, clinical manifestation, immunological diagnosis and immunotherapy of immunopathological conditions. They must have mastered modern methods for immunodiagnostics and immunotherapy of infectious immunopathology, immunodeficiency diseases, allergies, autoimmune diseases, malignancies, pre- and post-transplant monitoring, to know well the immune mechanisms in transplantation and transplant reactions. The ability to properly handle the methods and means of immunoprophylaxis and immunotherapy.

LECTURE PROGRAMME

IVyear, VII term (Bulgarian students),

VIII term (English-speaking students) (2 study hours)

№	TOPIC	HOURS	DATE
1.	Clinical immunology. Innate resistance and acquired immunity. Immune system. Development of the immune response.	2	
2.	Immunopathology. Immunodeficiency conditions and diseases.	2	
3.	Immunopathology. Allergies.	2	
4.	Autoimmunity. Autoimmune reactions and diseases.	2	
5.	Autoantibodies in the diagnostics of autoimmune diseases.	2	
6.	Tumor immunology.	2	
7.	Transplantation immunology. Reproductive immunology.	2	
8.	Infectious immunity. Role in bacterial, mycotic and viral infections.	2	
9.	Immunoprophylaxis and immunotherapy.	2	

HOURS: 18

PROGRAMME FOR PRACTICAL CLASSES

IVyear, VII term (Bulgarian students),

VIII term (English-speaking students) (2 study hours)

№	TOPIC	HOURS	DATE
1.	Laboratory methods for the study of humoral immune response.	2	
2.	Laboratory methods for the study of cell-mediated immune response.	2	
3.	Immune status and monitoring. Molecular biological methods in clinical immunology.	2	
4.	Test on practicals 1-3. Immunological methods for the study of allergic diseases.	2	
5.	Immunological methods for the diagnosis of organ-non-specific autoimmune diseases.	2	
6.	Immunological methods for the diagnosis of organ-specific autoimmune diseases.	2	
7.	Immunological diagnosis of tumor diseases.	2	
8.	Test on practicals 4-7. Tissue compatibility study. Transplantation immunology.	2	
9.	Seminar and test on practicals 1-8.	2	

HOURS: 18

LECTURES - THESES

LECTURE №1 – 2 hours

Clinical immunology. Innate resistance and acquired immunity. Immune system. Development of the immune response.

Clinical immunology. Subject and sections - general characteristics. Basic humoral and cellular immunological effector mechanisms for the development of protective and immunopathological reactions. Innate resistance. Essence and comparison with acquired immunity. Factors of innate resistance - mechanical barriers, cellular and humoral. Clinical importance of the mechanisms of innate resistance. Inflammation as a protective and pathological manifestation. Acquired immunity and immune response. The immune system - the basis of the immune response. Anatomy and structure: immune organs (central and peripheral); cells (populations, markers and functions); molecules (intracellular interaction and antibodies); HLA genes and products. Development of the immune response. Stages of the immune response. Types and forms of immune response depending on the antigen (development of immune response against extracellular and intracellular antigens). Dynamics of the immune response - primary and secondary. Immune memory. Regulation of the immune response.

LECTURE №2 – 2 hours

Immunopathology. Immunodeficiency conditions and diseases.

Immunodeficiency conditions. Definition, origin. Immunological characteristics of congenital and acquired immunodeficiencies. Syndromes and diseases. Monoclonal gammopathies - nature and examples.

LECTURE №3 – 2 hours

Immunopathology. Allergies

Allergies. Definition, types of allergens. Types of allergic reactions - characteristics, mechanisms of damage, diseases and syndromes. Examples.

LECTURE №4 – 2 hours

Autoimmunity. Autoimmune reactions and diseases.

Autoimmune reactions and diseases. Definition. Immunological tolerance - definition, immune processes for its implementation and maintenance. Causes of development and mechanisms of damage in autoimmune reactions and diseases. Types of autoimmune diseases - organ-specific and non-specific. Immunological characteristics.

LECTURE №5 – 2 hours

Autoantibodies in the diagnostics of autoimmune diseases.

Immunological indicators and tests for organ-specific autoimmune diseases (autoimmune thyroiditis, thyrotoxicosis, autoimmune hepatitis, PBC, MS, myasthenia gravis, type 2 diabetes, autoimmune hemolytic anemia). Anti-thyroid antibodies - against thyroglobulin, thyroid peroxidase, TSH receptor. AMA, ASMA, anti-GBM, anti-insulin, etc. The most common autoantibodies in systemic autoimmune diseases (ANA, anti-dsDNA, anti-ssDNA, anti-ENA - Sm, RNP, Ro, La, Scl-70, anti-Jo1, RF). IIFA of rat liver and McCoy-Plovdiv. Types of fluorescence at ANA detection. ELISA and immunoblot for autoantibodies in systemic autoimmune diseases

LECTURE №6 – 2 hours

Tumor immunology.

Tumor immunology. Types of tumor antigens. Immunological mechanisms against tumors. Reasons for "escape" of the tumor from immunological control. Immunological diagnosis of tumor diseases. Tumor immunoprophylaxis and immunotherapy - basic approaches.

LECTURE №7 – 2 hours

Transplantation immunology. Reproductive immunology.

Transplantation immunology. Importance of MHC for accepting or rejecting the transplant. Immune response after transplantation - reactions and mechanisms of transplant rejection; graft versus host reaction. Pre- and post-transplant immunological monitoring. Chemotransfusion reactions - immunological bases, types, causes, examples. Reproductive immunology. The immunological paradox of pregnancy. The feto-placental unit as an immune organ - structure and antigens. Immunological conflicts during pregnancy. Immunological causes of infertility and abortion.

LECTURE №8 – 2 hours

Infectious immunity.

Role in bacterial, mycotic and viral infections. Infectious immunology. Immune reactions in bacterial, mycotic and viral infections.

LECTURE №9 – 2 hours

Immunoprophylaxis and immunotherapy.

Immunomodulation - definition and directions. Immunostimulation - specific and nonspecific immunological prophylaxis and therapy. Examples and application.

PRACTICAL CLASSES - THESES

PRACTICAL CLASS №1 – 2 hours

Laboratory methods for the study of humoral immune response

QUESTIONS FOR THEORETICAL PREPARATION: Innate resistance, acquired immunity, non-specific humoral factors. Methods of examination in health and disease. Humoral (antibody-dependent) immune response. Immunoglobulins - biological properties, paraproteinemias, specific antibodies. Laboratory methods for the study of humoral immunity: immunoprecipitation, immunodiffusion, immunoelectrophoresis, immuno-nephelometry, immunoturbidimetry, agglutination reaction, neutralization reaction, labeled immune reactions.

DEMONSTRATION OF: Various agglutination reactions - Gruber type, latex agglutination, Widal type, RHA, RPHA, RDHA. Precipitation reactions - Mancini, Ouchterlony. Electrophoresis and immunoelectrophoresis. Immunoglobulin and complement nephelometry. AST, CFT. ELISA reader machine. IFA in autoantibodies. Images of rocket and counter electrophoresis.

PRACTICAL TASKS: Reporting of Widal reaction, RPHA, AST, RDHA, CFT, latex agglutination and IFA. Reporting and interpretation of results from quantitative study of immunoglobulin classes by nephelometry.

PRACTICAL CLASS №2 – 2 hours

Laboratory methods for the study of cell-mediated immune response

QUESTIONS FOR THEORETICAL PREPARATION: Innate immune cells - neutrophils, monocytes, macrophages, NK cells. Examination of the phagocytic system - NBT, flow cytometry. Acquired immune cells - T and B lymphocytes and their subpopulations. Clinical significance of the study of cells of the innate and acquired immune response.

DEMONSTRATION OF: Determination by flow cytometry of antigenic (CD) markers of T, B lymphocytes and NK cells. Cytokines - determination by ELISA. Blood smear with erythrocytes, lymphocytes and leukocytes. NBT test. FACS - scheme and principle of operation.

PRACTICAL TASKS: Determination of NBT test. Histogram reading from a flow cytometry of immune cells.

PRACTICAL CLASS №3 – 2 hours

Immune status and monitoring. Molecular biological methods in clinical immunology

QUESTIONS FOR THEORETICAL PREPARATION: Methods for the study of humoral and cellular immune response (**practical classes 1 and 2**). Clinical significance of the studied parameters. Immunodeficiency diseases. Terminology: immune status, immunological monitoring, diagnostic sensitivity and specificity. Indications for immunological monitoring. Basic indicators for the study of immune reactivity. Minimum panel for determination of lymphocyte populations by flow cytometry. Clinical application of flow cytometry.

DEMONSTRATION OF: Determination of NBT test. Flow cytometric analysis of FACSCanto.

PRACTICAL TASKS: Clinical cases on documents.

PRACTICAL CLASS №4 – 2 hours

Test on practicals 1-3. Immunological methods for the study of allergic diseases.

QUESTIONS FOR THEORETICAL PREPARATION: Types of allergic reactions - mechanisms and diseases. Immunological methods for the study of allergic diseases: in vivo and in vitro tests.

DEMONSTRATION OF: Discussion of types of allergens and types of allergic reactions and immunological tests for allergy testing – skin allergy tests. Algorithm for testing type I allergies. Modern methods for the study of IgE. ELISA plate with total IgE and patient allergy test card. Immunoblot strips.

PRACTICAL TASKS: Reporting of ELISA-IgE. Examples of allergy panels. Work on clinical cases.

PRACTICAL CLASS №5 – 2 hours

Immunological methods for the diagnosis of organ-non-specific autoimmune diseases

QUESTIONS FOR THEORETICAL PREPARATION: Autoimmunity and autoimmune diseases. Characteristics of the autoimmune response. Autoimmune diseases. Mechanisms of occurrence. Genetic predisposition. Classification of autoimmune diseases. Immunological diagnosis. Immunological features in more common systemic autoimmune diseases.

DEMONSTRATION OF: The most common autoantibodies in systemic autoimmune diseases (ANA, anti-dsDNA, anti-ssDNA, anti-ENA - Sm, RNP, Ro, La, Scl-70, anti-Jo1, RF). IIFA of rat liver and McCoy-Plovdiv. Type of fluorescence at ANA detection. ELISA for autoantibodies in systemic autoimmune diseases.

PRACTICAL TASKS: Fluorescence type with IIFA. ELISA reporting and interpretation for ANA. Discussion of clinical cases.

PRACTICAL CLASS №6 – 2 hours

Immunological methods for the diagnosis of organ-specific autoimmune diseases

QUESTIONS FOR THEORETICAL PREPARATION: Immunological indicators and tests for organ-specific autoimmune diseases (autoimmune thyroiditis, thyrotoxicosis, autoimmune hepatitis, PBC, MS, myasthenia gravis, type 2 diabetes, autoimmune hemolytic anemia). Anti-thyroid antibodies - against thyroglobulin, thyroid peroxidase, TSH receptor. AMA, ASMA, anti-GBM, anti-insulin, etc.

DEMONSTRATION OF: The most common autoantibodies in organ-specific autoimmune diseases (ANCA, AGBM, anti-TG, anti-TPO, AMA, ASMA). IIFA of rat stomach and kidney for AMA, ASMA. ELISA for autoantibodies in organ-specific autoimmune diseases (anti-GBM, anti-LKM).

PRACTICAL TASKS: Reporting of AMA and ASMA with IIFA. Reporting of anti-TG, anti-TPO by ELISA. Anti-LKM by ELISA. Interpretation of the results. Discussion of clinical cases.

PRACTICAL CLASS №7 – 2 hours

Immunological diagnosis of tumor diseases

QUESTIONS FOR THEORETICAL PREPARATION: Subject and tasks of tumor immunology. Carcinogens. Cellular oncogenes. Tumor antigens. Antitumor protection. Mechanisms of immunological "escape" of tumor cells from immune control. Immunological diagnosis of tumors. Serological determination of tumor markers. In vitro anti-tumor immunity tests. Immunotherapy of tumors.

DEMONSTRATION OF: Flow cytometric examination in lymphoblastic leukemias. Immunocytogenetic analysis of chromosomal translocations and deletions. Serological examination of various tumor markers by ELISA, RIA, etc. Monitoring of serum concentrations of CEA in rectal cancer. Methods for testing various hormones. Methods for proving genes encoding tumor antigens. Methods for detecting monoclonal immunoglobulins. Analysis of CMI and HI of the body against tumors.

PRACTICAL TASKS: Procedures and methodology for determining the immune status in the immunological laboratory for cancer patients.

PRACTICAL CLASS №8 - 2 hours

Test on practicals 4-7. Examination of tissue compatibility. Transplantation immunology.

QUESTIONS FOR THEORETICAL PREPARATION: Tissue compatibility antigens. Transplantation. Immune response after transplantation. Rejection reactions. Graft versus host disease (GvHD). Immunological monitoring. Prevention and treatment of rejection reactions.

DEMONSTRATION OF: Molecular tests - PCR, RFLP, HLA typing by NGS.

PRACTICAL TASKS: Discussion of clinical cases.

PRACTICAL CLASS №9 - 2 hours

Seminar and test on practicals 1-8.

LITERATURE

Obligatory:

1. Lecture theses in clinical immunology
<https://muplovdivbg.sharepoint.com/teams/FacultyofPharmacy>;
2. Clinical Immunology: Principles and Practice, 4e. Robert Rich, Thomas A Fleisher, William T. Shearer, Harry Schroeder, Anthony J. Frew, Cornella Weyand. Elsevier Saunders, 2013, ISBN-13: 978-0723436911, 1235 pp.

Recommended:

1. Immunology for medical students – 2nd ed. Roderick Nairn, Matthew Helbert, 2006, eBook ISBN: 9780702058479, 320pp;
2. Essentials of Clinical Immunology, Helen Chapel, Mansel Haeney, Siraj Misbah, Neil Snowden, 6th Edition, Wiley-Blackwell, 2014, ISBN: 978-1-118-47295-8, 376pp;
3. Essential Clinical Immunology, John Zabriskie, Cambridge University Press, 1 e, 2009, ISBN-10: 0521704898, 372pp;
4. Basic immunology: functions and disorders of the immune system 5th ed. Abbas, Abul K. et al., 2015, ISBN: 9780323390828, 352pp;
5. Cellular and molecular immunology – 9th ed. Abbas, Abul K. et al., 2017, ISBN: 9780323479783, 608pp.

SYLLABUS

FOR CLINICAL IMMUNOLOGY EXAM

Topic 1. Clinical Immunology. Subject and parts – general characteristics. Basic humoral and cellular mechanisms for the development of defense and immunopathological reactions.

Topic 2. Innate immunity. Comparison with adaptive immunity. Factors of innate immunity – mechanical barriers, cellular and humoral factors. Clinical significance of innate immunity mechanisms. The inflammation as a defense and pathological process.

Topic 3. Adaptive immunity and immune response. Immune system – the basis of the immune response. Anatomy and structure of the immune system – immune organs (primary and secondary), immune cells (populations, markers, and function), molecules (cytokines and antibodies), HLA genes, and their products.

Topic 4. Development of immune response. Stages of the immune response. Types and forms of the immune response according to the antigen (immune response against intracellular and extracellular antigens). Dynamics of the immune response – primary and secondary immune response. Immune memory. Regulation of immune response.

Topic 5. Infectious Immunology. Immune response in bacterial, mycotic and viral infections.

Topic 6. Immune deficiencies. Definition and origin. Immunological characteristics of primary and secondary immune deficiencies. Syndromes and diseases. Monoclonal gammopathy - nature and examples.

Topic 7. Allergy. Terms. Types of allergens. Types of allergic reactions – characteristics, mechanism of tissue damage, diseases and syndromes – examples.

Topic 8. Autoimmune reactions and diseases. Terms. Immune tolerance – definition, underlying mechanisms, and immune processes for its maintenance. Reasons and mechanisms for the development of autoimmunity. Types of autoimmune diseases – organ-specific and non-organ-specific. Immunological characteristics.

Topic 9. Tumor immunology. Tumor antigens. Immunological mechanisms against tumors. Immunological diagnosis of the tumor diseases. Mechanisms by which the tumor escapes the immune control. Anti-tumor immune prophylaxis and immune therapy – basic approaches.

Topic 10. Transplantation immunity. The role of MHC molecules in transplantation. Post-transplantation immune response – types of reactions and mechanisms; graft versus host disease. Pre- and post-transplantation immune monitoring. Haemotransfusion reactions – immunological mechanism, types, reasons, examples.

Topic 11. Reproductive immunology. The immunological paradox of pregnancy. The fetoplacental unit as an immune organ - structure and antigens. Immunological conflicts during pregnancy. Immunological causes of infertility and abortion.

Topic 12. Immunological methods for testing innate and adaptive humoral factors – tests for complement and other serum proteins (agglutination, precipitation, complement-fixation, and labeled immune reactions) – principles, clinical application, and interpretation.

Topic 13. Immunological methods for testing innate and adaptive cellular factors – tests for phagocytosis, immunophenotyping, lymphocyte functional assays – principles, clinical application, and interpretation. Immune status and monitoring – examples in various immune disorders.

Topic 14. Immune modulation – terms and parts. Immune stimulation – specific and non-specific immune prophylaxis and therapy. Examples and application.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

SPECIAL SURGERY

Approved by the Department Council on 25.05.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

SPECIAL SURGERY

Discipline	Final exam/ semester	Academic hours				Academic hours in years and semesters	
						4th year	
SPECIAL SURGERY	VIII	Total	Lectures	Practices	ECTS	1 st sem.	2 nd sem.
		180	60	120	9.1	90	90

DISCIPLINE:

“SPECIAL SURGERY”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS:

MANDATORY

LEVEL OF QUALIFICATION:

MASTER /M/

FORMS OF TRAINING:

LECTURES, EXERCISES

YEAR OF TRAINING:

4TH & 6TH

DURATION OF TRAINING:

TWO SEMESTERS

ACADEMIC HOURS:

60 HOURS OF LECTURES, 120 HOURS OF EXERCISES

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

AUDIO VISUAL EQUIPMENT; MODELS; IMAGING EQUIPMENT;
SURGICAL INSTRUMENTS, CATHETERS, SONDS, DIFFERENT TYPE OF
BANDAGES;
WORK WITH PATIENTS UNDER THE SURVEILLANCE OF THE ASSISTANTS AND
PROFESSOR.

FORMS OF EVALUATION:

CURRENT AND FINAL ASSESSMENT: TEST AND ORAL EXAM

EVALUATION CRITERIA:

ASSESSMENT BY THE ASSISTANT DURING THE SEMESTER;
TEST INCLUDING OPEN AND CLOSED QUESTIONS AND CLINICAL CASES;
TEST AND ORAL EXAM WITH FINAL GRADE.

ASPECTS OF EVALUATION CRITERIA:

The final grade determines the extent to which the student has achieved the goal of the education set at the beginning. It is multi-component and includes a written final exam grade as well as the following components:

Assessment from ongoing control;

Assessment from a written exam;

Assessment from the final oral exam;

If one of the components of the final grade is weak 2, then the final grade will be weak 2.

SEMESTER EXAM:

WRITTEN AND ORAL EXAM

STATE EXAM:

PART OF EXAM “SURGICAL DISEASES”

LECTURER:

PROFESSORS FROM THE DEPARTMENT OF SPECIAL SURGERY

DEPARTMENT:

“SPECIAL SURGERY»

ANNOTATION:

Special surgery is a medical specialty that studies the symptoms, etiology, pathogenesis, diagnosis, prevention and treatment of the different kind of surgical diseases (etc. traumas, inflammatory and tumor diseases of the neck, thorax and abdomen)

BASIC AIMS OF THE DISCIPLINE:

To teach the students: patient physical examination, laboratory and imaging investigation.

To develop the ability of clinical interpretation of the symptoms of different surgical diseases.

To make the differential diagnosis and the final diagnosis of patients with surgical diseases.

To assimilate practical skills for obtaining the right diagnosis of surgical diseases.

To be able to perform basic procedures and manipulations in surgery.

To understand the interdisciplinary approach in special surgery with general surgery, pediatrics, obstetrics and gynecology, urology, oncology, radiology, etc.

EXPECTED RESULTS:

Assessment of basic information from the history and the physical examination of the patients with surgical diseases.

To be able to perform the most commonly used methods of examination in special surgery.

To have the necessary knowledge about the common surgical diseases
Skills for recognition, correct assessment, approach and initial treatment of emergencies and
urgent cases in special surgery

LECTURES:

LECTURES “SPECIAL SURGERY” FOR MEDICAL STUDENTS – IV COURSE – 1ST SEMESTER

1. The Abdominal Wall, Including Hernia – Part I. Groin Hernias.
2. The Abdominal Wall, Including Hernia – Part II. Umbilical Hernias. Femoral hernias.
3. Small Intestine and Appendix: Acute Appendicitis; Meckel’s Diverticulum. Crohn’s Disease.
4. Acute peritonitis.
5. Abdominal Trauma: Blunt and Penetrating abdominal traumas.
6. Stomach and Duodenum: Peptic Ulcer Disease’s Complications.
7. Stomach and Duodenum: Stomach Cancer.
8. The small intestine: Small bowel Obstruction. Small bowel tumours. Foreign bodies.
9. Colon and Rectum: Part I - Diverticular disease: diverticulitis, bleeding, and fistula. Ulcerative Colitis – Part II. Colonic Obstruction. Sacrococcygeal pilonidal sinus.
10. Colon and Rectum: Part II - Colorectal tumors.
11. Colon and Rectum: Part III - Large-bowel obstruction.
12. Gallbladder Disease.
13. Portal Hypertension. Liver Abscess and Cysts.
14. The Spleen. Splenic Trauma. Disorders of Splenic Function.

LECTURES “SPECIAL SURGERY” FOR MEDICAL STUDENTS – IV COURSE – 2ND SEMESTER

1. Acute pancreatitis. Pathogenesis. Clinical Presentation. Diagnosis. Treatment.
2. Chronic Pancreatitis. Pancreatic Pseudocysts.
3. Exocrine and Endocrine Pancreatic Tumors.
4. Acute generalized peritonitis. Intra-abdominal abscesses.
5. Cervical cysts and fistulas. Neck Phlegmonas.

- 6. Non-toxic goitre. Hashimoto's disease. De Quervain's thyroiditis.**
- 7. Thyrotoxicosis. Carcinoma of the thyroid gland.**
- 8. Thoracic Trauma.**
- 9. Benign breast tumors. Acute mastitis. Breast Cancer.**
- 10. Pleural Empyema. Spontaneous Pneumothorax. Tumors of the pleura.**
- 11. Lung abscess. Lung Hydatid Disease. Bronchiectatic disease.**
- 12. Acute Mediastinitis. Mediastinal Tumors and Cysts.**
- 13. Lung Cancer.**
- 14. Achalasia. Esophageal diverticulas. Diaphragmal Hernias. Esophageal Cancer. Panaritium.**

PRACTICES:
“SPECIAL SURGERY” FOR MEDICAL STUDENTS – IV COURSE – 1ST
SEMESTER

1. The Abdominal Wall, Including Hernia – Part I. Groin Hernias.
2. The Abdominal Wall, Including Hernia – Part II. Umbilical Hernias. Femoral hernias.
3. Small Intestine and Appendix: Acute Appendicitis; Meckel's Diverticulum. Crohn's Disease.
4. Acute peritonitis.
5. Abdominal Trauma: Blunt and Penetrating abdominal traumas.
6. Stomach and Duodenum: Peptic Ulcer Disease's Complications.
7. Stomach and Duodenum: Stomach Cancer.
8. The small intestine: Small bowel Obstruction. Small bowel tumours. Foreign bodies.
9. Colon and Rectum: Part I - Diverticular disease: diverticulitis, bleeding, and fistula. Ulcerative Colitis – Part II. Colonic Obstruction. Sacrococcygeal pilonidal sinus.
10. Colon and Rectum: Part II - Colorectal tumors.
11. Colon and Rectum: Part III - Large-bowel obstruction.
12. Gallbladder Disease.
13. Portal Hypertension. Liver Abscess and Cysts.
14. The Spleen. Splenic Trauma. Disorders of Splenic Function.

PRACTICES
“SPECIAL SURGERY” FOR MEDICAL STUDENTS – IV COURSE – 2ND
SEMESTER

1. Acute pancreatitis. Pathogenesis. Clinical Presentation. Diagnosis. Treatment.
2. Chronic Pancreatitis. Pancreatic Pseudocysts.
3. Exocrine and Endocrine Pancreatic Tumors.
4. Acute generalized peritonitis. Intra-abdominal abscesses.
5. Cervical cysts and fistulas. Neck Phlegmonas.

- 6. Non-toxic goitre. Hashimoto's disease. De Quervain's thyroiditis.**
- 7. Thyrotoxicosis. Carcinoma of the thyroid gland.**
- 8. Thoracic Trauma.**
- 9. Benign breast tumors. Acute mastitis. Breast Cancer.**
- 10. Pleural Empyema. Spontaneous Pneumothorax. Tumors of the pleura.**
- 11. Lung abscess. Lung Hydatid Disease. Bronchiectatic disease.**
- 12. Acute Mediastinitis. Mediastinal Tumors and Cysts.**
- 13. Lung Cancer.**
- 14. Achalasia. Esophageal diverticulas. Diaphragmal Hernias. Esophageal Cancer. Panaritium.**

CONSPECTUS OF SURGICAL DISEASES - FOR 4TH YEAR MEDICAL STUDENTS

1. Head traumas
2. Inflammatory diseases of head and face
3. Congenital cervical cysts and fistulas
4. Thyroiditis and thyroid cancer
5. Endemic goiters
6. Thyrotoxicosis
7. Cervical traumas
8. Neck phlegmon
9. Acute mastitis
10. Benign breast tumors
11. Breast cancer
12. Blunt thoracic trauma
13. Open thoracic trauma
14. Traumatic pneumothorax
15. Pneumothorax
16. Rib fractures and flail chest
17. Pleural empyema
18. Lung abscess
19. Bronchiectasis
20. Lung cancer
21. Lung metastatic disease
22. Esophageal diverticulitis
23. Esophageal cancer
24. Achalasia
25. Acute mediastinitis
26. Blunt abdominal trauma
27. Open abdominal trauma
28. Acute peritonitis
29. Primary type of peritonitis
30. Intraperitoneal abscess
31. Anterior abdominal wall hernias. General information.
32. Anterior abdominal wall hernias. Complications. Incarceration and strangulation.
33. Femoral hernias
34. Inguinal hernias

35. Umbilical and epigastric hernias
36. Diaphragmatic hernias
37. Acute appendicitis. General information.
38. Acute appendicitis. Complications. Acute peritonitis, appendicular infiltrate, appendicular abscess.
39. Acute appendicitis in children, elderly and pregnant women.
40. Chronic appendicitis
41. Peptic ulcer disease. Surgical point of view. Complications.
42. Peptic ulcer perforation
43. Upper gastrointestinal bleeding
44. Pyloric stenosis
45. Malignant degeneration of peptic ulcer
46. Peptic ulcer penetration
47. Benign stomach tumors
48. Gastric cancer
49. Liver hydatid disease
50. Liver abscess
51. Cholecystitis
52. Portal hypertension. Clinical presentation.
53. Acute pancreatitis
54. Pancreatic cancer
55. Pancreatic pseudocyst
56. Spleen disorders
57. Ileus. Intestinal obstruction. General information.
58. Intestinal obturation
59. Intestinal strangulation
60. Congenital ileus
61. Invagination/ intussusception
62. Mesenteric thrombosis
63. Dynamic ileus
64. Paronychia (acute inflammatory process of fingers)
65. Phlegmon of the hands and forearms
66. Hemorrhoids
67. Perianal disease. Perianal abscess. Perianal fistulas.
68. Anal fissures

- 69. Colon cancer.
- 70. Rectal cancer.
- 71. Ulcero-hemorrhagic colitis
- 72. Mediastinal masses and tumors.
- 73. Caustic necrosis (burning) of the esophagus.
- 74. Spontaneous pneumothorax.

CONSPECT - STATE EXAM OF SURGICAL DISEASES

I. GENERAL AND SPECIAL SURGERY

1. Local and regional anaesthesia.
2. Wound Healing: Sanatio per Primam.
3. Wound Healing: Sanatio per Secundam. Sanatio sub crustam.
4. Thermal Trauma. Burns.
5. Thermal Trauma. Frost-bite.
6. Hemostasis.
7. Blood Transfusion. Complications.
8. Shok.
9. Surgical Infections. Necrotizing soft tissue infections.
10. Surgical Infections. Phlegmona. Abscess. Empyema.
11. Surgical Infections. Furunculus. Carbunculus.
12. Surgical Infections. Acute lymphangitis. Acute lymphadenitis.
13. Surgical Infections. Sepsis.
14. Femoropopliteal and Tibial acute occlusive Disease.
15. . Femoropopliteal and Tibial chronic occlusive Disease.
16. Venous thromboembolism.
17. Blunt trauma. Penetrating trauma.
18. Osteomyelitis.
19. Panaritium.
20. Tetanus.
21. Cervical cysts anf fistulas.
22. Thyrotoxicosis.
23. Non-toxic goitre. Hashimoto's disease. De Quervain's thyroiditis.
24. Carcinoma of the thyroid.
25. Benign breast tumors.
26. Acute mastitis.
27. Breast Cancer.
28. Chest Trauma. Rib Fractures. Flail Chest.
29. Chest Trauma. Traumatic Hemothorax.
30. Chest Trauma. Traumatic Pneumothorax.

31. Chest Trauma. Pulmonary Contusion. Tracheal Injury. Esophageal Injury. Cardiac tamponade.
32. Pleural Empyema.
33. Lung abscesses.
34. Lung Hydatid Disease.
35. Bronchiectatic disease.
36. Lung Cancer.
37. Esophageal Diverticula. Achalasia.
38. Esophageal Neoplasms.
39. Esophageal perforation. Mallory-Weiss syndrome.
40. Acute Mediastinitis.
41. Mediastinal Tumors and Cysts.
42. Abdominal Wall Hernias. Groin Hernia.
43. Abdominal Wall Hernias. Femoral Hernia.
44. Abdominal Wall Hernias. Umbilical Hernia. Epigastric Hernia.
45. Abdominal Wall Hernias. Incisional Hernia.
46. Paraesophageal hiatal hernia. Sliding type of hiatal hernia.
47. Abdominal Trauma. Penetrating Injury.
48. Abdominal Blunt Trauma.
49. Peptic ulcer. Complications. Pyloric Stenosis. Penetration.
50. Peptic ulcer. Complications. Perforation.
51. Acute Gastro-intestinal bleeding.
52. Stomach cancer.
53. Calculous Biliary Disease
54. Acute cholecystitis.
55. Obstructive Jaundice.
56. Liver Hydatid Disease.
57. Acute Pancreatitis.
58. Acute appendicitis. History. Physical findings.
59. Appendicitis in the elderly. Appendicitis in pregnancy.
60. Ileus and Bowel Obstruction. Pathogenesis. Clinical presentation.
61. Ileus and Bowel Obstruction. Intussusception.
62. Ileus and Bowel Obstruction. Volvulus.
63. Ileus and Bowel Obstruction. Paralytic Ileus.
64. Ileus and Bowel Obstruction. Hernial obstruction.

65. Exocrine Pancreatic Cancer. Endocrine Pancreatic Tumors.
66. Liver Cancer.
67. Pancreatic Pseudocyst.
68. Mesenteric Thrombosis.
69. Acute generalized peritonitis.
70. Intra-abdominal abscesses.
71. Ulcerative Colitis
72. Diverticular disease of the colon.
73. Colorectal Cancer.
74. Anorectal Abscesses.
75. Fistula-in-Ano. Anal Fissure.
76. Hemorrhoids.

II. UROLOGY

A. GENERAL UROLOGY

1. Symptomatology in urology- classification.
2. Urinary symptoms- classification.
3. Changes of voided urine
4. Haematuria.
5. Retention of urine.
6. Incontinence of urine.
7. Physical examination of the genitourinary tract.
8. Radiology of the urinary tract.
9. Urologic laboratory investigations. Sperm parameters.
10. Instrumental investigations in urology.
11. Biopsy in urology.
12. Ultrasound in urology.
13. Renal function tests.
14. Acute renal failure.
15. Hydronephrosis. Pyonephrosis.
16. Chronic renal failure.
17. Catheterization of the urinary bladder. Suprapubic drainage of urine (Cystofix).
18. Overactive bladder.
19. Percutaneous Endourology. Ureterorenoscopy.
20. Urinary Obstructions. Stasis.

21. Bacterial and specific infections of the Genitourinary tract. Sexually transmitted diseases. Urosepsis.
22. Mechanism of normal micturation, Neural circuits controlling storage and expulsion of urine.
23. Urodynamic studies.
24. Urinary Obstruction. Stasis of urine.
25. Renal transplantation- general aspects.

B. SPECIAL UROLOGY

26. Congenital anomalies of the kidney.
27. Congenital anomalies of the ureter.
28. Congenital anomalies of the bladder.
29. Congenital anomalies of the urethra.
30. Congenital anomalies of the testis.
31. Congenital anomalies of the penis.
32. Trauma to the kidney.
33. Injury to the ureter.
34. Injury to the bladder.
35. Injury to the urethra.
36. Trauma to the scrotum.
37. Trauma to the penis.
38. Renal parenchymal neoplasms.
39. Wilm's tumor (nephroblastoma).
40. Urothelial carcinoma: cancers of the bladder, ureter, renal pelvis,
41. Benign prostatic hyperplasia(BPH).
42. Prostate cancer.
43. Germ cell tumors of the testis.
44. Tumors of the penis.
45. Inflammation of the epididymis and testis.
46. Torsion of the testis (torsion of spermatic cord).
47. Hydrocele. Varicocele.
48. Male infertility.
49. Nephrolithiasis- epidemiology, types of stones, specific risk factors for stone formation, pathophysiology.

50. Nephrolithiasis- clinical features, diagnosis, complications (classification), management (minimally invasive procedures).
51. Inflammation of the bladder- acute and chronic cystitis.
52. Inflammation of the prostate (prostatitis).
53. Disorders of ejaculation.
54. Male sexual dysfunction- physiology of penile erection (inervation of the penis, anatomy and hemodynamics of penile erection, mechanism of penile erection). Erectile dysfunction.
55. Male reproductive system- organs involved in the production of semen. Path of sperm transport.

ORTHOPEDICS.

1. Torticollis
2. Paralysis obstetrica
3. Congenital dysplasia of the hip joint
4. Congenital dysplasia of the hip joint in walking children
5. Coxa vara. Epyphysiolysis adolescentia. Coxa valga
6. Deformities and diseases of the knee joint (genu varum, genu valgum, chondrodystrophia patellae, luxatio patellae)
7. Rachitis deformities
8. Pes equinovarus
9. Scoliosis. Kyphosis. Lordosis
10. Diseases of the muscles and their insertions due to fatigue
11. Diseases of the tendons.
12. Periarthritis of the shoulder joint
13. Pes planovalgus
14. Perte disease
15. Aseptic necroses
16. Osteochondritis dissecans of the knee joint
17. Bone tumors
18. Degenerative joint diseases (coxarthrosis and gonarthrosis)
19. Central paralysis. Peripheral paralysis
20. Fractures- in general
21. Pathological fractures
22. Spine fractures. Dislocation of the spine
23. Fractures of the pelvis

24. Pertrochanteric fractures
25. Fractures of the femoral neck
26. Supracondylar fracture of the femur
27. Patellar fractures
28. Intraarticular fractures of the knee joint
29. Dyaphisal fractures of the tibia and fibula
30. Fractures of the ankles
31. Fractures of the dyaphysis of the humerus
32. Shoulder fractures
33. Surgical neck fractures of the humerus
34. Supracondylar fracture of the humerus
35. Fracture of the elbow (olecranon)
36. Fractures of the forearm
37. Colles fracture
38. Traumatic dislocations of the hip joint
39. Dislocation of the shoulder joint
40. Dislocation of the elbow joint
41. Soft tissue injuries of the knee joint
42. Fractures of the carpal, metacarpal bones and phalangeal fractures

ПРЕПОРЪЧВАНА ЛИТЕРАТУРА ЗА ОБУЧЕНИЕ ПО „СПЕЦИАЛНА ХИРУРГИЯ”:

1. Лекционен курс – Специална Хирургия.
2. Lecturer Course – Special Surgery.
3. Хирургия - Учебник за студенти по медицина / Ред. Мишев П.
4. Спешна хирургия – ред. Н. Ярёмов/ София : МИ „ Арсо” , 2011, 830с.
5. Ръководство по Гръдна хирургия : 23Т. – Ред. Д. Дамянов, Ред. на Том Данаил Петров, / София : А. И. « М. Дринов « 2011,
6. Хирургия : Учебник за студенти по Медицина - Ред. Н. Ярёмов, / София : МИ « АРСО « 2011,
7. И. Новаков. Основни Клинични процедури. Изд. Медицински Университет – 2009.
8. И. Новаков. 112 Въпроса от Спешната Хирургия. Изд. „Медицински Университет” – Пловдив – 2011.
9. И. Новаков. „Ръководство за Практически Упражнения по Хирургия” – изд. „Медицински Университет” – Пловдив; 2011.
10. Специална хирургия под ръководството на проф. Я. Добрев – 1987г
„Хирургически болести” – под редакцията на проф. Ст. Баев – 1997г
11. Хирургически болести” – под редакцията на проф. Ст. Баев - 1995г
12. Ръководство за практически упражнения по клинична хирургия под редакцията на проф. Ст. Баев
13. Спешна хирургия под ръководството на А. Пинкас и Виячки - 1998г
Аноректални и чревни тумори – диагностика и лечение под редакцията на В. Димитров.
14. Essential of General Surgery – 2th ed. Williams&Wilkins; 1992.
15. Novakov I. “Selected Lectures in Special Surgery” – 2017.
16. Novakov I. “Questions & Answers in Special Surgery” – 2018.
17. Новаков И. „Закрита Гръдна Травма”. Медицински Университет – Пловдив 2019.
18. Новаков И. „Плеврални Изливи” . Медицински Университет – Пловдив 2019.

УЧЕБНАТА ПРОГРАМА НА ДИСЦИПЛИНАТА „СПЕЦИАЛНА ХИРУРГИЯ” ЗА ОБУЧЕНИЕ НА СТУДЕНТИ – МАГИСТРИ ПО „МЕДИЦИНА” Е ОБСЪДЕНА, АКТУАЛИЗИРАНА И ПРИЕТА НА КАТЕДРЕН СЪВЕТ – ПРОТОКОЛ №4/ ОТ 25.05.2022 г.

**MEDICAL UNIVERSITY -PLOVDIV
FACULTY OF MEDICINE**

**SYLLABUS
IN**

**CARDIAC AND VASCULAR SURGERY
Cycle of Specialized Surgeries exam**

Approved by the Department Council on 14.06.2022

Confirmed by the Faculty Council – Protocol №7/13.07.2022

CYCLE CARDIAC AND VASCULAR SURGERY

CURRICULUM

Discipline	Semester exam	Hours				Years and semester classes	
						4th course	V course
Cardiac and vascular surgery	VIII / IX	All	Lectures	Exercises	Credit	VIII	IX
		30	10	20	4,7*	2/4	2/4

* Credits are for Specialized Surgeries

Name of discipline:

"Cardiac and vascular surgery"

Type of discipline according to the uniform state requirements:

Mandatory

Level of qualification:

Master /M/

Forms of training:

Lectures, seminars, practicals, extra-auditory activity (self-preparation, making of referrals, etc.)

Year of training:

IV and V course medicine

Duration of training:

5 weeks

Academic hours:

10 hours of lectures and 20 hours of exercise

Technical equipment applied in the training:

Multimedia presentations, discussions, demonstration of patients, solving practical tasks, development of behavior algorithms and referrals on certain topics of the material

Forms of evaluation:

Current control, solving tests, working on referral

Evaluation criteria

Participation in discussions, solving tests, drafting a referral

Exam:

Yes /Part of specialized surgeries –complex test/

State exam:

No

Lecturer:

Habilitated lecturer from the Department of Cardiac and Vascular Surgery

Department:

Cardiac and vascular surgery

ANNOTATION

The training in cardiovascular surgery for medical students includes modern methods of physical and instrumental examination of patients with surgical diseases of the cardiovascular system. Basic knowledge of the principles of extracorporeal circulation and pacemaker. Surgical tactics in congenital and acquired cardiac surgery cases are considered, as well as modern opinions of diagnosis and treatment of ischemic heart disease. Main issues of acute and chronic arterial insufficiency – etiology, clinic, diagnostics, behavior. Vascular aneurysms – arterials, venous, true, false. Cardiovascular trauma, diagnosis and treatment. Acute and chronic venous and lymph-vascular insufficiency. Congenital defects of the development of vessels – blood and lymphatic. Modern tactics in patients with extracranial vessels disease. Carotid and vertebral arteries, jugular veins. Role of the endovascular methods of diagnosis and treatment. Principles of fibrinolytic, anticoagulant and anti-platelet therapy in patients with cardiovascular surgical diseases.

AIM OF THE DISCIPLINE

The aim of the training of the students in cardiovascular surgery is to introduce them to the basic principles of diagnosis and treatment tactics in patients with cardiovascular surgical diseases.

Students learn in time to navigate the very common cases of acute cardiac and vascular diseases, which require urgent diagnosis, initial procedures and transportation to the relevant specialized unit for continuing treatment, given that the time factor is often of crucial importance to the patient.

Students to be trained to perform some of the required life-saving procedures at first meeting with patients with cardiovascular surgical problems (acute cardiac tamponade, bleeding from a large blood vessel, sudden cardiac arrest, etc., which not every time can be demonstrated in practical classes but requires sufficient theoretical preparation).

TASKS OF THE DISCIPLINE

- Students to learn the basic physical and instrumental methods for diagnosis of the patients with acute and chronic cardiovascular surgical diseases.
- Be trained to perform basic and life-saving actions if necessary.
- To build and maintain a system of the most necessary knowledge concerning diagnosis and behavior in this category of patients.

TRAINING METHODS

Lecture course, practical exercises, seminar classes. During the undergraduate internship the students are capable of getting more practical knowledge for the treatment of the patients with cardiovascular diseases.

TECHNICAL MEANS APPLIED IN TRAINING

- Demonstration of specifics in the physical examination of the patient.
- Use and demonstration with the most common tools and apparatus in the diagnosis and treatment of patients.
- Display schemes, tables and photos demonstrating the studied matter.
- Use of modern audiovisual equipment
- Demonstration of clinical and intraoperative findings in rare and very interesting cases (live demonstration in operating rooms, showing films).

CONTROL AND EVALUATION

- *Ongoing control* – each exercise begins with oral interrogation.
 - *Final control* – complex test
- Control methods:** tests.

MANDATORY COMPETENCIES

- Students get basic theoretical knowledge and practical habits when examining patients with cardiovascular and surgical diseases: history of vascular disease, physical examination – especially palpation and auscultation of possible vessels, mastering the technique of mechanical hemostasis in bleeding from arterial and venous vessels, observance of the rules of asepsis and antiseptic in vascular injuries, prevention of progression of ischemia in acute cases.
- Students to gain theoretical knowledge, allowing them practical actions in carrying out life-saving manipulations and procedures (decompression in cardiac tamponade, stopping life-threatening bleeding, appropriate posture when transporting a sick person, etc.).
- Administration of life-saving medications in some situations such as acute thrombosis – arterial or venous, cardiac massage, use of defibrillation equipment, etc., as the earliest measure and further referral for continuation of treatment.

PROGRAM OF THE LECTURE COURSE CYCLE CARDIAC AND VASCULAR SURGERY

LECTURE No1 – 2 hours

ANATOMY OF THE HEART AND MEDIASTINUM.

EXAMINATION OF PATIENTS WITH CARDIOVASCULAR DISEASE

PRINCIPLES OF ECC (extracorporeal circulation) and PACEMAKER

LECTURE No2 – 2 hours

CONGENITAL HEART DISEASES.

ACQUIRED HEART DISEASES, ISCHEMIC HEART DISEASE– surgical aspects.

LECTURE No3 – 2 hours

DISSECTION AND ANEURYSM OF THE THORACIC AORTA.

LECTURE No4 – 2 hours

ACUTE AND CHRONIC ARTERIAL INSUFFICIENCY.

VASCULAR INJURIES

LECTURE No5 – 2 hours

ACUTE AND CHRONIC VENOUS INSUFFICIENCY (superficial and deep vein thrombosis, pulmonary thromboembolism, varicose disease, post thrombophlebitis disease, etc.)

CONGENITAL AND ACQUIRED LYMPH-VASCULAR INSUFFICIENCY. Modern surgical treatment.

**PROGRAM OF PRACTICAL EXERCISE
CYCLE CARDIAC AND VASCULAR SURGERY**

EXERCISE #1

CARDIAC SURGERY

ECC demonstration. Surgical approach in patients with congenital and acquired heart valve diseases and ischemic heart diseases –specific cases, demonstration and analysis, pattern of behavior.

EXERCISE #2

SURGICAL TREATMENT OF PERICARDIUM DISEASES (including puncture technique, permanent drainage, etc.)

TACTICS FOR RHYTHM AND CONDUCTION DISORDERS AND CARDIAC TRAUMA

EXERCISE #3

PHYSICAL AND INSTRUMENTAL EXAMINATION OF BLOOD VESSELS (palpation, auscultation, doppler examination, interpretation of rheography, plethysmography, angiography, etc.).

EXERCISE #4

EXAMINATION OF A PATIENT WITH ACUTE ARTERIAL INSUFFICIENCY (diagnosis and treatment tactics).

EXERCISE #5

CHRONIC ARTERIAL INSUFFICIENCY (etiology, clinic, diagnosis, treatment. Types of operations. Surgical tactics in the diseases of the extracranial vessels and Raynaud disease).

EXERCISE # 6

ANEURYSMS OF BLOOD VESSELS (types, clinic, diagnosis, behavior).

EXERCISE No7

DISEASES OF THE VENOUS SYSTEM (congenital, varicose disease, post thrombophlebitis disease, superficial and deep vein thrombosis – methods of diagnosis and treatment tactics).
PULMONARY THROMBOEMBOLISM (prevention, diagnosis, behavior).

EXERCISE #8

EXAMINATION OF A PATIENT WITH SURGICAL DISEASE OF THE LYMPHATIC SYSTEM (congenital and acquired lymphedema, elephantiasis – causes, diagnostics, conservative and operative treatment)..

EXERCISE #9

FIBRINOLYTIC AND ANTICOAGULANT TREATMENT IN VASCULAR SURGERY (indications, application technique, monitoring of the patient, possible complications and their prevention and treatment).

EXERCISE No10

ELECTROCARDIOSTIMULATION (indications, methods of implementation in outpatient and stationary conditions, control).

SYLLABUS FOR MEDICAL STUDENTS – IV-V COURSE – SPECIALIZED SURGERIES EXAM

CARDIOVASCULAR SURGERY

1. Anatomy of the heart and great vessels. Major vessels of the neck.
Mediastinum – definition, anatomy and contents.
2. Congenital heart defects - classification, diagnosis, surgery
3. Ischemic heart disease. Surgical treatment. Indications for myocardial revascularization. Arterial and venous bypass grafts
4. Surgical treatment of complications of acute myocardial infarction
5. Acquired valvular heart disease - etiology, diagnosis, operative technique, indications for surgery
6. Pulmonary embolism - etiology, clinical features, diagnosis, treatment
7. Aneurysms – classification, clinical manifestations, diagnosis, surgical treatment – indications
8. Acute aortic dissection - risk factors, classification, clinical manifestations, diagnosis, indications and operative techniques
9. Cardiac tumors – clinical manifestation, diagnosis and treatment
10. Cardio-vascular injuries - diagnosis and treatment. Iatrogenic injuries

11. Temporary and permanent electrocardiostimulation
12. Acute arterial insufficiency of the extremities and mesenteric arteries - clinical features, diagnosis, treatment
13. Chronic arterial occlusive disease of the extremities – clinical features, classification, diagnosis, operative techniques
14. Obliterating atherosclerosis, Thromboangiitis obliterans, diabetic angiopathy - specific features
15. Raynaud's disease, Raynaud syndrome

16. Superficial and deep thrombophlebitis. Phlegmasia cerulea dolens
17. Varicose disease - etiology, clinical manifestations, treatment
18. Postphlebotic syndrome. Paget–Schroetter disease – clinical features and treatment
19. Acute and chronic lymphatic insufficiency
20. Anticoagulant and fibrinolytic therapy in surgery – principles
21. Stenotic-obliterative diseases of extracranial arteries - surgical techniques

Resources:

1. *Lecture course*
2. *Manual of Cardiac and Vascular Surgery- 2019.*
3. *Cardiac Surgery, Kirklin/Barratt-Boyes, 4th edition*
4. *Rutherford's Vascular Surgery, 8th edition*
5. *Multimedia manual of cardiac surgery. (ctsnet.org)*

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
PEDIATRIC SURGERY

Approved by the Department Council on 17.05.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

PROGRAMME OF LECTURES & PRACTICAL CLASSES

Discipline: PEDIATRIC SURGERY

Speciality: MEDICINE

Course and Semesters of education: IV course-8th semester (II stream) и V course-9th semester (I stream)

Exam: after 9th semester

Hours of auditorium classes: 24 hours (8 hours lectures and 16 hours practical classes)

Lecturers: Professor Penka Steffanova, M.D., Ph.D.

Professor Alexander Yonkov, M.D., Ph.D.

Associate Professor Evgenii Moshekov, M.D., Ph.D.

PLAN OF EDUCATION

Form of classes	Hours of auditorium classes				Credits
	Week	8 th semester	9 th semester	Total	
Lectures	2	8	8	16	
Practical classes	4	16	16	32	
Total	6	24	24	48	

ANNOTATION: Pediatric surgery is an independent surgical discipline. The education in Pediatric surgery includes the most often diseases in infancy and childhood like congenital anomalies of oesophagus and diaphragm, congenital hypertrophic pyloric stenosis, congenital anomalies of small and large bowels, acute abdomen in children, acute inflammatory diseases, congenital anomalies of the abdominal wall, major tumors in infancy and childhood.

OBJECT OF DISCIPLINE: Theoretical and practical mastering of knowledges in the main pediatric surgical diseases and their treatment.

TASKS OF DISCIPLINE:

- Get acquaintance with the most often diseases in Pediatric surgery: etiology, pathogenesis, pathology, clinical presentation.

- Mastering of the diagnostic methods of examination in different nosologic units and their practical application.
- Get acquaintance and mastering of principals of treatment of pediatric surgical diseases.

METHODS OF EDUCATION:

- Practical classes at patient's bed, manipulation room, dressing room, operation hall.
- Lecture course

TECHNICAL MEANS USED IN EDUCATION: PPT presentations, tables, schemes, graphics and pictures, operational atlases, X- rays, photos, movies.

CONTROL AND EVALUATION:

- Current control – oral examination, colloquiums in sections;
- Final control - written exam, discussion with the examiner.

METHODS FOR KNOWLEDGE CONTROL:

- tests

OBLIGATORY COMPETITIONS:

1. Theoretical knowledge:

- Presentation of esophageal atresia and pyloric stenosis, methods for diagnosis and principles in operative treatment.
- Most common nosological entities leading to acute abdomen.
- Presentation and X-ray characteristics of pneumothorax and pyothorax
- Recognition of the meaning of prenatal diagnosis in newborn anomalies.
- Recognition of the features in transportation of children with congenital anomalies.
- Recognition of the terms for operative treatment of congenital anomalies.

2. Practical skills:

- Placement of nasogastric tube
- Performing of diaphanoscopy
- Performing of rectal exam

- Performing of thoracentesis
- Ablation of the foreskin
- Realization of preoperative preparation in prehospital dehydration and intoxication.

PROGRAMME OF THE LECTURE COURSE IN PEDIATRIC SURGERY

LECTURE N1 – 2 hours. HISTORY OF PEDIATRIC SURGERY. DISEASES OF ESOPHAGUS AND STOMACH.

1. Pediatric surgery as a detached surgical discipline.
2. Anatomophysiological features in children's age and their importance for surgical pathology
3. History of Pediatric surgery
4. History of Pediatric surgery in Bulgaria
5. Relations of Pediatric surgery with other medical branches
6. Esophageal atresia
7. Congenital pyloric stenosis

LECTURE N 2 – 2 hours. ACUTE ABDOMEN IN CHILDREN – ACUTE APPENDICITIS, INTUSSUSCEPTION, INCARCERATED INGUINAL HERNIA.

1. Acute appendicitis in children
2. Intussusception
3. Incarcerated inguinal hernia in children

LECTURE N 3 – 2 hours. ANORECTAL MALFORMATIONS.

1. Forms of anorectal malformations.
2. Presentation and diagnosis.
3. Principles and stages of non operative and operative treatment. Algorithm of conduct.

LECTURE N 4 – 2 hours. MOST COMMON CONGENITAL ANOMALIES IN CHILDHOOD.

1. Congenital diaphragmatic hernia.
2. Classification of congenital intestinal atresia, presentation, diagnosis and treatment.
3. Meconium ileus.
4. Gastrointestinal duplications.

PROGRAM OF OF PRACTICAL CLASSES IN PEDIATRIC SURGERY

PRACTICAL CLASS N1 – 2 hours. CONGENITAL DISEASES OF ESOPHAGUS AND DIAPHRAGM.

1. Esophageal atresia.
2. Congenital tracheoesophageal fistula
3. Congenital esophageal stenosis
4. Esophageal diverticula
5. Chagas disease of the cardia
6. Achalasia of the cardia

PRACTICAL CLASS N2 – 2 hours. CONGENITAL DISEASES OF THE ABDOMINAL WALL.

1. Omphalocele – presentation, diagnosis, differential diagnosis, treatment.
2. Gastroschisis– presentation, diagnosis, treatment.
3. Hernias– presentation, diagnosis, treatment.
4. Urinary bladder extrophy– presentation, diagnosis, treatment.

PRACTICAL CLASS N 3 – 2 hours. CONGENITAL DISEASES OF THE STOMACH AND GERD.

1. Congenital hypertrophic pyloric stenosis.
2. Gastroesophageal reflux– presentation, diagnosis, conservative and operative treatment.

PRACTICAL CLASS N4 – 2hours. CONGENITAL DISEASES OF THE SMALL INTESTINE.

1. Congenital diseases of the duodenal segment with symptoms of complete and incomplete bowel obstruction.
2. Congenital disease – atresias and stenoses of the small intestine.
3. Surgical complications of Meckel's diverticulum.
4. Meconium ileus.

PRACTICAL CLASS N5 – 2 hours. CONGENITAL DISEASES OF THE LARGE INTESTINE.

1. Congenital disease – atresias and stenoses of the large intestine
2. Hirschsprung's disease
3. Anorectal anomalies

PRACTICAL CLASS N6 – 2 hours. ACUTE ABDOMEN IN CHILDHOOD – ACUTE APPENDICITIS, INTUSSUSCEPTION, INCARCERATED INGUINAL HERNIA.

1. Definition. Criteria.
2. Classification of the diseases in “Acute abdomen” group.
3. Features of acute abdomen in childhood
4. Presentation.
5. Laboratory studies of acute abdomen.
6. Imaging studies of acute abdomen.
7. Disguises of acute abdomen.
8. Treatment – non operative and operative.

PRACTICAL CLASS N7 – 2 hours. ACUTE INFLAMMATORY DISEASES IN CHILDHOOD – NECTROTIC PHLEGMON, ANAEROBIC INFECTION, EMPYEMA, ACUTE OSTEOMYELITIS.

1. Definition
2. Agents – characteristics
3. Presentation – syndrome characteristics.
4. Methods of treatment
5. Features of acute haematogenous osteomyelitis in childhood – principles of early diagnosis, most common mistakes, X-ray, principles of treatment.

PRACTICAL CLASS N8 – 2hours. TUMORS IN CHILDHOOD.

1. Wilms’s tumor.
2. Neuroblastoma.
3. Rhabdomyosarcoma.

SYNOPSIS - PEDIATRIC SURGERY

1. Esophageal atresia
2. Congenital diaphragmatic hernia
3. Hypertrophic pyloric stenosis
4. Congenital impassability of the duodenum
5. Congenital impassability of the small intestine
6. Hirschsprung’s disease
7. Anorectal malformations
8. Intussusception
9. Meckel’s diverticulum and its complications
10. Acute appendicitis in childhood

11. Bacterial destructive lung disease
12. Acute osteomyelitis in childhood
13. Congenital anomalies of the abdominal wall
14. Solid tumors in childhood

LITERATURE:

1. Ръководство по хирургия с атлас, том XIII-Детска хирургия, под редакцията на проф. О. Бранков, Академично издателство „Проф. М. Дринов”, София, 2011 г.
2. Учебник по Детска хирургия, под редакцията на проф. Ив. Иванчев, Медицина и физкултура, София 1988г.
3. Учебник по Детска хирургия, под редакцията на проф. д-р Д. Арnaudов, Медицина и физкултура, София ,1978г.
4. Internet – Pediatric surgery, 6th edition, Jay Grosfeld et all, Mosby, 2006.
5. Internet – Pediatric surgery, P. Puri, M. Hollwarth ed. Springer, 2006.

The programme is actualized on February 2022 and accepted on a chair meeting. The education programme is considered with students' suggestions.

КС №4/17.05.22

MEDICAL UNIVERSITY- PLOVDIV
FACULTY OF MEDICINE
DEPARTMENT OF NEUROSURGERY

CURRICULUM
“Neurosurgery”

/Included in the cycle of Specialized Surgeries/

**Approved by the Department Council with Protocol №2/11.05.2022 and
Faculty Council with Protocol №6/15.06.2022**

NEUROSURGERY

CURRICULUM

Discipline	Final exam/ semester	Auditorium classes (hours)				ECTS non- auditorium classes	ECTS total	Academic hours in years and semesters			
		Total	Lectures	Practices	ECTS			IV year VIII sem		V year IX sem	
Neurosurgery /part of *Specialized surgeries/	VIII/IX	24	8	16	3.0 *	1.7*	4.7*	L 2 weekly	T 4 weekly	L 2 weekly	T 4 weekly
Neurosurgery /part of Neurology/	VIII	8	4	4				IV year VIII sem. L 2 weekly	T T 2 weekly		

* ECTS Credits are for Specialized surgeries

Name of discipline:

“Neurosurgery”

Type of discipline according to EDA:

Compulsory

Degree of education:

Master /M/

Teaching methods:

Lectures, seminars, tutorials, additional activities (self-preparation, preparation of presentations, etc.)

Years of education:

IV and V year (course)

Duration of teaching:

Four weeks

Horarium for Neurosurgery as part of Specialized Surgeries:

8 hours lectures, 16 hours tutorials

Horarium for Neurosurgery as part of Neurology:

4 hours lectures, 4 hours tutorials

Teaching facilities:

Multimedia presentations, discussions, demonstrations of patient-based cases, solving practical tasks, elaboration of behavioral algorithms and abstracts on certain topics

Assessment forms:

Ongoing evaluation during the semester, solving clinical cases, preparation of essay

Grading:

An average grade is formed from the grades of the tutorials, the written and oral exam

Aspects of grading:

Participation in discussions, test solving, making an essay

Semestrial exam:

Yes/ Part of the Specialized Surgeries - written and oral exam.

State exam:

No

Leading lecturer:

Habilitated lecturer from the Department of Neurosurgery

Department:

Neurosurgery

ANNOTATION

Neurosurgery is a specialized medical discipline, combining knowledge of the human nervous system, neurology, surgery, radiology, traumatology, oncology and others. Neurosurgery deals with the surgical treatment of diseases and anomalies of the central and peripheral

nervous system, which represent social and personal issue. Neurosurgery is a discipline that has made a tremendous progress for the last 20-30 years.

DISCIPLINE OBJECTIVES

Medical students have to get familiar with the nature and the need of specialized neurosurgical care as well as with the resources and knowledge necessary for its implementation.

DISCIPLINE TASKS

Medical students have to learn the clinical presentation, diagnosis and contemporary treatment methods of the basic neurosurgical diseases –injuries, tumors, vascular diseases, inflammatory and parasitic diseases of the central nervous system, spondylogenic myelopathies and radiculopathies, hydrocephalus, etc. The main emphasis is put on the emergency conditions in neurosurgery and the actions needed for their management.

EXPECTED RESULTS

1. Students have to be able to give life-saving help for patients with central nervous system trauma.
2. Students have to be able to identify life-threatening neurosurgical diseases, and to be able to perform timely and adequate actions for their prevention.
3. Students have to be able to recognize the basic neurosurgical diseases in outpatient setting.
4. Students have to be able to prescribe the necessary studies and to direct patients for treatment in specialized neurosurgical unit.
5. Students have to obtain the necessary competence to avoid complications before the admission of patients to specialized neurosurgical unit.
6. Students have to be able to make a prognosis and to be informed for the contemporary methods of treatment of neurosurgical diseases.
7. Students have to be able to follow-up neurosurgical patients in the postoperative period and to avoid possible complications.

LECTURES PROGRAMME

Neurosurgery Cycle (part of Neurology)

LECTURE № 1 /2 hours/

NEUROONCOLOGY

1. Intracranial tumors:

- Classification of intracranial tumors.
- Focal (local) syndrome according to tumor location.
- Syndrome of increased intracranial pressure.
- Brain dislocation syndromes (types of brain herniations) - diagnosis and treatment.
- Syndromes of tumors with specific location:
 - ✓ Pituitary gland adenoma
 - ✓ Craniopharyngioma
 - ✓ Optic nerve glioma
 - ✓ Intraventricular tumors
 - ✓ Cerebello-pontine angle tumors
- Neuroradiological diagnosis of intracranial tumors.
- Clinical presentation of intracranial tumors in children.
- Treatment of intracranial tumors. Contemporary treatment methods - options and advantages.
- Prognosis for different types of intracranial neoplasms.

Aim of teaching: Students have to be able to recognize different types of intracranial tumors, their pathophysiology, clinical presentation according to their location in the brain, the contemporary imaging diagnosis and treatment. Students should be aware of the urgent indications for surgical treatment of intracranial tumors as well as with the prognosis of the different types of tumors.

2. Tumors of the spine and spinal cord:

- Syndromes of spinal cord compression – in relation to the region of the spinal cord, the site of the spinal cord compression
- 2.2. Classification of spinal cord tumors – according to location and histology.
- Possibilities for early outpatient diagnosis.
- Neuroimaging - features.
- Contemporary treatment methods.
- Stable and unstable spinal segment.
- Disease prognosis and outcome.

Aim of teaching: Students should be able to differentiate different types of spinal tumors according to the region of spinal cord compression. They should be able to diagnose the location of the tumors, to give first aid and to be familiar with the diagnostic and treatment options.

3. Peripheral nerve tumors:

- Types of peripheral nerve tumors.
- Clinical presentation according to the damaged nerve.
- Diagnosis and treatment (conservative and surgical)

Aim of teaching: Students should be able to diagnose peripheral nerves tumors in a timely manner, so they can direct the patient for specialized treatment.

LECTURE № 2 /2 hours/

HEAD INJURIES

1. Closed head injuries:

1.1. Cerebral concussion:

- Clinical presentation, diagnosis and treatment

Aim of teaching: Students have to get acquainted the pathophysiological mechanisms of the head trauma, causing the specific clinical presentation. They should be aware of the risks if the diagnosis of intracranial hematoma is delayed. Students should be familiar with the medico-legal aspects and consequences of omitted intracranial hematomas.

1.2. Cerebral contusion

- Grades
- Pathophysiological mechanisms
- Clinical presentation, diagnosis and treatment

Aim of teaching: Students have to be familiar with the Glasgow Coma Scale for assessment of consciousness and the severity of brain contusions. They should be able to give first aid, recognize primary and secondary brain damage, and apply the necessary adequate therapeutic measures.

1.3. Intracranial hematomas and subdural hydroma

- Types of intracranial hematomas
- Pathophysiological mechanisms
- Location
- Specific imaging studies for differentiating the type of intracranial hematoma
- Subdural hydroma- mechanism of development and diagnosis

- Treatment of traumatic intracranial hematomas and subdural hematoma

Aim of teaching: Students should be able to differentiate the types of traumatic intracranial hematomas and their clinical presentation. They should know the stages of development of different types of hematomas and for their surgical treatment.

2. Skull fractures:

- Fractures of the cranial vault – linear and comminuted fractures (impression and depression fractures). Imaging diagnosis, possible complications, treatment.
- Fractures of the cranial base- possible complications (nasoliquorrhea and otoliquorrhea) and treatment.
- Diagnosis.

3. Opened and penetrating head injuries:

- Types.
- Clinical presentation.
- Diagnosis.
- Treatment.
- Possible complications.

Aim of teaching: Students should know the different types of skull fractures, possible complications and their treatment. They should be able to recognize opened and penetrating head injuries and the necessary therapeutic measures.

4. Long-term complications of head injuries:

- Posttraumatic cerebrasthenia.
- Posttraumatic encephalopathy.
- Posttraumatic epilepsy.
- „Growing skull fracture“.
- Terms for developing of complications.
- Clinical presentation, diagnosis and treatment

Aim of teaching: Students should be able to predict the possible development of long-term complications of head trauma, so they can take measures to prevent them. They should know the clinical presentation of the long-term complications, the diagnosis and treatment.

TUTORIALS PROGRAMME
Neurosurgery cycle (part of Neurology)

TUTORIAL № 1 /2 hours/

INTRACRANIAL TUMORS

1. Classification of intracranial tumors according to:
 - Histology
 - Origin
2. Topographical characteristics of intracranial tumors in relation to:
 - Tentorium cerebelli.
 - Brain parenchyma.
 - Cerebral vasculature
 - CSF pathways.
 - Eloquent and non-eloquent brain areas
3. Focal neurourological symptoms according to the location of intracranial tumors
4. Clinical presentation of increased intracranial pressure
5. Brain herniations - clinical presentation and treatment
6. Neuroradiological diagnosis (CT, MRI and carotid angiography) – indications, procedure description, typical imaging findings.
7. Treatment - types and timing of surgical treatment, necessity of postoperative chemotherapy and radiotherapy.
8. Advantages of contemporary radiosurgery- Gamma and Cyber knife

TUTORIAL № 2 /2 hours/

HEAD INJURIES

1. Closed head injuries – definition, epidemiology, types
 - 1.1. Cerebral concussion:
 - Pathophysiology
 - Clinical presentation
 - Treatment

Students should know that a 24-hours observation period is necessary in order to rule out the development of intracranial hematomas.

- 1.2. Cerebral contusion:
 - Biomechanics of brain contusions.

- Pathophysiology of primary brain injury (coup, contre coup and diffuse axonal injuries) and secondary brain injury (cytotoxic and vasogenic brain edema).
- Syndromes of brain dislocation.
- Treatment of secondary brain injury.
- Evaluation of the unconscious state of patients and the severity of head injury according the Glasgow Coma Scale

Students should know that the treatment of brain contusion aims at reducing the impact from secondary brain injury.

1.3. Cerebral compression:

- Types of traumatic intracranial haematomas (epidural, subdural and intracerebral)
- Source of bleeding.
- Location.
- Time for clinical presentation of intracranial haematoma.
- Clinical presentation and its characteristics.
- Neuroradiology - characteristics of images of the different types of intracranial hematomas.
- Timing of surgical treatment.

1.3.2. Subdural hydroma:

- Pathophysiology, clinical presentation, diagnosis and treatment.

2. Skull fractures:

2.1. Fractures of the cranial vault – linear and comminuted fractures (depressed fractures).

- Diagnosis and treatment.

2.2. Fractures of the cranial base

- Possible complications (nasoliquorrhea, otoliquorrhea and pneumocephalia)
- Routes of CSF leakage.
- Imaging diagnosis and treatment

3. Opened and penetrating skull and brain injuries:

3.1. Types.

- Characteristics of injury according to the damaging agent.
- Clinical presentation, diagnosis and treatment.
- Late complications.

4. Long-term complications of head injuries:

- Posttraumatic cerebraesthesia- clinical presentation, diagnosis and treatment.
- Posttraumatic encephalopathy- clinical presentation, diagnosis and treatment.
- Posttraumatic epilepsy- clinical presentation, diagnosis and treatment.
- „Growing skull fracture“- clinical presentation, diagnosis and treatment.

- Prophylaxis of posttraumatic complications.
- Clinical presentation, diagnosis and treatment

LECTURE PROGRAMME

Neurosurgery cycle (part of Specialized Surgeries)

LECTURE № 1 /2 hours/

SPINAL INJURIES. PERIPHERAL NERVE INJURIES

1. Spinal injuries:

- Classification.
- Types of spinal injuries according to the damage of the vertebral column.
- Types of spinal cord injuries - specific syndromes.

2. Specific spinal cord injuries:

- Injuries of the occipito-atlanto-axial complex - types, mechanism, clinical presentation, diagnosis and treatment.
- Subaxial cervical injuries- types, mechanism, clinical presentation, diagnosis and treatment.
- Thoracic, thoraco-lumbar and lumbar injuries - types, mechanism, clinical presentation, diagnosis and treatment.
- Stable and unstable fractures - diagnosis and treatment.

Aim of teaching: Students should be aware of the first aid and the adequate transportation procedures for patients with spinal injury. They should be able to locate the spinal injury and to be familiar with the options for imaging diagnosis and treatment.

3. Peripheral nerves injuries:

- Types of peripheral nerve injuries according to the mechanism.
- Stages of nerve damage.
- Diagnosis.
- Terms and types of surgical treatment.

Aim of teaching: Students should know the clinical presentation of the damaged peripheral nerve and be aware of the timing of surgery for the different peripheral nerve injuries according to the mechanism and severity of the trauma.

LECTURE № 2 /2 hours/

SPNDYLOGENIC MYELOPATHY AND RADICULOPATHY. NEURALGIA. HYDROCEPHALUS.

I. Spondylogenic myelopathy and radiculopathy

1.1. Types of disc disease according to:

- Affected spinal segment.
- Type of disc herniation.
- Severity of disc herniation.

1.2. Pathophysiological mechanisms of disc degeneration.

1.3. Clinical presentation of the different types of disc disease.

1.4. Contemporary neuroimaging diagnosis.

1.5. Types of treatment. Indications for surgical treatment - urgent and elective, differential diagnosis

2. Types of spinal stenosis according to:

- Time for occurrence.
- Affected spinal segment.

2.2. Clinical presentation of spinal stenosis:

- Lumbar spinal stenosis.
- Cervical spinal stenosis.
- Thoracic spinal stenosis.

2.3. Differential diagnosis between herniated disc and spinal stenosis.

2.4. Neuroimaging diagnosis.

2.5. Treatment options depending on the type of spinal stenosis.

Aim of teaching: Students should be able to differentiate the clinical presentation of spinal stenosis and herniated disc, the type of the surgical treatment needed and the timing for its implementation.

3. Degenerative spondylolisthesis:

- Pathophysiology
- Location.
- Clinical presentation, diagnosis and treatment.

Aim of teaching: Students should know the clinical presentation of the disease and the treatment options.

II. Neuralgias and hydrocephalus:

1. Trigeminal neuralgia:

- Etiology.
- Types of trigeminal neuralgia according to the causative agent.
- Clinical presentation and diagnosis.
- Contemporary treatment options.

2. Glossopharyngeal neuralgia:

- Etiology.
- Clinical presentation, diagnosis and treatment

Aim of teaching: Students have to differentiate neuralgias from other similar pain syndromes. They should be able to direct the patients for treatment in a timely manner.

2. Hydrocephalus:

- Congenital hydrocephalus.
- Obstructive hydrocephalus.
- Normal pressure hydrocephalus.
- Difference in the clinical presentation of hydrocephalus a/ in infants, b/ in children, c/ in adults.
- Clinical presentation of normal pressure hydrocephalus.
- Diagnosis.
- Treatment - methods, indications for elective and urgent surgical treatment.

Aim of teaching: Students should know the different types of hydrocephalus and their etiology. They should be able to accurately diagnose the disease and the patients for surgical treatment before occurrence of irreversible complications.

LECTURE № 3 /2 hours/

VASCULAR DISEASES OF THE CENTRAL NERVOUS SYSTEM

1. Spontaneous intracerebral hematomas (non-traumatic, hypertensive):

- Incidence.
- Epidemiology.
- Pathophysiology of brain tissue damage - syndromes.
- Clinical presentation according to the location.
- Diagnosis and treatment.
- Prognosis.

2. Intracranial aneurysms:

- Types of aneurysms.
- Location.
- Clinical presentation according to the location of the aneurysm and the subarachnoid hemorrhage distribution.
- Contemporary neuroimaging diagnosis.
- Indications and contraindications for surgical treatment.
- Timing of surgery.
- Alternative treatment methods – endovascular coiling.

3. Cerebral arterio-venous malformations /AVMs/:

- Types.
- Epidemiology.
- Clinical presentation of non-ruptured and ruptured AVM.
- Diagnosis.
- Treatment- conservative, surgical, endovascular, radiosurgery.

Aim of teaching: Students should be able to differentiate spontaneous intracerebral hematoma and subarachnoid hemorrhage, hypertensive and non-hypertensive intracerebral hematoma. They should be able to direct the patient in a timely manner to specialized neurosurgical unit for diagnosis and treatment. Students should know the indications and contraindications for surgical treatment. They should know the difference in the clinical presentation between AVM and intracerebral aneurysm and the different types of treatment of these diseases.

LECTURE № 4 /2 hours/

INFLAMMATORY AND PARASITIC DISEASES OF THE CENTRAL NERVOUS SYSTEM

1. Inflammatory diseases of the central nervous system:

1.1. Posttraumatic meningitis:

- Pathophysiology.
- Etiology.
- Clinical presentation.
- Diagnostics and treatment.

1.2. Subdural empyema and epidural abscess.

- Etiology, path of transmission.
- Clinical presentation.

- Diagnostics and treatment.

1.3. Cerebral abscess.

- Etiology, path of transmission.
- Clinical presentation.
- Diagnostics and treatment.
- Indications and contraindications for operative treatment.

1.4. Inflammatory diseases of the brain and spine.

- Etiology.
- Paths of contamination.
- Clinical presentation, diagnostics and ways of treatment.

Aim of teaching: Students should be aware of the risks for possible infection after opened and penetrating head injury. They should be familiar with the options for prophylaxis, etiology, epidemiology, pathology and the treatment of brain abscesses. Indications and contraindications should be outlined. They should be able to diagnose or rule out the presence of spinal infection.

2. Parasitic diseases of CNS

2.1. Brain echinococcosis

- Etiology.
- Pathology.
- Clinical presentation and course.
- Laboratory tests.
- Diagnostics and treatment.

2.2. Spinal echinococcosis

- Etiology
- Disease course
- Clinical presentation
- Laboratory tests and diagnostics
- Treatment

2.3. Brain cysticercosis:

- Etiology
- Pathology
- Clinical presentation
- Types
- Laboratory tests
- Diagnostics and treatment

2.4. Brain toxoplasmosis:

- Etiology
- Path of transmission
- Types and pathology
- Clinical presentation
- Laboratory tests
- Diagnostics and treatment

Aim of teaching: Pathology and the localization of the parasitic diseases should be known and the students should be familiar with etiology, clinical presentation, types, diagnostics and treatment of the diseases.

TUTORIAL PROGRAMME

Neurosurgery (part of Specialized Surgeries)

TUTORIAL № 1 /2 hours/

INTRACRANIAL TUMORS

1. Classification of intracranial tumors:

- Histological
- In relation to tentorium cerebelli
- In relation to brain parenchyma
- In relation to functionally eloquent and non- eloquent brain areas
- In relation to major intracranial vessels

- In relation to the ventricular system.
2. Syndromes caused by intracranial tumors – increased intracranial pressure and focal neurological deficit.
 3. Dislocation phenomena – types of brain herniation, clinical and diagnostic characteristics.
 4. Initial symptoms of brain neoplasms in relation to their localization in eloquent or non-eloquent areas.
 5. Type of symptoms – excitatory (epileptic seizures), focal neurological symptoms and symptoms of increased intracranial pressure – their characteristics in cases with intracranial neoplasms.
 6. Clinical syndromes in tumors with specific localization:
 - Pituitary adenomas
 - Craniopharyngiomas
 - Optic nerve glioma
 - Intraventricular tumors
 - Cerebellopontine angle tumors
 7. Modern imaging methods (computed tomography, magnetic resonance tomography and angiography) – when and how they should be performed and interpreted.
 8. Principles of surgical treatment – options for different kinds of tumors, necessity of subsequent radiotherapy and chemotherapy. Advantages and indications of the most contemporary treatment (gamma knife and cyber knife).
 9. Postoperative course – what to do, what to follow and how to react.
 10. Characteristics of pediatric brain tumors.
 - Types – specific onset and disease course.
 11. Brain metastases:
 - Specificity of brain metastases.
 - Localization.
 - Indications and contraindications for surgical intervention.

- Options for surgical treatment

TUTORIAL № 2 /2 hours/

SPINE AND SPINAL CORD TUMORS

1. Classification
2. Types of clinical syndromes in relation to:
 - The level of damage of the spinal cord
 - Tumor location according to the axial section of the spine
3. Differences in the onset and clinical presentation of spinal cord tumors
4. Diagnostic methods – clinical, laboratory and imaging
5. Treatment of spinal cord tumors and their prognosis
6. Metastatic tumors of the spine and spinal cord:
 - Paths of metastasizing
 - Clinical course before and after spinal cord decompression
 - Types of treatment:
 - ✓ In cases without neurological symptoms
 - ✓ In cases with neurological symptoms
7. Tumors of the peripheral nerves
 - Incidence
 - Types
 - Localization
 - Recklinghausen's disease
 - Clinical presentation, diagnostics and treatment

TUTORIAL № 3 /2 hours/

HEAD INJURIES

1. Closed head injuries
 - Definition
 - Epidemiology
 - Types
2. Cerebral concussion
 - Pathophysiology
 - Clinical presentation and treatment

Aim of teaching: Students must be aware that patients need to be strictly observed in the first 24 hours due to possible formation of intracranial hematoma with fatal consequences.

3. Cerebral contusion

- Biomechanics
- Types and pathophysiology of primary brain damage (coup, contre coup and diffusional axonal injury), as well as secondary brain damage (cytotoxic and vasogenic swelling/edema).
- Dislocation syndromes
- Glasgow Coma Scale for assessment of the level of depressed consciousness and severity of the sustained head injury.
- Treatment of secondary brain damage

Aim of teaching: Students have to know that the treatment of cerebral contusion should be aimed at controlling and minimizing secondary brain damage.

4. Cerebral compression

4.1. Traumatic intracranial hematomas

- Pathology
- Localization
- Acuteness of development
- Clinical presentation and its characteristics
- Neuroimaging studies – imaging specifications of different types of hematomas
- Timing of treatment

4.2. Subdural hydroma

- Pathophysiology
- Clinical presentation, diagnostics and treatment

5. Skull fractures:

- Fractures of the cranial vault - linear and comminuted (depressed)
- Diagnostics and treatment

6. Skull base fractures:

- Possible complications (liquorhhea and pnemocephalus) – according to fracture localization
- Imaging and treatment

7. Opened and penetrating head injuries:

- Types
- Characteristics (according to the damaging agent)
- Clinical presentation, diagnostics and treatment
- Late complications

TUTORIAL № 4 /2 hours/

SPINE AND SPINAL CORD INJURIES. PERIPHERAL NERVE INJURIES

1. Spine injuries
 - Classification
 - Types injuries to the vertebrae and ligaments
2. Spinal cord injuries
 - Types – syndromes
 - Pathophysiology
 - Clinical presentation in relation to level of injury
3. Specific spinal injuries
 - Occipito-atlanto-axial injuries – types, biomechanics, clinical presentation, diagnostics and treatment
 - Subaxial cervical injuries - types, biomechanics, clinical presentation, diagnostics and treatment
 - Thoracolumbar injuries - types, biomechanics, clinical presentation, diagnostics and treatment
 - Stable and unstable fractures – diagnostics and treatment
 - types, biomechanics, clinical presentation, diagnostics and treatment

Aim of teaching: Students have to pay attention to the following factors – first aid at the site of incident, immobilization of the patient and his/her proper transportation.

4. Peripheral nerves injuries:

4.1. Injury to brachial plexus

- Types
- Clinical presentation
- Diagnostic tests
- Therapeutic options

4.2 Injury to peripheral nerves:

- Clinical presentation (according to the affected nerve)
- Diagnostics
- Treatment - timing
- Types of operative interventions

Aim of teaching: Students have to know that the primary revision of the wound is extremely important– it could prevent additional nerve damage.

TUTORIAL № 5 /2 hours/

VASCULAR DISEASES OF THE BRAIN

1. Spontaneous intracerebral hematomas (hypertensive):

- Incidence
- Epidemiology
- Pathophysiology of brain damage – syndromes
- Clinical presentation of stroke, depending on the localization of hemorrhage
- Diagnostics
- Indications and timing of operative treatment and prognosis

2. Cerebral aneurysms:

- Types of aneurysms
- Localization
- Clinical presentation depending on aneurysm localization and severity of hemorrhage
- Contemporary neuroimaging studies (CT and MRI angiography, conventional DSA angiography).
- Recurrent bleedings
- Indications and contraindications for operative treatment
- Timing of surgery
- Alternative methods of treatment – endovascular coiling

3. Arteriovenous malformations /AVMs/:

- Epidemiology
- Types and incidence
- Clinical presentation of ruptured and non-ruptured AVM
- Diagnostics
- Treatment options– conservative, operative, endovascular and radiosurgery.

Students should be aware of the different symptoms between AVM and cerebral aneurysms.

TUTORIAL № 6 /2 hours/

INFLAMMATORY AND PARASITIC DISEASES OF CNS

I. Inflammatory diseases of CNS

1.1 Posttraumatic meningitis

- Pathology
- Most frequent causative agents
- Clinical presentation, diagnostics (laboratory tests) and treatment

Aim of teaching: Students should know that skull base fractures with liquorrhea might cause serious infectious complications.

2. Subdural empyema and epidural abscess

- Pathology
- Clinical presentation, diagnostics and treatment

3. Cerebral abscess

- Etiology
- Path of transmission
- Clinical presentation
- Neuroimaging diagnostics
- Types of treatment – indications and contraindications for operative treatment

4. Inflammatory diseases of the spine and spinal cord

- Etiology
- Pathology
- Clinical presentation, imaging, types of treatment – indications and contraindications

II. Parasitic diseases of CNS

1. Brain echinococcosis
 - Disease course
 - Clinical presentation
 - Laboratory tests and imaging
 - Treatment
2. Echinococcosis of the spine and spinal cord
 - Path of disease
 - Clinical presentation
 - Laboratory tests and imaging
 - Treatment
3. Brain cysticercosis
 - Etiology
 - Pathology
 - Types
 - Clinical presentation
 - Laboratory tests and imaging
 - Treatment
4. Brain toxoplasmosis
 - Etiology
 - Pathology
 - Forms of disease
 - Laboratory tests and imaging
 - Treatment.

TUTORIAL № 7 /2 hours/

DEGENERATIVE SPINE DISEASE (SPONDYLOGENIC MYELOPATHIES AND RADICULOPATHIES)

1. Disc herniation
 - Types of disc herniations depending on
 - ✓ Different parts of the spine
 - ✓ Location of the herniated nucleus pulposus
 - ✓ Stage of herniation
 - Clinical presentation of disc herniation depending on the affected spinal segment
 - Pathophysiology of disc degeneration
 - Modern imaging methods
 - Types of treatment
 - Indications for operative treatment – emergency and elective

Aim of teaching: Students should know the time frame between reversible and irreversible nerve root damage – especially in cases with cauda equina syndrome!

2. Spinal stenosis
 - Types in relation to
 - ✓ Time for clinical manifestation
 - ✓ Localization of narrowed structures
 - Differential diagnosis with disc herniations
 - Clinical presentation of:
 - ✓ Lumbar spinal stenosis
 - ✓ Cervical spinal stenosis
 - ✓ Thoracic spinal stenosis
 - Imaging methods
 - Treatment options
3. Degenerative spondylolisthesis
 - Pathophysiologic mechanisms of occurrence
 - Localization
 - Clinical presentation, imaging and treatment

TUTORIAL № 8 /2 hours/

NEURALGIA OF CRANIAL NERVES. HYDROCEPHALUS

1. Trigeminal neuralgia
 - Etiology
 - Types (depending on etiology)
 - Clinical
 - Contemporary therapeutic option (advantages and disadvantages)
2. Glossopharyngeal neuralgia
 - Etiology
 - Clinical presentation and treatment
3. Hydrocephalus
 - Types
 - ✓ Congenital
 - ✓ Obstructive hydrocephalus
 - ✓ Normal pressure hydrocephalus
 - Differences in the clinical presentation
 - ✓ In infants

- ✓ In childhood
- ✓ In adults
- Clinical presentation of normal pressure hydrocephalus /NPH/
- Diagnostic methods
- Treatment – methods, indications for emergency and elective surgery

CONSPECTUS - NEUROSURGERY

/within the Specialized Surgery Exam/

1. Head injuries – Classification. Biomechanics. Pathology, clinical presentation, diagnostics and treatment of: a/ cerebral concussion b/ cerebral contusion. Glasgow Coma Scale for the assessment of the level of depressed consciousness and severity of the sustained head injury.
2. Intracranial hematomas – epidural, subdural and intracerebral. Localization, sources of bleeding, types, clinical presentation (typical and atypical), imaging studies – typical findings, treatment. Subdural hydroma.
3. Skull fractures and penetrating head injuries: A/Skull fractures – fractures of the cranial vault (linear and comminuted). Skull base fractures and their complications (liquorhhea, pneumocephalus, etc.) – prophylaxis and treatment. Imaging studies. B/ Penetrating injuries to the brain – types, clinical presentation, diagnostics and treatment.
4. Spine injuries. Classification of spine and spinal cord injuries. Pathology of spinal cord injuries. Clinical syndromes of spinal cord trauma depending on the level of injury. Diagnostics and treatment of spine and spinal cord injuries- conservative and operative.
5. Intracranial tumors. Classification: a/ histological; b/ in relation to tentorium cerebelli; c/ in relation to brain parenchyma; d/in relation to functionally eloquent and non- eloquent brain areas; e/in relation to major intracranial vessels; f/ in relation to the ventricular system. Syndromes of increased intracranial pressure and focal neurological deficit – clinical presentation. Dislocation phenomena – types of brain herniation.
6. Intracranial tumors. Clinical presentation depending on the localization: a/frontal lobe tumors (intra- and extra-cerebral); b/temporal lobe tumors (intra- and extra-cerebral); c/ parietal lobe tumors (intra- and extra-cerebral); d/occipital lobe tumors (intra- and extra- cerebral).
7. Pituitary adenomas. Classification depending on the size, hormonal activity and

- localization of the tumor. Clinical presentation of intrasellar tumors. Clinical presentation of suprasellar tumors. Diagnostics. Treatment.
8. Subtentorial tumors. Tumors of the cerebellar hemispheres, vermis cerebelli and 4th ventricle. Cerebello-pontine tumors – neurinoma of the 8th cranial nerve – clinical presentation during different grades, diagnostics and treatment.
 9. Spinal cord tumors. Classification. Clinical syndromes depending on the tumor localization: a/ intramedullary and extramedullary tumors; b/ in relation to the level of the lesion c/ in relation to spinal cord section. Diagnostics and treatment.
 10. Vascular diseases of the brain. Spontaneous intracerebral hematomas. Etiology and epidemiology. Clinical presentation depending on the localization. Diagnostics and treatment.
 11. Vascular diseases of the brain. Cerebral aneurysms and arteriovenous malformations. Etiology and epidemiology. Localization. Types of aneurysms and AVMs. Clinical presentation of ruptured aneurysm. Clinical presentation of AVM- before and after bleeding. Differential diagnosis between aneurysms and AVMs. Diagnostics and treatment.
 12. Inflammatory diseases of the brain. Posttraumatic meningitis. Subdural empyema and epidural abscess. Cerebral abscess. Etiology, path of transmission. Clinical presentation. Diagnostics and treatment.
 13. Parasitic diseases of CNS. Echinococcosis – etiology, clinical presentation, diagnostics and treatment. Cysticercosis – etiology, clinical presentation, diagnostics and treatment. Toxoplasmosis – etiology, clinical presentation, diagnostics and treatment.
 14. Degenerative spine disease. Disc herniations. Etiology and pathology. Stages. Clinical presentation: a/ depending on the affected spinal segment; b/ depending on the localization of the disc herniation (median, paramedian, lateral, etc.). Cauda equina syndrome – clinical presentation. Imaging studies and treatment.
 15. Cervical and lumbar spinal stenosis. Etiology and pathology. Classification: a/ in relation to the time of clinical occurrence; b/ localization. Clinical presentation. Imaging studies and treatment.
 16. Hydrocephalus. Differential diagnosis between congenital hydrocephalus and hydrocephalic syndrome. Congenital hydrocephalus in infants. Hydrocephalus in childhood. Normal pressure hydrocephalus in adulthood. Clinical presentation, syndromes, imaging studies and treatment.

Recommended literature for exam preparation:

1. Fundamentals of Neurosurgery. Edited by B. Kitov. Издателство „Лакс бук“, Пловдив, 2014. ISBN 978-954-8326-91-9
2. Lectures in Neurosurgery
3. Atlas of the human Brain Edited by B. Kitov. Издателство „Лакс бук“, Пловдив, 2015. ISBN 978-619-189 -028-6
4. Neurological Surgery: A Comprehensive Reference Guide to the Diagnosis and Management of Neurosurgical Problems. Julian R. Youmans
5. Essential Neurosurgery. Andrew Kaye. 3rd Edition. Blackwell Publishing Ltd. 2005.
6. Neurosurgery. Principles and Practice. Anne J. Moore and David W. Newell (Eds). Series Editor : John Lumley. Springer-Verlag, 2005.
7. Handbook of Neurosurgery. M.S. Greenberg. 7th edition. Thieme, 2010

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
MAXILLOFACIAL SURGERY

Approved by the Department Council on June 8th 2022

Confirmed by the Faculty Council – Protocol №6/15.06.2022

MAXILLOFACIAL SURGERY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
								(VIII) IX
Specialized surgeries	(VIII) IX	Total	Lectures	Practices	ECTS	1.7	4.7*	2 / 4
		90	30	60	3.0			

*

DISCIPLINE:

“MAXILLOFACIAL SURGERY”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Mandatory

LEVEL OF QUALIFICATION:

Master (M)

FORMS OF TRAINING:

Lectures, practical seminars, bedside practical exercises, non-auditorium classes (self-preparatory activities, short thesis development, etc)

YEAR OF TRAINING:

IVth and Vth year of medical studies

DURATION OF TRAINING:

One semester

ACADEMIC HOURS:

4 hours of lectures, 8 hours of practical seminars

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Computers and multimedia screens/projectors, hospital equipment, related to the specialty's clinical practice

FORMS OF EVALUATION:

On-going assessment, MCQs

EVALUATION CRITERIA:

Based on on-going assessment – oral communication and written MCQs

ASPECTS OF EVALUATION CRITERIA:

Student activity and participation in discussions, demonstration of knowledge – orally and on tests

SEMESTER EXAM:

Yes (part of exam for “Specialized surgeries” – written and oral)

STATE EXAM:

No

LECTURER:

Habilitated lecturer from the Department of Maxillofacial Surgery

DEPARTMENT:

Maxillofacial Surgery

ANNOTATION

The course in Maxillofacial surgery for medical students includes teaching clinical and contemporary instrumental diagnostic methods and knowledge about the treatment of surgical diseases of the maxillofacial and neck regions. Main areas of focus are: maxillofacial infections (abscesses and cellulites) of the face, around the jaws and the neck, osteomyelitis and osteonecrosis of the jaws, odontogenic sinusitis, lymphadenitis, sialadenitis, etc.; maxillofacial trauma – injuries to the soft tissues and facial and jaw bones; and maxillofacial oncology – tumors of the oral cavity, face, neck, jaw bones.

BASIC AIMS OF THE DISCIPLINE

To introduce medical students to the most important surgical diseases in the maxillofacial region and the neck and to teach them more detailed knowledge about the diagnosis and treatment of maxillofacial infections, trauma and tumors.

More specific aims are for medical students to:

- know about the most common maxillofacial surgical diseases;
- acquire basic skills for performing systematic clinical examination of the head and neck
- acquire knowledge about the most common maxillofacial infections and concomitant life-threatening conditions, their etiopathogenesis, clinical presentation, diagnosis, and principles of management;
- be able to examine and diagnose patients with injuries to the soft tissues, facial and jaw bones, to know how to provide initial management of severely injured patients

with maxillofacial trauma, as well as be familiar with the basic principles of management of maxillofacial trauma.

- acquire knowledge about the most common and significant oncological diseases of the oral cavity and maxillofacial region.

EXPECTED RESULTS

Students will be expected to be able to define the most common surgical diseases, managed by maxillofacial surgeons; be able to perform systematic examination of a patient with maxillofacial pathology; be able to describe the most common maxillofacial infections (etiology, typical clinical presentation, diagnostic methods) and describe principles of management; demonstrate knowledge about the initial management of severe maxillofacial trauma, as well as diagnosis and principles of definitive treatment of soft-tissue and facial/jaw bone injuries; know the most common maxillofacial tumors and their typical clinical presentation.

LECTURES

LECTURE № 1 – 2 hours

Orofacial infections.

1. Introduction to maxillofacial surgery
2. Infections of the soft tissues (abscesses and phlegmones) of the face and around the jaws – anatomic-topographic characteristics, etiology (odontogenic and other), clinical presentation, diagnosis, principles of treatment.
3. Other orofacial infections – osteomyelitis and osteonecrosis, odontogenic sinusitis, sialadenitis. lymphadenitis.

Tumors of the oral cavity and the maxillofacial area

1. Incidence and classification.
2. General characteristics and principles of management of the most common tumors:
 - a. Squamous cell carcinoma of the oral cavity;
 - b. Tumors of the jaw bones;
 - c. Tumors of the salivary glands.

LECTURE № 1 – 2 hours

Maxillofacial trauma.

1. Epidemiology of maxillofacial trauma.

2. Initial management of patients with maxillofacial trauma.
3. Soft-tissue injuries – types, principles of management.
4. Facial and jaw bone fractures (maxilla, mandible, zygomatic complex) – clinical presentation, diagnosis, principles of management.

PRACTICES

SEMINAR № 1 - 2 hours

1. Introduction to maxillofacial surgery.
2. Systematic clinical examination and basic laboratory investigations of the maxillofacial surgical patient.
3. Etiopathogenesis of odontogenic infections. Clinical presentation and diagnosis of odontogenic infections (abscesses and cellulites) of the soft-tissue spaces in the maxillofacial region. Specific considerations depending on their localization.
4. Osteomyelitis and osteonecrosis of the jaws, odontogenic sinusitis, sialadenitis, lymphadenitis.
5. Principles of treatment of maxillofacial infections.

SEMINAR № 2 - 2 hours

1. Incidence, general characteristics and principles of management of the most common types of tumors in the oral cavity and the maxillofacial area:
 - a. Benign tumors of the soft tissues of the oral cavity – papilloma, fibroma, lipoma.
 - b. Squamous cell carcinoma of the oral mucosa.
 - c. Tumors of the jaw bones.
 - d. Tumors of the salivary glands
 - e. Skin malignancies of the face and neck.

SEMINAR № 3 - 2 hours

1. Maxillofacial trauma – types, incidence, distribution.

2. Initial management of patients with maxillofacial trauma:
 - a. General principles of initial trauma management;
 - b. Specific aspects of initial management of maxillofacial trauma.
3. Soft-tissue trauma – types, principles of management.

SEMINAR № 4 - 2 hours

1. Mandibular fractures – clinical presentation, diagnosis, principles of management.
2. Maxillary fractures – clinical presentation, diagnosis, principles of management.
3. Fractures of the zygomatic complex – clinical presentation, diagnosis, principles of management.

BIBLIOGRAPHY

Atanasov D., Pechalova P., Tsvetanov TS. A Textbook of Oral and Maxillofacial Surgery. Plovdiv, 2018 Publisher: Medical University – Plovdiv, Bulgaria ISBN 978-619-237-002-2.

CONSPECTUS

1. Odontogenic infections of the soft tissues in the maxillofacial region – etiology, path of spread, anatomical spaces, clinical presentation, diagnosis, principles of management.
2. Osteomyelitis and osteonecrosis of the jaw bones (medication-related and osteoradionecrosis). Etiopathogenesis, clinical presentation, diagnosis, differential diagnosis, principles of management.
3. Other maxillofacial infections – odontogenic sinusitis, sialadenitis, lymphadenitis – etiology, clinical presentation, diagnosis, principles of management.
4. Squamous cell carcinoma of the oral cavity – risk factors, etiology, clinical presentation, diagnosis, differential diagnosis, principles of management.
5. Skin malignancies of the face (basal and squamous cell carcinoma, malignant melanoma) – diagnostic and management considerations.
6. Jaw bone tumors – major types, clinical presentation, principles of management.
7. Salivary gland tumors - clinical presentation, diagnosis, principles of management.

8. Maxillofacial trauma – diagnosis, general principles and specific considerations in the initial management of severe maxillofacial trauma. Soft-tissue injuries to the face and neck – types, clinical presentation, diagnosis, principles of management.
9. Mandibular fractures - clinical presentation, diagnosis, principles of management.
10. Maxillary fractures - clinical presentation, diagnosis, principles of management.
11. Fractures of the zygomatic complex - clinical presentation, diagnosis, principles of management.

MEDICAL UNIVERSITY OF PLOVDIV
MEDICAL FACULTY

PROGRAM

ORTHOPEDICS AND TRAUMATOLOGY

Accepted by Department Council with Protocol №3/11.07.2022г.

Approved by the Faculty Council with Protocol № 7/13.07.2022 г.

ORTHOPEDICS AND TRAUMATOLOGY

CURRICULUM

Discipline	Semester exam	Auditory employment				Non-audit employment loans	Total credits	Hours by year and semester
								IV/V year
		Total	Lectures	Exercises	Credits			VIII/IX
ORTHOPEDICS AND TRAUMATOLOGY	VIII/I X	90	30	60	3.0	1.5	4.5	30/60

Name of the discipline:

„ORTHOPEDICS AND TRAUMATOLOGY”

Type of discipline according to EDI:

Mandatory

Level of training:

Master's degree/M/

Forms of training: Lectures, exercises, self-training

Course of study: IV-th and V-th

Study duration: One semester /90 hours/

Hours:

30 hours of lectures, 60 hours of exercises

Teaching Aids:

Audio-visual equipment, a set of charted X-ray examinations, a set of specific instrumentation and sets for orthopedic-traumatic surgery, a set for pelvic surgery, Cryoablator;

Forms of assessment:

Test, oral examination

Forming the assessment:

Current control - oral examination at each practical session;

Final control - entrance test, written work, oral examination.

Aspects in forming the assessment:

Individual testing in exercise classes;

At least two control tests;

Independent performance of practical tasks and activities set by the teacher or the assistant leading the exercises;

Semester exam: When conducting the exams, the requirements for transparency and objectivity in the evaluation, as well as for non-admission of violations on the part of the students, are observed.

Form of examination: Written, oral.

State Examination: Part of the State Examination in Surgery.

Lead teacher:

Qualified teacher from the department Prof. Dr. Vladimir Stavrev, DMN

Department: Orthopedics and Traumatology

ANNOTATION

Modern orthopedics and traumatology, in its content and tasks, corresponds too little to the literal meaning of its name, composed of two Greek words - "upright" and "child". Its subject is primarily congenital, acquired and traumatic diseases of the musculoskeletal system, in which operative and bloodless surgical methods of treatment are used. Added to this are a large number of general, infectious, neoplastic, exchange and endocrine diseases, as well as those of the central nervous system, nerve pathways and others affecting the musculoskeletal system. In some of these diseases, orthopedic interventions are only a stage of the complex treatment with the participation of various specialists.

MAIN TASKS OF THE CURRICULUM

Theoretical knowledge: all nosological units included in the training course in orthopedics and traumatology.

Practical skills: all practical skills covered in the exercise program.

EXPECTED RESULTS

Learning objective methods of researching diseases of the musculoskeletal system;

Theoretical knowledge: anatomy, physiology, specific research methods, etiology and clinical picture of the main diseases in orthopedics and traumatology;

Practical skills: regarding the organization of admission, preparation for examination, treatment and discharge of a patient with orthopedics and traumatology;

Mastering the specific activities in the treatment and prevention of diseases of the musculoskeletal system;

➤ LECTURES - THESES

LECTURE No. 1 – 2 hours

Brief historical notes.

Dysplasia coxae congenita. Luxation coxae congenita. Coke is boiling.

Adolescent epiphysiolysis

LECTURE No. 2 – 2 hours

Congenital deformities and diseases of the upper limb. Rickets deformities.

Diseases of muscles, tendons and their insertions from overstrain.

Periarthritis of the shoulder joint.

LECTURE No. 3 – 2 hours

Foot deformities. MOVIE.

Damage intrapartum

LECTURE No. 4 – 2 hours.

Deformations and diseases of the spine.

Degenerative joint diseases

LECTURE No. 5 – 2 hours

Traumatic injuries of the ODA - General characteristics. Contusion. Distortion. Ruptures.

Fractures of the shoulder girdle /clavicle, scapula/ and the proximal end of the humerus

LECTURE No. 6 – 2 hours

Fractures of the humerus - middle and distal third.

Fractures of the forearm - upper and middle third

LECTURE No. 7 – 2 hours

Fractures of the radial bone in a typical location. Fractures of the wrist and fingers.

Soft tissue injuries of the hand.

Dislocations of the ODA. Luxatio humeri. Luxatio cubiti

LECTURE No. 8 – 2 hours

Fractures of the spine.

LECTURE No. 9 – 2 hours

Luxation coxae traumatika. Luxatio vertebrae. Luxatio pollicis.

Pelvic ring fractures

LECTURE No. 10 – 2 hours

Fractures of the femur - upper and middle third

Intra-articular fractures of the lower leg

LECTURE No. 11 – 2 hours

Fractures of the lower leg.

Ankle fractures of the lower leg

LECTURE No. 12 – 2 hours

Bone tumors

Soft tissue injuries of the knee joint

LECTURE No. 13 – 2 hours

Bone and joint tuberculosis

Aseptic necrosis

LECTURE No. 14 – 2 hours

Flaccid and spastic paralysis. Demo films

LECTURE No. 15 – 2 hours

Demonstration films - in the specialty

➤ **EXERCISES - THESIS**

EXERCISE No. 1 – 2 hours**Organization of orthopedic and traumatological care. Basic methods of treatment**

- o Examination of an orthopedic and traumatic patient
- o Apparatus therapy - exercise therapy, orthopedic workshop, polyclinic

EXERCISE No. 2 – 2 hours**Luxatio cocce congenita****Coxa vara, valga, genu varum, valgum. Adolescent spiphysiolysis**

- o View
- o Palpation of bones
- o Soft tissue palpation according to clinical areas
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks

EXERCISE No. 3 – 2 hours**Examination of an orthopedic and traumatological patient**

- o View
- o Palpation of bones
- o Soft tissue palpation according to clinical areas
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks

EXERCISE #4 - 2 hours**Basic means of immobilization. Gypsum technique.****EXERCISE #5-2 hours****Apparatus therapy - exercise therapy, orthopedic workshop,****EXERCISE #6 - 2 hours**

- o Clinical examination in the shoulder area
- o View
- o Palpation of bones
- o Soft tissue palpation according to clinical areas
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific signs (stability of the long head of the biceps, condition of the rotator cuff, stability of the shoulder joint.
- o Areas of projection pain

EXERCISE No. 7 – 2 hours

- o Clinical examination of the elbow joint
- o View
- o Palpation of bones
- o Traffic volume. Registration.
- o Neurological examination

EXERCISE No. 8 – 2 hours

- o Clinical examination of wrist and hand.
- o View

- o Palpation of the skin
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 9 – 2 hours

Deformations of the spine - scoliosis, kyphosis, lordosis means for immobilization.

- o Clinical examination of the cervical spine by departments
- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 10 – 2 hours

Fractures of the spine.

- o Clinical examination of the spine by department
- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 11 – 2 hours

Pelvic fractures

- o Clinical examination
- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 12 – 2 hours

Polyclinic - lower limb injuries

- o View
- o Palpation of the skin
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 13 – 2 hours

Fractures of the malleoli of the lower leg

- o View
- o Palpation of the skin
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 14 – 2 hours

Fractures of the proximal femur

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 15 – 2 hours

Fractures of the femur, diaphysis, supracondylar fractures

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 16 – 2 hours

Intra-articular fractures of the knee joint

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 17 – 2 hours

Fractures of the lower leg

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)

- o Specific marks
- o Areas of projection pain

EXERCISE No. 18 – 2 hours

Clinical examination of the hip joint and pelvis. /Fractures, congenital diseases/. A clinical examination of posture and gait

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks

EXERCISE No. 19 – 2 hours

Clinical examination of the knee joint.

- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- o Specific marks
- o Areas of projection pain

EXERCISE No. 20 – 2 hours

Clinical examination of the ankle and foot

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)
- Specific marks

EXERCISE No. 21–2 hours

Polyclinic - damage to the lower limb. Diseases of the ODA from overstrain

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)

EXERCISE No. 22–2 hours

Foot deformities

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensation)

EXERCISE No. 23 – 2 hours

Dislocations of the musculoskeletal system

View

- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

EXERCISE No. 24–2 hours

Degenerative joint diseases

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

EXERCISE No. 25 – 2 hours

Aseptic necrosis

View

- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

EXERCISE No. 26 – 2 hours

Bone tumors

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

EXERCISE No. 27–2 hours

Rickets deformities

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

EXERCISE No. 28 – 2 hours

Flaccid and spastic paralysis

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

EXERCISE No. 29 – 2 hours**Congenital diseases intrapartum**

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

EXERCISE No. 30 – 2 hours**Aseptic necrosis**

- o View
- o Palpation of bones
- o Soft tissue palpation
- o Clinical signs of joint stability
- o Traffic volume. Registration.
- o Neurological examination (muscle strength, reflexes, sensitivity). Specific signs

LITERATURE:

**Textbook on "Orthopaedics and Traumatology", authors: Prof. Dr. P. Stavrev, PhD;
Assoc. Dr. VI. Stavrev, MD, 2011.**

CONSPECTUS FOR SEMESTRIAL EXAMINATION

1. Crooked neck
2. Obstetric paralysis
3. Congenital hip dysplasia
4. Congenital luxation of the hip joint in walking children
5. Coxa vara. Adolescent epiphysiolysis. Coxa valga.
6. Deformations and diseases of the knee joint /genu varum, genu valgum, chondromatosis, patellar chondrodystrophy, patellar luxation/
7. Rickets deformations
8. Pes equinovarus
9. Scoliosis. Kyphosis. Lordosis
10. Diseases of muscles and their insertions from overstrain
11. Diseases of the tendons and their sheaths from overstrain
12. Periarthritis of the shoulder joint
13. Carpal tunnel syndrome - methods of diagnosis and treatment
14. Pes planovalgus
15. Perthes disease
16. Aseptic necrosis
17. Osteochondritis dissecans of the knee joint
18. Bone tumors
19. Degenerative joint diseases/coxarthrosis and gonarthrosis/
20. Central paralysis. Flabby paralysis
21. Fractures - general
22. Pathological fractures
23. Fracture of the spine. Dislocation of the spine
24. Fracture of the pelvis
25. Pertrochanteric fractures

26. Fracture of the neck of the femur
27. Supracondylar fracture of the femur
28. Cap breakage
29. Inter-articular fractures of the knee joint
30. Fracture of the bodies of the pubic bones
31. Broken ankles
32. Fracture of the diaphysis of the femur
33. Fracture of the shoulder girdle
34. Fracture of the surgical neck of the humerus
35. Fracture of the supracondylar humerus
36. Fracture of the olecranon
37. Fracture of the axillary bones
38. Fracture of the radial bone in a typical location
39. Traumatic sprains of the hip joint
40. Dislocation of the shoulder joint
41. Dislocation of the elbow joint
42. Soft tissue injuries of the knee joint
43. Fractures of the carpal, metacarpal bones and phalanges

OUTLINE FOR THE STATE EXAMINATION - ONLY FOR THE DISCIPLINES IN WHICH THERE IS ONE.

Part of Synopsis for the State Examination in "Surgery"

MEDICAL UNIVERSITY-PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
Pediatrics
for medical students

Accepted by Departmental Council on 4.5.2022 (Protocol No9)

Approved by Faculty Council - Protocol №6/15.06.2022

Pediatrics
Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								5 th year	
Pediatrics	X	Total	Lectures	Practices	ECTS	4.0	11.0	IX	X
		210	90	120	7.0			45/60	45/60

DISCIPLINE: „Pediatrics”

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS: Mandatory

LEVEL OF QUALIFICATION: Master's /M/

FORMS OF TRAINING: Lectures, practicals, self-preparation.

YEAR OF TRAINING: Fifth

DURATION OF TRAINING: Two semesters

ACADEMIC HOURS: 90 hours of lectures, 120 hours of practicals

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Multimedia presentations, discussions, demonstration of clinical cases, solving clinical tasks, periodic verification of knowledge with tests.

FORMS OF EVALUATION: Ongoing assessment by colloquiums and tutors, practical and theoretical examination at the end of the training.

EVALUATION CRITERIA:

- The tutor's opinions based on the students' knowledge, activity and regular attendance during practicals.
- Grades from the tests conducted at the end of each of two chapters in pediatrics.
- Grades from the semestrial exam.

ASPECTS OF EVALUATION CRITERIA: Knowledge, practical skills, discipline, regular preparation for practicals, participation in discussions, solving tests.

SEMESTER EXAM: It consists of MCQ test and practical examination on a clinical case and an oral exam.

STATE EXAM: It has the same structure as the semestrial exam, but with a greater focus on practical knowledge and skills, differential diagnosis and treatment.

LECTURERS: Professors and associate professors who are specialists in pediatrics and profile pediatric specialties at the Department of Pediatrics and Medical Genetics.

DEPARTMENT: Pediatrics and Medical Genetics

ANNOTATION

Pediatrics is a discipline that deals with the main biological features children, antenatal pathology, characteristics of the newborn and diseases of the newborn, birth trauma, jaundice and infections. The main focus is on the growth and development of the child, its feeding and nutrition-related diseases. Medical students also study diseases of the respiratory, digestive, cardiovascular, genito- urinary system, endocrine and nervous systems in children, blood disorders, malignancies, immunity and immunodeficiency disorders, allergy in children as well as preventative medicine.

BASIC AIMS OF THE DISCIPLINE

OBJECTIVES OF DISCIPLINE:

1. Learning the basic theoretical knowledge related to growth, development, prevention, nutrition and diseases in children.
2. Learning the PRACTICAL skills for objective examination of the child. .
3. **Aquiring** skills for interpreting laboratory studies in different age groups.
4. Learning the basic theoretical knowledge of diseases in children, physiology in different age periods, nutrition and disease prevention.
5. Building skills for logical diagnosis and differential diagnosis.
6. Learning the basic principles of treatment in children

EXPECTED RESULTS

After completing the training, students must have the following:

- knowledge of the physiology, prophylaxis and nutrition of children.
- skills to perform a physical examination of a child, regardless of age, and interpret laboratory tests
- ability to formulate syndromes and hence differential diagnosis and diagnosis of the sick child
- knowledge of the basic principles of children's treatment
- knowledge of the algorithms for management of a critically ill child

CURRICULUM

<i>Form of teaching</i>	<i>Workload</i>				ECTS
	<i>Weekly</i>	<i>IX Sem.</i>	<i>X Sem.</i>	<i>Total</i>	
<i>Lectures</i>	3	45	45	90	7.0
<i>PRACTICALLY PRACTICAL</i>	4	60	60	120	
<i>Total</i>	<i>7 hours</i>	<i>105 hours</i>	<i>105 hours</i>	<i>210 hours</i>	

LECTURES PROGRAMME

V year, IX semester

N in order	Lecture topic	Hours
1.	General biological features of the child. The scope of pediatrics. Periods in childhood. Childhood morbidity and mortality.	3
2.	Rational feeding. Malnutrition. Obesity. Calcium-phosphorus metabolism in childhood. Rickets. Osteoporosis.	3
3.	Neurodevelopment – morphological basis, signs, disorders. Intellectual deficit. Autism spectrum disorder. Nurturing care.	3
4.	Newborns at risk. Hypoxic-ischemic encephalopathy. Neonatal convulsions. Birth trauma. Adaptation syndrome.	3
5.	Congenital and acquired infections in the newborn.	3
6.	Differential diagnosis of jaundice in the neonatal period. <u>Colloquium on growth, development, nutrition, rickets.</u>	3
7.	Characteristics of immunity in childhood. Immunodeficiency disorders - general diagnosis and most common diseases.	3
8.	Anatomical and physiological features of the respiratory system in infancy and childhood. Acute infections of the upper respiratory tract – etiology, presentation, treatment.	3
9.	Bronchitis, bronchiolitis, foreign body in the respiratory tract. Acute pneumonias – bacterial, viral, mycoplasmal, etc.	3
10.	Chronic pneumonias. Cystic fibrosis. Tuberculosis. <u>Colloquium on Neonatology</u>	3
11.	Allergic diseases in childhood. Bronchial asthma.	3
12.	Congenital and acquired cardiopathies. Heart failure in childhood.	3
13.	Joint syndrome. Connective tissue diseases. Vasculitides. DD of fever.	3
14.	Pediatric diagnosis in the era of evidence-based medicine. Principles of treatment in pediatrics. Antibiotics in pediatrics.	3
15.	Clinical lecture – building a diagnosis in pediatrics.	3

V year, X semester

N in order	Lecture topic	Hours
1.	Congenital anomalies of the urinary system. Urinary tract infections.	3

2.	DD of hematuria and arterial hypertension in childhood. Acute and chronic nephritis. Acute kidney injury. <u>Colloquium on pulmonology and cardiology.</u>	3
3.	DD of edema in children. Nephrotic syndrome.	3
4.	DD of vomiting, abdominal pain and constipation in childhood.	3
5.	DD of chronic diarrhoea.	3
6.	DD of seizure. Epilepsy.	3
7.	Motor disorders in childhood - cerebral palsy, acute and chronic flaccid paralysis. <u>Colloquium on nephrology and gastroenterology.</u>	3
8.	Encephalitis and encephalopathies in childhood. Hydrocephalus.	3
9.	Diabetes mellitus. Other common disorders of the endocrine glands.	3
10.	Abnormal pubertal development. DD of short stature.	3
11.	Anemias – types, pathogenesis, clinical presentation and treatment. <u>Colloquium on neurology and endocrinology</u>	3
12.	DD of bleeding disorders.	3
13.	Leukemias and lymphomas. Solid tumors.	3
14.	Dehydration. Fluid resuscitation. Principles of drug therapy in childhood.	3
15.	Poisonings and other accidents in childhood.	3

Total: 90 hours

PRACTICAL PROGRAMME

V year, IX semester

1. Specifics of history taking in childhood
2. Specifics of physical examination in children.
3. Anatomical and physiological characteristics and examination of the respiratory system.
4. Anatomical and physiological characteristics and examination of the cardiovascular system.
5. Anatomical and physiological characteristics and examination of the digestive and endocrine system.
6. Anatomical and physiological characteristics and examination of the excretory and hematopoietic system.
7. Anatomical and physiological characteristics and examination of the nervous system.
8. Neuro-development.
9. Growth and physical development. Acceleration.
10. Breastfeeding and weaning.
11. Formula feeding and mixed feeding.
12. Eating disorders.
13. Calcium and phosphorus metabolism. Rickets and rickets-like disorders.
14. **Colloquium** – Feeding of infants and toddlers, physical development and neuro-development. Calcium-phosphorus metabolism disorders.
15. Infections of the newborn - congenital.
16. Infections of the newborn - acquired

17. DD of jaundice in the newborn and infant.
18. Birth injuries of the newborn.
19. Colloquium – Neonatology.
20. Acute infections of the upper respiratory tract.
21. Acute infections of the lower respiratory tract.
22. Pneumonias – characteristics of the clinical presentation in regard to the causative agents.
23. Destructive pneumonias.
24. Cystic fibrosis.
25. Chronic pneumonias. Foreign body in the respiratory tract.
26. Tuberculosis in childhood.
27. Bronchial asthma.
28. Treatment of diseases of the respiratory system
29. Preparation for colloquium on diseases of the respiratory system.
30. Prophylaxis in childhood.

V year, X semester

1. Physical examination of the cardiovascular system. Transition from fetal to adult blood circulation.
2. Congenital left-to-right shunt cardiopathies
3. Congenital cardiopathies with right-to-left shunt.
4. Congenital cardiopathies without shunt. Heart failure.
5. Myocarditis, pericarditis, arrhythmias in children.
6. DD of joint syndrome in children
7. Connective tissue disorders and vasculitides. DD of fever.
8. Urinary tract infections. Anomalies of the urinary system
9. DD of hematuria. Acute renal damage.
10. DD of edema. Nephrotic syndrome
11. DD of vomiting.
12. DD of abdominal pain and constipation.
13. DD of chronic diarrhea
14. DD of seizures. Features of neuroinfections in infants.
15. Comatose conditions in childhood
16. Cerebral palsy. Neuro-developmental delay and intellectual deficit.
17. DD of muscle hypotonia.
18. Diabetes mellitus
19. Diseases of the thyroid gland.
20. Normal puberty. Pathology of pubertal development.
21. DD of short stature.
22. DD of anemia
23. DD of bleeding disorders.
24. Leukemia.
25. Solid tumors. DD of lymphadenomegaly.
26. DD of hepatosplenomegaly.
27. Dehydration. Fluid resuscitation.
28. Emergency conditions – poisonings and other accidents
29. Children's Emergency Department
30. Well-baby clinic

Total: 120 hrs.

LECTURE COURSE PROGRAM

LECTURE No1 – 3 hours: Biological features of infants and children. Major issues in pediatrics. Periods in childhood. Infant mortality.

1. Terminological definition and importance of pediatrics.
2. Basic tasks of pediatrics.
3. A historical overview of the development of pediatrics in the world and in our country.
4. Social aspects of pediatrics and modern problems.
5. Environmental problems.
6. Definition of infant mortality, general pediatric mortality, miscarriage, stillbirth and live birth.
7. Trends in infant mortality in Bulgaria.
 - a. Factors determining infant mortality.
 - b. Analysis of the structure of infant mortality.
 - c. Causes of infant mortality by age group.
 - d. Prophylactic measures to reduce infant mortality.
8. Concept definition of growth and development.
 - a. Factors determining growth and development – endogenous and exogenous.
 - b. Indicators for assessment of physical development – growth and maturation.
 - c. Acceleration.
9. Periods of childhood and their characteristics.

LECTURE No2 – 3 hours: Nutrition in childhood. Malnutrition. Obesity. Calcium-phosphorus metabolism. Rickets. Osteoporosis..

1. Definition of 'rational / age-appropriate nutrition'.
2. Nutritional needs of the child and factors that determine them. Energy needs, essential nutrients.
3. Types of infant feeding – breastfeeding, mixed, formula feeding.
4. Advantages of breast milk over other milks.
5. Formula milk.
6. Feeding of children from 1 to 3 years old.
7. Nutrition-related disorders.
 - a. Hypothrophy
 - b. Specific forms of dystrophy: flour dystrophy, adipose dystrophy, kwashiorkor
 - c. Obesity.
 - d. Anorexia
8. Calcium and phosphorus metabolism

9. Definition of rickets. Etiology and pathogenesis. Predisposing factors.
10. Clinical presentation of rickets
11. Spasmophilia.
12. Prevention and treatment for rickets.
13. Vit.D resistant rickets (endogenous rickets – forms).
14. Hypervitaminosis D.
15. Diseases of the parathyroid glands
16. Osteoporosis

LECTURE No3 – 3 hours: Neuropsychological development - morphological bases, signs, disorders. Intellectual deficit. Autism spectrum disorder. Nurturing care.

1. Neuropsychological development - definition, morphological basis, domains, milestones
2. Types of developmental delays, screening and diagnostic tools, diseases.
3. Intellectual deficit - definition, grades, causes.
4. Autism spectrum disorder - signs, criteria, causes.
5. Nurturing care - meaning, requirements for proper care, education and upbringing

LECTURE No4 – 3 hours: High risk newborns. Hypoxic-ischemic encephalopathy. Neonatal seizures. Birth injuries. Adaptation syndrome in newborn.

1. Concept definition of high risk newborns.
2. Anatomical and biological features of the newborn – term and preterm newborns.
3. Premature children – anatomical and physiological characteristics, causes of prematurity, characteristic pathology of newborns.
4. Care of premature newborns.
5. Late pathology of premature children.
6. Prognosis and development of premature newborns.
7. Other high risk newborn.
8. Hypoxic-ischemic encephalopathy.
9. Neonatal seizures.
10. Adaptation after birth and its most common disorders.
11. Clinical characteristics of adaptation conditions by systems and organs.

LECTURE No5 – 3 hours: Congenital and acquired infections of the newborn.

1. Definition of congenital infection.
2. Mechanisms for fetal infections.
3. Classification of congenital infections.
4. Clinical presentation of the most common congenital infections: toxoplasmosis, cytomegaly, herpes simplex infections, congenital lues, congenital rubella, etc.
5. Diagnosis of congenital infections.
6. Treatment of congenital infections.
7. Prevention.

8. Predisposition to infections in the newborn - immunological features.
9. Predisposing conditions for infecting the newborn.
10. Hospital-acquired infections.
11. Sepsis in the newborn.
12. Infections of the skin, respiratory system, digestive and nervous system.
13. Prevention and treatment of infections in the newborn.

LECTURE No 6 - 3 hours: DD of jaundice.

1. Features of bilirubin metabolism in the newborn.
2. Classification of jaundice.
3. Clinical characteristics of the main types of jaundice and clinical characteristic and diagnosis of the most common disorders, causing jaundice

LECTURE No7 – 3 hours: Characteristics of immunity in children. Immunodeficiency disorders.

1. Physiology of child's immune system – structure, factors of immune defense (specific and nonspecific immunity). Development of immunity and major morphological features of the immune system in childhood
2. Immunodeficiency disorders – classification, diagnosis, clinical presentation and management.
3. Congenital (inherited) immunodeficiency disorders.
4. Acquired immunodeficiency syndrome (AIDS).
5. Secondary immunodeficiency disorders in childhood.

LECTURE No8 – Anatomical and physiological characteristics, examinations and semiotics of the respiratory system in childhood. Acute upper respiratory tract infections: Etiology. Clinical presentation. Treatment.

1. To acquaint students with the anatomical and functional features of the respiratory system in different age periods.
2. Etiology, pathogenesis, clinical presentation, diagnosis and treatment of rhinitis, sinusitis, ethmoiditis, otitis media, tonsillitis, laryngitis.

LECTURE No9 – 3 hours: Pneumonias. Acute respiratory failure in childhood.

1. Acute bronchitis, obstructive bronchitis, bronchiolitis.
2. Foreign body in the respiratory tract.
3. Etiology, pathogenesis, clinical presentation, diagnosis and treatment of pneumococcal, viral, mycoplasmal, pneumocystic pneumonia.
4. Destructive pneumonias - staphylococcal, gram-negative - clinical features, complications, treatment.
5. Definition of respiratory failure by clinical and pathophysiological features.
6. Causes of respiratory failure.

7. Clinical presentation and laboratory studies in respiratory failure. Grades of respiratory failure by clinical and blood gas indicators.
8. Management of respiratory failure in children.

LECTURE No10 – 3 hours: Chronic pneumonias. Cystic fibrosis. Tuberculosis.

1. Chronic pneumonia – clinical, morphological and functional criteria. Changes in functional performance and types of respiratory failure.
2. Predisposing factors for chronic pneumonias in children. Criteria and methods of establishing the most common causes.
3. Management. Importance of respiratory rehabilitation.
4. Etiology and pathogenesis of foreign bodies in the respiratory tract.
5. Prevalence and significance of cystic fibrosis – genetic defect – morphological changes in the respiratory and digestive systems – complications – early and late – clinical picture – methods of diagnosis - management – prenatal diagnosis and prevention.
6. Tuberculosis - global trends in prevalence, efficacy of BCG vaccination, epidemiology, clinical and radiology presentation of the various forms of pulmonary TBC, treatment, importance of primary and secondary resistance of current strains.

LECTURE No11 – 3 hours: Allergic diseases in childhood. Bronchial asthma.

1. Significance of allergic disorders in current times.
2. Genetic factors for the development of allergic diseases.
3. Recommendations for primary prophylaxis.
4. The most common allergic diseases in childhood. Importance of environmental factors and other exogenous triggers (viral infections, physical exertion, etc.) on the development and course of allergic diseases in children, mainly-respiratory allergic diseases.
5. Definition of BA – clinico-morphological. Major pathophysiological changes in BA.
6. Clinical presentation and DD with other diseases causing recurrent bronchial obstruction.
7. Treatment of bronchial asthma.

LECTURE No12 – 3 hours: Congenital and acquired cardiopathies. Heart failure in childhood.

1. Anatomical and physiological characteristics of the cardiovascular system.
2. Clinical significance of the characteristics in childhood.
3. Classification of congenital cardiopathies.
4. Clinical presentation of congenital heart malformations with right-to-left shunt
5. Clinical presentation of congenital cardiac malformations with left-to-right shunt.
6. Clinical presentation of congenital cardiac malformations without shunt.
7. Functional studies of the cardiovascular system in view of the diagnosis of congenital heart defects.
8. Treatment of congenital cardiopathies.
9. Etiology and pathogenesis of acute myocarditis.
10. Clinical manifestations of myocarditis. Evidence of myocardial damage.

11. DD of myocarditis.
12. Treatment.
13. Endocarditis – etiology, pathogenesis, clinical presentation.
14. Pericarditis – etiology, clinical presentation. Management in tamponade of the pericardium.
15. Cardio-vascular failure – definition.
16. Pathogenesis and etiology of acute cardiovascular failure.
17. Clinical manifestations of cardiovascular failure.
18. Urgent behavior in acute cardiovascular failure.
19. Prognosis of cardio-vascular failure.

LECTURE No13 – 3 hours: Joint syndrome. Connective tissue diseases. Vasculitis. DD of fever.

1. Definition of joint syndrome.
2. Examination of joints in children.
3. Differential diagnosis of joint syndrome in childhood.
4. Connective tissue diseases- classification.
5. Most common disorders:
 - a. Acute rheumatic fever – features in childhood. Treatment and prevention of rheumatic disease.
 - b. LED,
 - c. rheumatoid arthritis,
 - d. Dermatomyositis
 - e. Scleroderma
6. Types of vasculitis.
 - a. Kawasaki disease
 - b. Panarteritis nodosa
 - c. Schoenlein-Henoch purpura.
7. DD of prolonged fever.
8. Principles of treatment for autoimmune and autoinflammatory diseases.

LECTURE No 14 – 3 hours. Pediatric diagnosis in the era of evidence-based medicine. Principles of treatment in pediatrics. Antibiotics in pediatrics.

1. Methodology of clinical thinking - symptoms, syndromes, differentiation diagnosis, working diagnosis, investigations, management and follow-up.
2. Characteristics in pediatrics - generalization, dynamics, age-specific pathology.
3. Key skills in history taking, clinical examination, investigations and determination of therapeutic approach.
4. Treatment principles in pediatrics.
5. Antibiotics – types, indications, doses, specificities in various age groups.

LECTURE No 15 – 3 hours. Clinical cases.

1. Using appropriate clinical case, stages of clinical diagnosis are presented. The importance and characteristics of the history the physical examination are discussed.
2. Methodology for solving test tasks with clinical cases.

LECTURE No16 – 3 hours: Congenital abnormalities of the urinary system. Urinary tract infections.

1. Physiological characteristics of the urinary system in different age groups.
2. Methods of examination of the urinary system in childhood – history, functional and laboratory.
3. Congenital abnormalities of the urinary system
4. Etiology and pathogenesis of urinary tract infections.
5. Clinical features of urinary tract infections – cystitis, pyelonephritis.
6. Laboratory and microbiological diagnosis.
7. DD of urinary tract infections.
8. Principles of treatment and prognosis.
9. Night enuresis

LECTURE No. 17 – 3 hours: Differential diagnosis of hematuria and arterial hypertension in childhood. Acute and chronic nephritis. Acute kidney injury.

1. Definition on hematuria and DD of hematuria.
 - a. Nephritic syndrome.
 - b. Acute glomerulonephritis.
 - c. Chronic glomerulonephritis.
 - d. Nephroblastoma
 - e. Renal stones
2. Arterial hypertension - DD in childhood.
3. Acute kidney injury.
 - a. Hemolytic-uremic syndrome.

LECTURE No18 – 3 hours: Differential diagnosis of edema in childhood. Nephrotic syndrome.

1. Types of edema – pathogenetic mechanisms.
2. Definition of nephrotic syndrome.
3. Classification of nephrotic syndrome.
4. Pathogenesis.
5. Clinical variants of nephrotic syndrome and their differentiation.
6. Prognosis of nephrotic syndrome depending on morphological variants.
7. Principles of treatment of nephrotic syndrome.
8. DD of edema. Treatment.

LECTURE No19 – 3 hours: Vomiting, abdominal pain and constipation in childhood.

1. Significance of vomiting, as one of the most common symptoms in childhood – depending on the age of the child.
2. Diseases in which vomiting is a major or a leading symptom.
3. DD of vomiting depending on its characteristic.
4. Management of vomiting.
5. Significance of abdominal pain, as one of the most common symptoms in childhood – depending on the age of the child.
6. Diseases in which abdominal pain is a major or a leading symptom.
7. DD of abdominal pain, depending on its characteristic.
8. Management of abdominal pain
9. Childhood constipation - DD

LECTURE No20- 3 hours: Chronic diarrhea.

1. Definition of chronic diarrhea.
2. Maldigestion syndromes and malabsorption.
3. Chronic diarrhea - DD
4. Management of chronic diarrhea
5. Chronic colitis

LECTURE No21 – 3 hours: DD of seizures in childhood. Epilepsy.

1. Definition of paroxysm, epileptic and non-epileptic attack and seizure.
2. Classification of epileptic and non-epileptic seizures.
3. Neonatal convulsions - types, diagnostic tests and management.
4. Diagnosis and DD of the most common epileptic seizures in childhood.
5. Differential diagnosis with common nonepileptic seizures.
6. Epilepsy – definition, classification
7. Common epileptic syndromes
8. Management of seizures and status epilepticus.
9. Epilepsy treatment.

LECTURE No22 – Motor disorders in childhood – cerebral palsy, acute and chronic flaccid palsy.

1. Anatomy and physiology of motor control.
2. Differentiation of central from peripheral paresis.
3. Cerebral palsy - types, etiology, manifestations.
4. Spinal muscular atrophy.
5. Duchenne's disease.
6. Myasthenic syndromes
7. Guillain-Barre syndrome.

LECTURE No23 – 3 hours: Encephalitis and encephalopathies in childhood. Hydrocephalus.

1. Encephalopathy - definition, types. Acute encephalitis syndrome.
2. Herpesvirus encephalitis
3. Other encephalitis
4. Acute encephalopathies associated with viral infections.
5. Congenital metabolic diseases.
6. Diseases of accumulation
7. Leukodystrophy
8. Other genetic encephalopathies
9. Hydrocephalus and DD macrocrania

LECTURE No24 – 3 hours: Diabetes. Other most common endocrinopathies..

1. Classification of diabetes by WHO.
2. Etiology of childhood diabetes. The importance of genetic factors.
3. Pathogenesis of diabetes.
4. Clinical features of diabetes at different ages.
5. Diagnostic criteria.
6. Complications of diabetes mellitus.
7. Diabetic coma
8. Hypoglycemic coma - DD.
9. Treatment of diabetes mellitus
10. Treatment of diabetic ketoacidosis.
11. Metabolic syndrome and type 2 diabetes mellitus
12. Most common disorders of the thyroid gland.
 - a. Hypothyroidism. Hyperthyroidism. Clinical manifestations. Congenital hypothyroidism.
 - b. Thyroiditis and enlargement of the thyroid gland.
13. Acute adrenal insufficiency – etiology, clinical presentation, treatment.
14. Congenital adrenal hyperplasia – causes, clinical presentation, diagnosis, treatment.

LECTURE No25 – 3 hours: Puberty. Short stature.

1. Physiology of puberty.
2. Normal puberty. Gender characteristics.
3. Early and premature puberty – etiology, clinical presentation, management.
4. Late puberty – etiology, clinical presentation, management.
5. Disorders of sexual differentiation- short overview.
6. Growth factors – genetic, hormonal, alimentary, environmental, social, etc.
7. Short stature – classification
8. Short stature - DD.

LECTURE No 26 - 3 hours: Anatomical and physiological characteristics of the hematopoiesis in children. Anemia.

1. Age-related anatomical and physiological characteristics.
2. Classification of anemias.
3. Deficiency anemias – etiology, clinical presentation, diagnosis and treatment
4. Hypo- and aplastic anemias – etiology, clinical presentation, diagnosis and treatment
5. Hemolytic anemias, acute and chronic – etiology, clinical presentation, diagnosis and treatment.

LECTURE No27 – 3 hours: Bleeding disorders.

1. Definition of bleeding disorders.
2. Components of normal hemostasis and their abnormalities. Classification of bleeding disorders.
3. Differential diagnosis of the main types of hemorrhagic diseases.
4. Management of a child with hemorrhagic diathesis.

LECTURE No28 – 3 hours: Malignancies. Malignant hemopathies. Solid tumors.

1. Prevalence and significance of malignancies in childhood. Age characteristics.
2. Leukemias - classification, clinical manifestations, diagnostic tests, principles of treatment, current-day prognosis.
3. The most common solid tumors in childhood – Hodgkin and Non-Hodgkin lymphoma, neuroblastoma, nephroblastoma, osteosarcoma, Ewing's sarcoma, rhabdomyosarcoma, brain tumors.
4. Modern methods of treatment of malignant diseases in childhood.

LECTURE No29 – 3 hours: Dehydration. Fluid resuscitation. Principles of drug therapy in childhood.

1. Water and salt homeostasis in childhood.
2. Types of dehydration- pathophysiology, etiology and clinical manifestations.
3. Rehydration methods. An algorithm for conducting them.
4. Principles of drug therapy in childhood.

LECTURE No30 – 3 hours: Emergencies in childhood. Accidents and poisonings

1. Poisoning: general characteristics, incidence, age aspects, principles of diagnosis and treatment.
2. The most common poisoning in childhood- clinical manifestations, antidotes.
3. Causes, clinical presentation and management of the most common non-surgical emergency conditions in pediatrics – shock, drowning, heat and sun stroke, electrocution.

PROGRAMME OF PRACTICALS

PRACTICAL No1 – 2 hours: Characteristics of history taking in childhood.

Taking history– from the mother or close relatives and from the persons caring for the child.

Pregnancy. Birth. Course of the postpartum period. Eating. Development. Past diseases. Prophylaxis. Vaccinations and immunizations. Epidemiological history: in the family, nursery, school, neighborhood, village. Family history. Socio-economic conditions. Current disease.

PRACTICAL No2 – 2 hours: General status. Characteristics of physical examination.

Overview of: general condition of the child, skin, lymph nodes, head, neck, chest, spine, limbs and joints. Physical examination of: respiratory, cardiovascular, digestive, excretory and nervous systems.

PRACTICAL No3 – 2 hours: Anatomical and physiological characteristics and examination of the respiratory system.

Morphological and physiological characteristics of the lungs in a newborn. Physical examination of the respiratory system. Laboratory and imaging studies.

PRACTICAL No4 – 2 hours: Anatomy and physiology and examination of the cardiovascular system.

Independent taking of history, physical examination of the CVS in children and discussion of the specific patients. Discussion of ECG, echocardiography, blood gas, X-ray and other studies of CVS. Summary of the most important diagnostic criteria in CVS according to age.

PRACTICAL No5 – 2 hours: Anatomy and physiology and examination of the digestive and endocrine system.

Objective examination: abdomen – inspection, palpation, percussion, auscultation; liver and spleen; oral cavity. Examination of the feces of a breast fed and formula fed infant.

Endocrine system - Role of the thyroid gland, parathyroid glands, pituitary, adrenal gland, sex glands according to age.

PRACTICAL No6 – Anatomy and physiology and examination of the excretory and hematopoietic system.

Clinical study of the urinary system. Laboratory and functional kidney tests, discussing urinary changes in various kidney diseases. Instrumental tests.

Hematopoietic system. Age characteristics of blood count and differential blood count - explanation, clinical significance, reference ranges.

PRACTICAL No7 – 2 hours: Anatomy, physiology and examination of the nervous system.

Anatomical and physiological characteristics of the nervous system: morphological independence; functional immaturity.

Characteristics of neurological status in the first months after birth and up to about 2 years of age. Features of the cerebro-spinal fluid in the first weeks after birth.

Major syndromes and disorders of neurological status - quantitative and qualitative changes in consciousness, Glasgow coma scale, syndrome of increased intracranial pressure, meningo-radicular irritation, pyramid, extrapyramidal and flaccid palsy syndrome; paleo- and neocerebellar syndrome; disorders of cranial nerves; sensory and pelvic incontinence disorders; higher cortical functions.

PRACTICAL No8 – 2 hours: Neurodevelopment.

Definition of neuro-development. Main aspects of neuro-development. Age-dependent neurodevelopmental indicators. Factors that determine normal neuro-development. Scales for evaluation of neuro-development up to 1, 3 and 6 years of age. Neurodevelopmental history and assessment.

PRACTICAL No9 – 2 hours: Physical development. Acceleration.

Getting to know PRACTICALLY how to determine the individual indicators of development. Self-determination of growth in patients and calculation of deviation from the norm. Discuss the time frames and significance of tracking the physical development of each child.

PRACTICAL No10 – 2 hours: Breastfeeding and weaning.

Independent history taking in breast-fed and weaned infants. Determine if there are errors in nutrition. Determination if the infant is getting enough breast milk. Determination of the amount of breast milk and the intervals of feeding in a specific case. History taking in a weaned infant and determining whether the weaning is adequate. Compiling sample feeding schemes for infants of different ages.

PRACTICAL No11 – 2 hours: Formula and mixed feeding.

Definition of the concepts of mixed and formula feeding. Indications for mixed and formula feeding. Difference between cow's and breast milk. Quantitative and qualitative needs of the infant. Weaning: definition, causes, technique, time frame. Formula milks. Compilation of diets in formula fed infants of different ages (number of feeds, type of food, quantity, intervals).

PRACTICAL No12 – 2 hours: Eating disorders.

Causes of hypotrophy: nutritional, infectious, constitutional, poor care. Degrees of hypotrophy, clinical picture. Kwashiorkor. Milky and flour dystrophy. Principles of treatment in hypotrophic children. Prevention of dystrophy. Anorexia: pathogenetic explanation, clinical manifestations. Obesity - etiology at different ages, manifestations, risks, management.

PRACTICAL No13 – 2 hours: Calcium-phosphorus metabolism. Rickets and rickets-like diseases.

Physiology and pathology of calcium-phosphorus metabolism. Diseases of the parathyroid glands or the effects of parathormone. Vitamin D-deficient rickets. Treatment and prevention, complex treatment, therapeutic doses of vit.D depending on the severity of the disease. Clinical presentation and treatment of spasmodophilia. Ricket's-like diseases – pathogenesis, clinical presentation, treatment.

PRACTICAL No14 – 2 hours: Colloquium – nutrition, growth and neuro-development. Calcium-phosphorus metabolism disorders.

PRACTICAL No15 – 2 hours: Infections in the newborn – congenital.

Demonstrations of various cases of infants with congenital infections and building a DD plan according to clinical manifestations, presumed etiology and gestational age in infection.

PRACTICAL No16 – 2 hours: Infections in the newborn – acquired.

Demonstration of cases with early and late sepsis of the newborn, meningoencephalitis, skin infections, conjunctivitis, rhinitis, pneumonia, necrotizing enterocolitis, etc.

PRACTICAL No17 – 2 hours: DD of the jaundice in the newborn and infant.

Demonstrating children with different types of jaundice and discussing DD - type of jaundice, etiology, laboratory confirmation. Independent history taking and examination of jaundiced infants. Establishing an algorithm for management in an infant with jaundice.

PRACTICAL No18 – 2 hours: Birth traumas.

Demonstration of the most common birth injuries in the newborn, their clinical and imaging diagnosis, predisposing factors, treatment and prognosis - brachial nerve palsy, fracture of the clavicle, hematoma of m. sternocleidomastoideus, cephalhematoma, etc. The PRACTICAL can be partly conducted in the newborn sector at the Department of Obstetrics.

PRACTICAL No19 – 2 hours: Colloquium: Infections, jaundice and birth injuries in the newborn.

PRACTICAL No20 – 2 hours: Acute upper respiratory tract infections.

Demonstration of patients with the most common infections of upper respiratory tract – rhinitis, sinusitis, otitis media, pharyngitis, tonsillitis, laryngitis. Highlighting the specific symptoms. By an appropriate choice of patients to understand and learn the clinical picture, paraclinical characteristics and treatment of this very common childhood pathology.

PRACTICAL No21 – 2 hours: Acute infections of the lower respiratory tract.

Demonstration of cases with infection of lower respiratory tract – tracheitis, bronchitis, obstructive bronchitis, bronchiolitis. Differentiation of disease based on clinical manifestations.

PRACTICAL No22 – 2 hours: Acute pneumonias.

Demonstration of patients of different age groups with different etiology, localization and course acute pneumonias - pneumococcal lobular, lobar, mycoplasma, pneumocystic-comparison of the clinical picture and X-ray image, choice of treatment and determination of the prognosis of the disease.

PRACTICAL No23 – 2 hours: Destructive pneumonias.

Staphylococcal pneumonia – entry point, features, complications, laboratory tests, course and prognosis. Principles of treatment. Prevention. Gram-negative bacterial causative agents.

PRACTICAL No.24 - 2 hours: Cystic fibrosis.

Demonstration of patients with cystic fibrosis - with focus on pneumopathy, pancreatic and liver dysfunction, other manifestations, physical development. Maintenance treatment and treatment of exacerbations.

PRACTICAL No25 – 2 hours: Chronic pneumonias. Foreign body in the respiratory tract.

Age features of chronic pneumonies. Foreign body in the respiratory tract – predisposing factors – data from history– clinical picture and evolution over time – diagnosis of a foreign body in the airways. Treatment – principles. Prevention of chronic pneumonies.

PRACTICAL No26 – 2 hours: Features of tuberculosis in childhood. Tuberculosis diagnostics.

Demonstration of cases of tuberculosis in childhood. Diagnostic methods. Training in performing and interpreting tuberculin diagnostics.

PRACTICAL No27 – 2 hours: Bronchial asthma.

Demonstration of cases with bronchial obstruction. Differential diagnosis. Diagnostic criteria for bronchial asthma. Features of bronchial asthma in infants. Treatment of asthma attack and status asthmaticus. Prevention.

PRACTICAL No28 – 2 hours: Treatment of diseases of the respiratory system.

Antibiotic treatment. Bronchodilators. Cough medications. Nasal decongestants. Antipyretics. Indications for hospitalization.

PRACTICAL No29 – 2 hours: Preparation for colloquium on diseases of the respiratory system.

PRACTICAL No30 – 2 hours: Prophylaxis in childhood. Measures for improving general health and resistance to infections.. Education.

A demonstration of counseling parents for proper raising of the infant. Methods for improving general health and resistance to infections. Principles of education.

PRACTICAL No31 – 2 hours: Physical examination of the cardiovascular system. Transition from fetal to adult blood circulation.

Examination of the cardiovascular system of a newborn, infant and an older child. Manifestations of persistent fetal circulation in a newborn. Role of echocardiography. Medications for maintaining or closing the arterial canal. Features of ECG in childhood.

PRACTICAL No32 – 2 hours: Congenital cardiopathies – left-to-right shunt.

Demonstration of cases with defect of the atrial septum, with defect of the ventricular septum, with a persistent arterial canal, with pronounced heart failure with a discussion of therapeutic management. Echocardiographic criteria for overload and heart failure, case demonstration. Discussion of natural evolution, current management and prognosis.

PRACTICAL No33 – 2 hours: Congenital cardiopathies with right-to-left shunt

Demonstration of cases with tetralogy of Fallot, transposition of the great arteries or other CHD with right-to-left shunt. Differential diagnosis in the presence of cyanosis. Radiology image of pulmonary hypovolemia. Discussion of natural evolution, current management and prognosis.

PRACTICAL No34 – 2 hours: Congenital cardiopathies without shunt. Heart failure.

Demonstration of a case with pulmonary valve stenosis, with coarctation of the aorta, with aortic stenosis. Clinical manifestations of heart failure. ECG changes in ventricular systolic overload. Echocardiographic images - demonstration, criteria for overload. Treatment of heart failure.

PRACTICAL No35 – 2 hours: Myocarditis, pericarditis, endocarditis, arrhythmia in pediatrics.

Demonstration of cases with myocarditis or cardiomyopathy – clinical presentation, ECG, X-ray and Echocardiography manifestations. Clinical and ECG data on rhythm and conduction disorders. Demonstration of pericarditis and endocarditis cases. DD of syncope. Management.

PRACTICAL No.36 - 2 hours: DD of joint syndrome.

Demonstration of cases with joint syndrome and their discussion – rheumatoid arthritis, reactive arthritis, septic arthritis, acute rheumatic fever. Involvement of other organs and systems in children with joint syndrome. DD of joint syndrome. Principles of treatment in the most common joint diseases.

PRACTICAL No.37 - 2 hours: Connective tissue disorders and vasculitides. DD of fever.

Demonstration of cases of various collagenoses : systemic-onset juvenile idiopathic arthritis, LED, panarteritis nodosa , Kawasaki's disease. Fever of unknown origin at different ages.

PRACTICAL No38 – 2 hours: Urinary tract infections. Anomalies of the urinary system.

Presentation of an infant with urinary tract infection. Presentation of a child with secondary pyelonephritis. Presentation of a child with chronic pyelonephritis. Presentation of an older girl with cystitis. Clinical interpretation of pathological leukocyturia and significant bacteriuria. Indications for echographic and radiological examination. Differential diagnosis of urinary tract infections. Presentation of cases and imaging studies in congenital abnormalities of the urinary system. Treatment of urinary tract infections.

PRACTICAL No.39 - 2 hours: DD of hematuria. Nephritis.

Plan for the study of a patient with hematuria. Diagnostic discussion of acute and chronic glomerulonephritis. Treatment of acute poststreptococcal glomerulonephritis and chronic glomerulonephritis. Acute renal damage - manifestations, causes, management. Presentation of a patient with acute glomerulonephritis, with nephrolithiasis, with congenital uropathy, with nephroblastoma, rhabdomyosarcoma, hemolytic-uremic syndrome.

PRACTICAL No.40 - 2 hours: DD of edema. Nephrotic syndrome.

Demonstration of an infant with edema. Demonstration of a child with glomerulonephritis, with nephrotic syndrome, with heart disease, with allergic edema, with localized edema, with inflammatory edema, with edema due to liver dysfunction and hypoalbuminemia. DD plan and treatment.

PRACTICAL No41 – 2 hours: DD of vomiting in childhood.

Demonstration of children of different ages with vomiting with discussion of the major points for building a differential diagnosis - from the history, objective examination, laboratory and imaging studies. Management of vomiting.

PRACTICAL No42– 2 hours: DD of abdominal pain and constipation in childhood.

Demonstration of patients with acute or chronic abdominal pain of different age groups. Discussion, general principles of management. Algorithm for management of a child with abdominal pain. Demonstration of cases with constipation - Hirschsprung disease, ileus, encephalopathies, functional constipation. Encopresis.

PRACTICAL No43 – 2 hours: DD of chronic diarrhea.

Demonstration of a case or examination of notes of a patient with coeliac disease or coeliac-like syndrome, cystic fibrosis, lactase deficiency and other chronic diarrhea. DD approach in malabsorption. Specific treatment for certain diseases. Cases with chronic colitis - HUC, Crohn's.

PRACTICAL No44 – 2 hours: DD of seizures. Features of neuroinfections in infants.

Demonstration of a case with seizure – history , physical examination, tests, management. Frequent epileptic syndromes and non-epileptic seizures in different age groups. Clinical manifestations of neuroinfections in newborns and infants. Management of seizures, incl. Febrile and status epilepticus.

PRACTICAL No45 – 2 hours: Comatose conditions.

Examination of a patient in a comatose state. Determination of the severity of the coma. Focal symptoms Control of vital functions in coma. DD of coma.

PRACTICAL No46 – 2 hours: Cerebral palsy. Neurodevelopmental delay and intellectual deficit. Micro- and macrocephaly - DD.

Demonstration of cases with cerebral palsy - quadriparetic, diplegic, hemiparetic, choreoatetotic, hypotonic form. Presence of concomitant pathology - disorders in neuro-development or intellect, epilepsy, microcephaly, visual and auditory deficiency, behavioral disorders. Imaging and electrophysiological studies. Treatment and prognosis. Microcephaly and craniostenosis. Hydrocephalus and DD with idiopathic macrocrania.

PRACTICAL No47 – 2 hours: DD of muscle hypotonias.

Demonstration of cases with muscular hypotonias and weakness - Guillain-Barre syndrome, spinal muscular atrophy, progressive muscular dystrophy, congenital myasthenia, muscle hypotonia without weakness.

PRACTICAL No48 – 2 hours: Diabetes mellitus.

Examination of cases with type I diabetes mellitus. Main laboratory tests in the diagnosis of diabetes. Treatment and control. Diagnosis and treatment of diabetic ketoacidosis. Case with metabolic syndrome and type 2 diabetes mellitus.

PRACTICAL No49 – 2 hours: Diseases of the thyroid gland.

Demonstration of cases with Hashimoto's disease, thyrotoxicosis, congenital hypothyroidism. Hormonal, ultrasound and scintigraphy diagnosis. Treatment of hypothyroidism and thyrotoxicosis.

PRACTICAL No50 – 2 hours: Puberty. Pathology of pubertal development.

Demonstration of cases of both sexes with normal puberty development. Evaluation of Tanner puberty development. Classification and DD of early puberty. Late puberty – criteria, causes, diagnosis, treatment. Demonstration by patients' notes of abnormal pubertal development.

PRACTICAL No51 – 2 hours: DD of Short stature

Demonstration of cases with low stature - constitutional delay in growth and puberty, hyposomatotropism, hypothyroidism, syndromes with proportionate and disproportionate delay in height and physical development. Methods of diagnosis and control of treatment.

PRACTICAL 52 - 2 hours: DD of anemia.

Demonstration of cases with iron deficiency, acute and chronic hemolytic, hypoplastic and post-bleeding anemia. DD of anemic syndrome. Principles of treatment for specific anemic syndromes.

PRACTICAL No.53 - 2 hours: DD of bleeding disorders

Main paraclinical indicators of hemostasis. Clinical manifestation of bleeding disorders - DD plan. Diseases of platelets– thrombocytopenias, thrombocytopathies. Congenital coagulopathies. DIC syndrome. Vasopathies – Schonline-Henoch – Schonlein purpura.

PRACTICAL No.54 - 2 hours: Leukemia.

Demonstration of cases – features of the history , initial clinical manifestations, the path to diagnosis. Classification. Principles of treatment. Risks of cytostatic therapy.

PRACTICAL No55 – 2 hours: Solid tumors. DD of enlarged lymph nodes in childhood.

Demonstration of cases with a solid tumor - Hodgkin and non-Hodgkin lymphoma, neuroblastoma, nephroblastoma, osteosarcoma, Ewing's sarcoma, rhabdomyosarcoma, brain tumors. Demonstration of cases with local or generalized enlarged lymph nodes of inflammatory and non-inflammatory nature.

PRACTICAL No.56 - 2 hours: DD on hepatosplenomegaly.

Diagnosis of hepatomegaly and splenomegaly. Causes of hepatosplenomegaly. DD approach - case demonstration.

PRACTICAL No.57 – 2 hours: Dehydration. Principles of fluid rehydration.

Clinical demonstration of a child with dehydration – discussion of the clinical and paraclinical characteristics of different types of dehydration. Principle of rehydration. Types of rehydration fluids and the content of the electrolytes in them. Determination of the rate of infusion of different fluids. A PRACTICAL example of the calculation of electrolytes, fluids, the rate of infusion in a child with grade II dehydration.

PRACTICAL No.58 – 2 hours: Poisoning and other accidents.

A demonstration of a patient with acute poisoning. General management in poisoning. Demonstration of gastric lavage, administration of activated charcoal, laxatives, antidotes. Psycho-social aspects of suicide attempts.

PRACTICAL No.59 – 2 hours: Children's emergency department

Getting to know the functions of a children's emergency department. Triage of sick children.

PRACTICAL No.60 – 2 hours: Prophylaxis in childhood. “Well-child “clinic

Tasks of the children's prophylaxis and well-child clinics. Promotion of physical and mental health in children. Risk groups of children. Primary and secondary prophylaxis.

SOURCES OF SELF-PREPARATION

1. Lectures and practicals for medical students in MS Office 365/Share point.
2. Illustrated textbook of Paediatrics. T. Lisauer, W. Carroll, A. Craft, 2018.
3. Textbook of Pediatrics for Medical Students. I. Litvinenko (ed.). Arbilis, Sofia, 2020.

CONSPECTUS

for end of course exam for 5th -year medical students

1. Growth and development of children. Periods in childhood. Factors determining growth and development.
2. Normal neuro-development: main stages of neuro-development – gross motor skills, vision and fine motor skills, hearing, speech, social, emotional and behavioral development. Developmental delay. Intellectual deficit. Autism spectrum disorder.
3. Infant mortality
4. Nutrition
5. Diseases related to nutrition – faltering growth, malnutrition
6. Diseases associated with nutrition - obesity.
7. Calcium-phosphorus metabolism disorders..
8. Jaundice in the newborn.

9. Congenital infections in the newborn and infants.
10. Acquired infections of the newborn.
11. Birth injuries.
12. Hypoxic-ischemic encephalopathy. Convulsions of the newborn.
13. Hemorrhagic disease of the newborn. Prevention with vit. K
14. Allergic diseases.
15. Infections of the upper respiratory tract. DD of stridor.
16. Lower respiratory tract infections. Bronchiolitis.
17. Acute pneumonias.
18. Chronic pneumonias. Cystic fibrosis.
19. Tuberculosis.
20. Bronchial asthma
21. Respiratory failure
22. DD of vomiting
23. DD of acute and chronic abdominal pain
24. DD of chronic diarrhea
25. DD of constipation
26. Anatomy and physiology of the CVS. Circulatory changes after birth.
27. Congenital heart defects with left-to-right shunt
28. Congenital heart defects with right-to-left shunt
29. CHD with obstruction in the outlet of the ventricles
30. Arrhythmias and conduction disorders in childhood
31. Acquired diseases of the heart: infectious endocarditis, myocarditis, pericarditis, cardiomyopathies.
32. Arthritis - juvenile idiopathic arthritis, acute rheumatic fever, reactive, septic.
33. Connective tissue disorders and vasculitides - SLE, dermatomyositis, scleroderma, Schonlein-Henoch purpura, polyarteritis nodosa, Kawasaki disease
34. Urinary tract infections, Vesico-ureteric reflux.
35. Nephrotic syndrome. DD of edema.
36. Acute and chronic glomerulonephritis.
37. DD of hematuria
38. Acute renal damage. Hemolytic-uremic syndrome.
39. DD of arterial hypertension.
40. Anemias due to insufficient production of erythrocytes /Fanconi anemia/ and ineffective erythropoiesis /iron deficiency anemia, anemia in folate deficiency/.
41. Anemias due to increased destruction of erythrocytes – hemolytic anemias /hereditary spherocytosis, glucose 6- phosphate dehydrogenase deficiency, thalassemia/
42. DD of bleeding disorders. Coagulopathies. Haemophilia and von Willebrand disease. Other coagulopathies.
43. DD of bleeding disorders. Thrombocytopenia – immune, other platelet pathologies.
44. Leukemias
45. Lymphomas - Hodgkin's disease, non-hodgkin lymphomas
46. Solid malignant tumors - Wilms tumor, neuroblastoma
47. Diabetes mellitus
48. Diseases of the thyroid gland – hypothyroidism and hyperthyroidism.
49. Diseases of the adrenal gland - congenital adrenal hyperplasia, Cushing syndrome, Addison disease
50. Physiology of puberty.
51. Short stature
52. Premature sexual development. Late puberty.

53. Paroxysmal conditions in childhood - epileptic and nonepileptic seizures. Febrile seizures. Common epileptic syndromes.
54. Diseases of the central motor neuron. Cerebral palsy
55. Diseases of the peripheral motor neuron: spinal muscular atrophy, polyradiculoneuritis of Guillain – Barre, Duchenne muscular dystrophy .
56. Acute encephalitis and encephalopathies.
57. Hydrocephalus. Inborn errors of metabolism. Leukodystrophies. Other encephalopathies.
58. Accidents.
59. Poisonings
60. Immunodeficiency disorders.

CONSPECTUS **for state exam in pediatrics for medical students**

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2. Normal neuro-development: main stages of neuro-development – gross motor skills, vision and fine motor skills, hearing, speech, social, emotional and behavioral development. Developmental delay. Intellectual deficit. Autism spectrum disorder.
3. Infant mortality
4. Nutrition
5. Diseases related to nutrition – faltering growth, malnutrition
6. Diseases associated with nutrition - obesity.
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57. Hydrocephalus. Inborn errors of metabolism. Leukodystrophies. Other encephalopathies.
58. Accidents.
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60. Immunodeficiency disorders.

**MEDICAL UNIVERSITY-PLOVDIV FACULTY OF
MEDICINE**

PROGRAM

ON

**EPIDEMIOLOGY, INFECTIOUS DISEASES,
MEDICAL PARASITOLOGY AND
TROPICAL MEDICINE**

(CYCLE OF INFECTIOUS DISEASES)

Accepted by the Department Council on №3/19.04.2022

Approved by the Faculty Council with a Protocol №7/13.07.2022

CYCLE OF INFECTIOUS DISEASES

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			5 th year	
INFECTIOUS DISEASES	X							IX	X
		57	27	30	5.0	3.2	8.2*	8/14	19/16

*** Credits are for Epidemiology, Infectious Diseases, Medical Parasitology and Tropical Medicine**

Name of the discipline:

„INFECTIOUS DISEASES ”

Type of discipline according to EDI:

Mandatory

Level of education:

Master /M/

Forms of education:

Lectures, exercises, seminars

Training course:

V course

Duration of training:

2 semesters – IX, X

Hours:

29 hours of lectures, 28 hours of exercises

Teaching aids:

Multimedia presentations, discussions, solving tests and case studies

Forms of assessment:

Ongoing evaluation, elaboration of an abstract / thesis, etc. materials, colloquia

Solving tests and cases

Formation of the assessment:

An average current grade is formed for each semester

Aspects in the formation of the assessment:

Participation in discussions, evaluation of tests

Semester exam:

Yes / Entrance test, written exam, practical exam

State Examination:

Yes

Leading lecturer:

Habilitated lecturer from the Department of "Infectious Diseases and Parasitology"

Department:

Infectious diseases, parasitology and tropical medicine

➤ **ANNOTATION**

Abstract: Clarification of the basic concepts in infectology. Characteristic features of the infectious disease, periods of course. The most common symptoms and syndromes - pathogenetic and clinical characteristics. Principles for diagnosis: clinical, laboratory, microbiological and virological methods of diagnosis. Differential diagnosis with infectious and non-infectious diseases. Treatment: classical and modern methods of treatment. Prevention / specific and non-specific /.

➤ **MAIN TASKS OF THE CURRICULUM**

1. Presentation of modern theoretical knowledge about infectious diseases - etiology, pathogenesis, clinical picture, laboratory tests, diagnosis, differential diagnosis, treatment and prevention.
2. Practical skills for collecting and interpreting the data from the anamnesis, physical examination and laboratory tests. Clinical thinking with a view to making a probable clinical diagnosis, building a differential diagnostic and therapeutic plan.

➤ **EXPECTED RESULTS**

Upon completion of the training, students must have the following knowledge and skills:

1. In-depth history taking (including epidemiological and developmental).
2. To know and be able to interpret the data from the anamnesis, the examination and the main laboratory indicators.
3. To know the rules of collection, storage and transportation of biological materials for microbiological examination and the indications for their appointment (feces, cerebrospinal fluid, blood, throat secretions)
4. To know and apply the principles of rational antimicrobial therapy. To know the main side effects of antibiotics. Be able to interpret antimicrobial resistance and select an appropriate antimicrobial. To know the main antiviral drugs.
5. Acute viral hepatitis
 - be able to make a clinical diagnosis of acute viral hepatitis
 - to interpret serological markers in different types of hepatitis
 - to know the epidemiological and clinical features of the different types of VH
 - be able to make a differential diagnosis of jaundice syndrome (parenchymal, mechanical, hemolytic jaundice), as well as DD of viral hepatitis with other diseases with parenchymal jaundice

- prevention (non- and specific)
- 6. Intestinal infections with diarrhea syndrome
 - to know the main causes of intestinal infections with diarrhea syndrome
 - to be able to determine the different degrees of dehydration from clinical data
 - to know the principles of water-salt rehydration (oral, parenteral)
 - to know the indications for antimicrobial chemotherapy
 - to be able to make a diff. diagnosis with diarrheal syndrome in surgical diseases
- 7. Acute CNS infections
 - to know the main causes of CNS infections
 - to be able to detect the signs of meningeal irritation in different age groups
 - to know the technique of performing a lumbar puncture
 - to know the characteristics of the cerebrospinal fluid in purulent and aseptic meningitis
 - to know the preparations for the treatment of cerebral edema
 - to know the empirical antibiotic therapy for purulent meningitis of unspecified etiology
 - to know the characteristics of flaccid paralysis in polio
- 8. Infectious exanthemas
 - to be able to make an accurate and complete description of the rash
 - to know the clinical and epidemiological characteristics of chickenpox, measles, scarlet fever
 - to know the behavior of a pregnant woman, contact of a sick person, suspected of having rubella
 - to know the infectious diseases with hemorrhagic rash
 - to know the principles of etiological treatment of chickenpox and scarlet fever
- 9. Drip infections
 - to know the characteristics of diphtheria deposits
 - to know the clinical picture of infectious mononucleosis, the characteristic laboratory parameters and the serological diagnosis
 - to know the characteristics of whooping cough and antimicrobials for its treatment
- 10. Zoonoses
 - to be able to make a clinical diagnosis of erythema migrans (Lyme disease)
 - to know the peculiarities of serological reactions in Lyme disease
 - to know the oral antibiotic treatment of erythema migrans
 - to know the clinical picture of Marseille fever and its treatment
 - to know the non-specific prevention of tick-borne diseases

➤ LECTURES - THESIS

Infectious Diseases Lecture Program

V course, IX semester

LECTURE № 1 – 2 hours

Infection. Infectious disease. Symptoms and syndromes. Salmonellosis. Typhoid Fever.

LECTURE № 2 – 2 hours

Shigellosis. Cholienitis. Viral gastroenteritis.

LECTURE № 3 – 2 hours

Cholera. Therapy of intestinal infections with diarrhea syndrome.

LECTURE № 4 – 2 hours

Viral hepatitis: A, B, C, D, E, G

V course, X semester

LECTURE № 1 – 2 hours

Acute respiratory diseases. Influenza. SARS CoV2 / 2020

LECTURE № 2 – 2 hours

Infectious mononucleosis. Diphtheria. Mumps.

LECTURE № 3 – 2 hours

Measles. Rubella. Chickenpox. Scarlet fever.

LECTURE № 4 – 2 hours

Purulent meningitis. Meningococcal disease.

LECTURE № 5 – 2 hours

Encephalitis. Polio.

LECTURE № 6 – 2 hours

Lyme disease. Rickettsiosis. Viral hemorrhagic fevers.

LECTURE № 7 – 2 hours

HIV infection / AIDS.

Lecture program for tropical infectious diseases

LECTURE № 1 – 2 hours

Exotic viral hemorrhagic fevers (Ebola. Lhasa. Hemorrhagic fever of the Rift Valley). Plague.

Tularemia

LECTURE № 2 – 2 hours

Exotic rickettsiosis: Spotted fever on the rocky mountains. Tsutsugamushi.

Variola vera. Monkeypox - a possible biological weapon. Sap. Melioidosis.

LECTURE № 3 – 1 час

Tetanus. Anthrax.

➤ **EXERCISE - THESIS**

**Exercise program
V course, IX semester**

EXERCISE № 1 –2 hours

Construction and mode of operation in an infectious disease clinic, personal protective equipment. History and status of an infectious patient. SARS CoV2 / 2020. Marseille fever. Ku fever.

EXERCISE № 2 –2 hours

Clinic of a patient with diarrhea syndrome. Shigellosis. Salmonellosis. Differential diagnosis of a patient with diarrhea syndrome.

EXERCISE № 3 –2 hours

Cholienitis. Viral gastroenteritis (rotavirus, norovirus). Treatment of a patient with diarrhea syndrome.

EXERCISE № 4 –2 hours

Test for intestinal infections with diarrhea syndrome. Summary.

EXERCISE № 5 –2 hours

Viral hepatitis - clinic, laboratory abnormalities.

EXERCISE № 6 –2 hours

Viral hepatitis. Complications. Acute liver failure. Diagnosis. Differential diagnosis, treatment.

EXERCISE № 7 –2 hours

Test for acute viral hepatitis. Laboratory constellations in infectious diseases (intestinal infections with diarrheal syndrome, viral hepatitis, inflammatory constellations).

**Exercise program
V course, X semester**

EXERCISE № 1 –2 hours

Influenza. Pertussis. Mumps. Virological diagnosis in inf. diseases.

EXERCISE № 2 –2 hours

Purulent meningitis. Meningococcal disease.

EXERCISE № 3 –2 hours

Serous / aseptic / meningitis. Poliomyelitis. Leptospirosis. Test for neuroinfections.

EXERCISE № 4 –2 hours

Infectious exanthemas - part I. Diseases with maculo-papulo-vesicular / chickenpox / and erythema / scarlet fever / rash.

EXERCISE № 5 –2 hours

Infectious exanthemas - part II. Diseases with maculopapular rash - Measles, Rubella.

EXERCISE № 6 –2 hours

Anginous syndrome / Infectious mononucleosis. Diphtheria. /. Test for diseases with rash and anginal syndrome. Ku fever.

EXERCISE № 7 –2 hours

HIV infection / AIDS seminar.

EXERCISE № 8 –2 hours

Practical exam.

➤ **LITERATURE**

1. Textbook of infectious diseases. Yochev, Popivanova, Vertigovaya 2007
2. Practical guide to infectious diseases, 2017.
3. Symptoms and syndromes of infectious diseases. Genev et al., 2007
4. Textbook of infectious diseases for physicians, 2014, editor Prof. R. Komitova
5. Infectious diseases Clinical cases and more, 2018
6. Infectious Disease - short course, 2019

➤ **SUMMARY OF SEMESTERIAL EXAMINATION-Infectious Diseases**

1. Infection, infectious process / definition, forms /. Role of the micro- and macro-organism, role of the environment.
2. Infectious disease - definition, phases and features in the course.
3. Antibacterial therapy in infectious diseases.
4. Immunotherapy in infectious diseases.
5. Pathogenetic treatment of infectious diseases: water-salt rehydration, dehydrating therapy.
6. Typhoid fever. Paratyphoid A and B.
7. Salmonellosis.
8. Staphylococcal and other food poisoning infections.
9. Botulism.
10. Shigellosis.
11. Cholera.
12. Cholienteritis.
13. Brucellosis.
14. Leptospirosis.
15. Viral hepatitis - causes, mode of infection and main pathogenetic mechanisms in hepatitis A, E, B, C, D, G.
16. Viral hepatitis - clinical picture, diagnosis, differential diagnosis and therapy.
17. Hepatic coma - pathogenesis, clinic, therapy.
18. Diphtheria.
19. Scarlet fever.
20. Measles.
21. Rubella.
22. Infectious mononucleosis.
23. Chickenpox.
24. Influenza.
25. Parainfluenza. Adenoviruses. RS-expressions.
26. Pertussis and pertussis.
27. Mumps.
28. Meningococcal disease.
29. Polio. ECHO and coxsackie virus infections.

30. Encephalitis - herpetic, seasonal.
31. Marseille fever.
32. Ku fever.
33. Lyme disease.
34. Crimean hemorrhagic fever.
35. Hemorrhagic fever with renal syndrome.
36. Anthrax.
37. Tetanus.
38. Rage.
39. HIV / AIDS.
40. Tularemia.

➤ **SUMMARY FOR SEMESTERIAL EXAM-tropical diseases**

1. Viral hemorrhagic fevers - a common feature. Hunt viral lung syndrome.
2. Hemorrhagic fever of the Rift Valley.
3. Argentine and Bolivian hemorrhagic fevers.
4. Hemorrhagic fever Lassa.
5. Yellow hemorrhagic fever.
6. Hemorrhagic fevers Ebola and Marburg.
7. Dengue. Dengue hemorrhagic fever. Dengue shock syndrome.
8. Smallpox / brief data /. Monkeypox. Cowpox smallpox.
9. Typhoid fever - epidemic (lice) and endemic (rat).
10. Spotted fever on the rocky mountains.
11. Vesicular fever.
12. Tsutsugamushi fever (Japanese river fever).
13. Volyn (Trench) fever.
14. Typhoid fever - epidemic (lice) and endemic (tick).
15. Melioidosis. Sap.
16. Leprosy - clinical picture and clinical variants.
17. Plague.
18. Diarrhea of travelers.

➤ **SUMMARY FOR STATE EXAM - infectious diseases**

1. Infection, infectious process / definition, forms /, infectious disease.
2. Symptoms and syndromes of infectious diseases.
3. Basic clinical and laboratory tests for infectious diseases.
4. Microbiological and virological research in infectious diseases.
5. Etiological treatment of infectious diseases - antibiotic, chemotherapeutic and immunobiological.
6. Pathogenetic treatment of infectious diseases - principles of dehydrating and rehydrating therapy.
7. Typhoid fever, paratyphoid "A" and paratyphoid "B".
8. Salmonellosis.
9. Food poisoning.
10. Botulism.
11. Shigellosis.
12. Cholenteritis.
13. Cholera.
14. Brucellosis.
15. Leptospirosis.
16. Viral hepatitis type "A" and type "E".

17. Viral hepatitis type "B" and type "E".
18. Viral hepatitis type "C" and type "G".
19. Acute liver failure in viral hepatitis.
20. Diphtheria.
21. Scarlet fever.
22. Cranberry.
23. Rubella and hazelnut.
24. Infectious mononucleosis.
25. Influenza and ARI.
26. Pertussis and pertussis.
27. Mumps.
28. Meningococcal disease.
29. Polio.
30. Cocksackie and ECHO viral infections.
31. Plague.
32. Tularemia.
33. Typhoid fever - epidemic and endemic.
34. Ku fever.
35. Marseille fever.
36. Herpes simplex and seasonal (arboviral) encephalitis.
37. Recurrent typhus - lice and ticks.
38. Lyme disease.
39. Crimean hemorrhagic fever.
40. Hemorrhagic fever with renal syndrome.
41. Yellow fever.
42. Papatation fever. Dengue.
43. Anthrax.
44. Tetanus.
45. Rage.
46. HIV / AIDS

MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
EPIDEMIOLOGY, INFECTIOUS DISEASES,
MEDICAL PARASITOLOGY AND
TROPICAL MEDICINE
(CYCLE OF MEDICAL PARASITOLOGY)

Approved by the Departmental Council on 31.01.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

CYCLE OF MEDICAL PARASITOLOGY

SYLLABUS

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								5 th year	
Medical Parasitology	X	Total	Lectures	Practices	ECTS	3.2	8.2*	IX	X
		41	26	15	5.0			-	2/1

*Credits for Epidemiology, Infectious Diseases, Medical Parasitology and Tropical Medicine

DISCIPLINE: Medical Parasitology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: Mandatory

LEVEL OF QUALIFICATION: Master degree /M/

FORM OF TRAINING: Lectures, practices

YEARS OF TRAINING: 5th year

DURATION OF TRAINING: 1 semester (X semester)

ACADEMIC HOURS: 26 hours of lectures, 15 hours of practices

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Microscopes, permanent and temporary microscopic preparations, equipment used for serological tests, multimedia presentations

FORMS OF EVALUATION: Ongoing evaluation – oral examination, colloquia on different parts, tests; Final evaluation - test, written exam;

ASPECTS OF EVALUATION CRITERIA: Participation in discussions, evaluation of the tests;

SEMESTER EXAM: (joint exam with Epidemiology and Infectious Diseases)
Yes /entry test, written exam/

STATE EXAM: No

LECTURER: Habilitated lecturer from the Department of Infectious Diseases, Parasitology and Tropical Medicine

DEPARTMENT: Infectious Diseases, Parasitology and Tropical Medicine, Section of Parasitology

ANNOTATION

All clinical entities are to be presented based on the following algorithm – causative agent (morphology and life cycle), brief epidemiology (source of infection, infective form, mode of transmission), pathology and pathogenesis, clinical disease, complications, laboratory studies, parasitological diagnosis – materials and methods, differential diagnosis, treatment (medication, dosage, treatment regimen), prophylaxis.

BASIC AIMS OF THE DISCIPLINE:

1. To present the modern theoretical knowledge of etiology, epidemiology, pathogenesis, clinical picture, laboratory tests, diagnosis, differential diagnosis, treatment and prevention of parasitic diseases.
2. To introduce students in practical skills of collecting and interpreting the data from a patient's medical history, physical examination and laboratory tests.
3. To introduce students in making a differential diagnosis and therapeutic plans.

EXPECTED RESULTS

Upon completion of the training, students must have the following knowledge and skills:

1. To take a patient's medical history (history of travelling to an endemic region);
2. To be able to interpret the data from patients' physical examinations and laboratory tests;
3. To know the rules of collection, storage and transportation of biological materials (feces, blood, urine, cerebrospinal fluid, sputum) for parasitological examination;
4. To be able to make morphological diagnosis;
5. To know the principles of serological diagnosis;
6. To know the indications and contraindications for treatment of different parasitic diseases;
7. To know the main antiparasitic drugs;
8. In intestinal parasitic diseases with or without diarrhea:
 - to know the causative agents of intestinal parasitic infections;
 - to be able to examine permanent and temporary microscopic preparations in order to identify the causative agents;
 - to be able to do a transparent adhesive (cellophane) tape test to identify pinworm or pinworm eggs;
 - to be able to determine the different degrees of dehydration from clinical data;
 - to be able to make a differential diagnosis with other intestinal diseases and disorders;
 - to know the treatment of intestinal parasitic diseases;
9. In infections caused by blood or tissue parasites:
 - to be able to do a physical and neurological examination;
 - to be able to detect the signs of meningeal irritation in different age groups;
 - to know malaria diagnostic methods (preparation of thick and thin blood smears);
 - to be aware of trichinosis and artificial digestion;
 - to know the treatment of malaria, visceral leishmaniasis, cystic echinococcosis, trichinosis;

10. In parasitic diseases with rash or skin lesions:

- to be able to make an accurate and complete description of rash or skin lesions;
- to know types of tissue specimens and testing in cutaneous leishmaniasis;

LECTURES

LECTURE №1 – 2 hours

Introduction to clinical parasitology. Parasitism, parasites and hosts. Basic pathogenetic mechanisms. Classification of parasitic diseases. Amoebiasis (intestinal and extraintestinal). Diseases caused by free-living amoebae – naegleriasis, acanthamoebiasis.

LECTURE №2 – 2 hours

Visceral leishmaniasis (Mediterranean type). Old World cutaneous leishmaniasis. Trichomoniasis. Giardiasis.

LECTURE №3 – 2 hours

Malaria.

LECTURE №4 – 2 hours

Balantidiasis. Toxoplasmosis (congenital and acquired). Opportunistic infections – pneumocystosis, cryptosporidiosis.

LECTURE №5 – 2 hours

Taenia saginata (beef tapeworm) infection. Taenia solium (pork tapeworm) infection. Cysticercosis. Hymenolepiasis. Dipylidiasis. Diphyllbothriasis. Coenurosis. Cystic echinococcosis. Alveolar hydatid disease.

LECTURE №6 – 2 hours

Fascioliasis. Dicrocoeliasis. Trichinosis.

LECTURE №7 – 2 hours

Enterobiasis (pinworm infection). Ascariasis. Trichuriasis (whipworm infection). Strongyloidiasis. Trichostrongylidosis.

LECTURE №8 – 2 hours

Rare nematode infections – dioctophymosis, gongylonematosis, tominxosis, hepaticoliasis, dirofilariasis. Toxocariasis (visceral larva migrans). Miasis. Arthropods - mosquitoes, phlebotomies, blood-sucking flies, bedbugs, fleas, ticks - pathogenic action, epidemiological role.

LECTURE №9 – 2 hours

Introduction to tropical medicine. Parasitic diseases in the tropics. African trypanosomiasis (sleeping sickness). American trypanosomiasis (Chagas disease).

LECTURE №10 – 2 hours

Malaria in the tropics. Treatment of drug-resistant malaria. WHO's strategy for malaria elimination.

LECTURE №11 – 2 hours

Visceral leishmaniasis (Indian type, South-American type). New World cutaneous leishmaniasis. Mucocutaneous leishmaniasis.

LECTURE №12 – 2 hours

Sparganosis. Opisthorchiasis. Clonorchiasis. Fasciolopsiasis. Metagonimiasis. Heterophyiasis. Nanophyetiasis. Paragonimiasis. Schistosomiasis.

LECTURE №13 – 2 hours

Hookworm infections – ancylostomiasis, necatoriasis. Strongyloidiasis. Dracunculiasis. Filariasis – wuchereriosis, brugianis, loiasis, onchocerciasis, mansonellosis, acantoheylonematosi (dipetalonematosi).

PRACTICES**PRACTICAL №1 – 2 hours**

Introduction to clinical parasitology. Diagnostic approach to patients with suspected parasitic diseases. History taking and physical examination of patients with parasitic diseases. Basic laboratory methods in the diagnosis of parasitic infections. Structure and organization of parasitology laboratories. Personal safety standards. Registration and control of parasitic diseases. Clinical follow-up of patients with parasitic diseases. Control and surveillance of imported parasitic infections.

PRACTICAL №2 – 2 hours

Protozoan infection – visceral leishmaniasis (Mediterranean type). Intestinal protozoan infections – giardiasis, amoebiasis. Protozoan infections associated with immunodeficiency – toxoplasmosis, pneumocystosis, cryptosporidiosis. Naegleriasis, acanthamoebiasis.

PRACTICAL №3 – 2 hours

Malaria.

PRACTICAL №4 – 2 hours

Cestode infections – taeniasis (pork tapeworm infection), cysticercosis, taenia saginata (beef tapeworm) infection, hymenolepiasis, diphyllbothriasis (fish tapeworm infection), cystic echinococcosis (hydatid disease), alveolar echinococcosis. Trematode infections – fascioliasis, dicercoceliasis.

PRACTICAL №5 – 2 hours

Cutaneous leishmaniasis, mucocutaneous leishmaniasis. African trypanosomiasis (sleeping sickness), American trypanosomiasis (Chagas disease). Opportunistic infections – cyclosporiasis, isosporiasis, microsporidiosis, sarcocystosis.

PRACTICAL №6 – 2 hours

Trematode infections – paragonimiasis, clonorchiasis, opisthorchiasis, fasciolopsiasis, metagonimiasis, schistosomiasis. Nematode infections – hookworm infections (ancylostomiasis, necatoriasis), filariasis (wuchereriasis, brugiasis, onchocerciasis, loiasis).

PRACTICAL №7 – 2 hours

Nematode infections – enterobiasis (pinworm infection), ascariasis, trichuriasis (whipworm infection), trichinosis, strongyloidiasis (threadworm infection), toxocariasis (visceral larva migrans).

PRACTICAL №8 – 1 hours

Ectoparasites.

BIBLIOGRAPHY

1. Paniker's Textbook of Medical Parasitology, 8th ed., 2018. Revised and edited by Sougata Ghosh. Jaypee Brothers Medical Publishers (P) Ltd.
2. Essentials of Medical Parasitology, 1st ed., 2014. Apurba Sankar Sastry, Sandhya Bhat K. Jaypee Brothers Medical Publishers (P) Ltd.
3. Human parasitology, 4th ed., 2013. Burton J. Bogitsh, Clint E. Carter, Thomas N. Oeltmann. Elsevier.
4. Atlas of Medical Parasitology, 1st ed., 1996. Shiba Kumar Rai, Shoji Uga, Nobumasa Kataoka, Takeo Matsumira. Kyokuseisya Co.,Ltd.
5. Basic laboratory methods in medical parasitology, 1991. World Health Organization, Geneva.
6. Centers for Disease Control and Preventions. www.cdc.gov.
7. World Health Organization. www.who.int.

CONSPECTUS**MEDICAL PARASITOLOGY**

Medical students 5th year

LOCAL PARASITIC INFECTIONS

1. Tertian malaria – life cycle, clinical disease, complications, diagnosis and treatment
2. Quartan malaria – life cycle, clinical disease, complications, diagnosis and treatment
3. Visceral leishmaniasis – Mediterranean type

4. Naegleriasis, Acanthamoebiasis
5. Trichomoniasis
6. Giardiasis
7. Cryptosporidiosis
8. Toxoplasmosis
9. Pneumocystosis
10. Balantidiasis
11. Enterobiasis (pinworm infection)
12. Ascariasis
13. Trichuriasis (whipworm infection)
14. Trichinosis
15. Toxocariasis (visceral larva migrans)
16. Taeniasis (pork tapeworm infection). Cysticercosis
17. Taeniarhynchosis (beef tapeworm infection)
18. Hymenolepiasis (dwarf tapeworm infection)
19. Diphyllbothriasis (fish tapeworm infection)
20. Cystic echinococcosis (hydatid disease)
21. Alveolar echinococcosis (alveococcosis)
22. Fascioliasis (liver fluke disease). Dicrocoeliasis

TROPICAL PARASITIC INFECTIONS

1. Tropical malaria – life cycle, clinical disease, complications, diagnosis and treatment
2. Ovale malaria – life cycle, clinical disease, complications, diagnosis and treatment
3. Amoebiasis – intestinal and extraintestinal
4. Visceral leishmaniasis – Indian type
5. Visceral leishmaniasis – South-American type
6. Cutaneous leishmaniasis
7. Mucocutaneous leishmaniasis
8. African trypanosomiasis (sleeping sickness)
9. American trypanosomiasis (Chagas disease)
10. Hookworm infections – ancylostomiasis and necatoriasis
11. Strongyloidiasis
12. Filariasis – wuchereriosis, brugiasis
13. Loiasis
14. Onchocerciasis
15. Opisthorchiasis, clonorchiasis
16. Fasciolopsiasis, metagonimiasis, heterophyiasis
17. Paragonimiasis
18. Urogenital schistosomiasis
19. Intestinal schistosomiasis
20. Japanese schistosomiasis

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
FORENSIC MEDICINE AND
DEONTOLOGY

Approved by the Department Council on 30.05.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

Syllabus

Discipline	Final exam/ semester	Academic hours				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			5 th year	
Forensic Medicine and Deontology	after the 10th semester	75	45	30	2.5	1.5	4.0	IX	X
								-	3/2

DISCIPLINE: Forensic Medicine and Deontology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS: MANDATORY DISCIPLINE

LEVEL OF QUALIFICATION: Master Degree in Medicine

FORMS OF TRAINING: *Theoretical competence via lecture course:* basic knowledge of basics of legal proceedings in forensic examination in The Republic of Bulgaria, thorough knowledge of Forensic Traumatology, Tanatology, Toxicology, Deontology.

Practical skills via practical seminars: active participation in crime scene investigation of a dead body; writing a forensic report individually; distinguishing features of death, defining its duration, primary assessing its type and kind, properly reacting to the bodies of Ministry of Interior and approaching them whenever necessary.

YEAR OF TRAINING: 5th year

DURATION OF TRAINING: One semester

ACADEMIC HOURS: 75 hours (30 hours practical seminars + 45 hours lecture course)

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: projectors, diagrams, sketches, models, photographs, instructional film, organ specimens, posters related to different medicolegal cases, spectrophotometers, laboratory equipment, histologic specimens, multimedia presentations, instructional computers.

FORMS OF EVALUATION: Current control – tests at the end of each seminar. The grade resulting from the current control constitutes one third of the final grade. Final control – an end-of-semester exam; the grade thereof constitutes one third of the final grade. This exam

includes a test, a written exam on a question randomly selected for each student and a discussion.

EVALUATION CRITERIA: Approved and included in the Academic Standard Protocol of the subject Forensic Medicine and Deontology

ASPECTS OF EVALUATION CRITERIA: basic knowledge of the basics of legal proceedings in forensic examination in The Republic of Bulgaria, thorough knowledge of Forensic Traumatology, Tanatology, Toxicology, Deontology.

SEMESTER EXAM: An end-of-semester exam. This exam includes a test, a written exam on a question randomly selected for each student and a discussion.

STATE EXAM: No

LECTURER: Assoc. Prof. S. Spasov, Assoc. Prof. P.Timonov

DEPARTMENT: Department of Forensic Medicine and Deontology

ANNOTATION

Basics of legal proceedings in Forensic Medicine. Forensic traumatology. Basics of Forensic Medical Expert Examination of living persons. Forensic Obstetrics and Gynaecology. Expert Examination of simulated diseases and self-injuries. Expert Examination in case of disputable paternity and/or maternity. Forensic Toxicology. Expert Examination of written data. Expert Examination of trace evidence. Medical Ethics and Deontology.

BASIC AIMS OF THE DISCIPLINE

The aim of the course in Forensic Medicine is to develop capability and skills necessary in graduating medical students, for medico-legal cases in their career practice.

EXPECTED RESULTS

Gaining knowledge and practical skills necessary for participation in the functioning of courts.

Lectures

LECTURE No 1 - 2 hours: Historical aspects of Forensic Medicine. Subject, objectives, methods and content of Forensic Medicine. Basics of legal proceedings in and organization of Forensic Medical Expert Examination – Penal Procedure Code, Criminal Code, Code of Civil Practice. Rights and obligations of the expert. Types of Expert examinations. Subjects of Forensic Medical Expert Examinations. Subjects of Forensic Medical Expert Examination. Responsibility of the experts.

LECTURE No 2 - 2 hours: Injuries caused by mechanical factors – general description, classification of injuries. Forensic Medical Expert Examination in blunt force trauma. Soft-tissue traumatic injuries – abrasions, bruises, lacerated wounds. Bone fractures typical of Forensic Medicine. Blunt force trauma of internal organs. Medicolegal aspects of blunt force trauma. Objectives of the Forensic Medical Expert Examination in case of such injuries.

LECTURE No 3 – 2 hours: Traffic accidents. Definition, classification, types. Injuries of pedestrians - characteristics of traumatic injuries. Rolling injuries - characteristics of traumatic injuries. Injuries of occupants of the vehicles-characteristics of traumatic injuries. Problems in cases of motor vehicle traumas. Objectives of the Forensic Medical Expert Examination. Medicolegal importance.

LECTURE No 4 – 2 hours: Forensic Medical Expert Examination in cases of sharp force trauma and firearm injuries. Stab, incised, puncture and chop wounds. Morphological characteristics. Distant, close, near and contact range gunshots. Morphological characteristics of entry and exit firearm wounds. Additional gunshot factors. Medicolegal importance. Objectives of the Forensic Medical Expert Examination.

LECTURE No 5 – 2 hours: Cause and mechanism of death in case of mechanic force injuries. Vital and postmortem injuries.

LECTURE No 6 - 2 hours: Mechanical asphyxias – major issues, classification of mechanical asphyxias. Pathophysiology of mechanical asphyxias. Hanging, ligature strangulation and manual strangulation – general and type characteristics, manner of death. Problems. Objectives of the Forensic Medical Expert Examination.

LECTURE No 7 - 2 hours: Other types of mechanical asphyxias – drowning, airway obstruction, postural asphyxia, asphyxia due to exhaustion or displacement of environmental oxygen. Problems. Objectives of the Forensic Medical Expert Examination.

LECTURE No 8 - 2 hours: Thermal deaths. Cold. Burns. Scalds. Electrical injuries. Lightning stroke. Specific medicolegal issues.

LECTURE No 9 - 2 hours: Forensic Toxicology – definition of “poison”, toxicokinetics and toxicodynamics of poisoning, conditions influencing poison reactions, major issues, medicolegal tests to detect drugs or poisons in living persons or dead bodies, toxicological analysis.

LECTURE No 10 - 2 hours: Forensic Toxicology – specific issues, poisoning caused by different types of poison. Rare, particular poisonings.

LECTURE No 11 - 2 hours: Forensic Medical Expert Examination of dead body – Violent death and Sudden natural death.

LECTURE No 12 - 2 hours: Forensic Thanatology. Cause and mechanism of death. Meaning of cellular, clinical (somatic), brain-stem, biological death and suspended animation. Determination of death. Early postmortem changes –changes in the skin, changes in the eye, livor mortis, algor mortis, rigor mortis. Late postmortem changes- putrefaction, adipocere, mummification. Time since death.

LECTURE No 13 - 2 hours: Forensic Medical Expert Examination of living people. Bodily injuries according to the Criminal Code of the Republic of Bulgaria. Legal and medical criteria for bodily injury. Short summary of the various medicobiological signs.

LECTURE No 14 - 2 hours: Forensic Medical Expert Examination in cases pertaining to sex. Sexual offences and paraphilias – legal criteria according to the Criminal Code of the Republic of Bulgaria. Forensic Medical Expert Examination in case of debauchery.

LECTURE No 15 - 2 hours: Forensic Medical Expert Examination in cases of pregnancy, abortion and delivery. Criminal abortion – legal regulation of willful abortion in the Republic of Bulgaria. Criminal liability in cases of criminal abortion.

LECTURE No 16 - 2 hours: Infanticide – legal criterion. Forensic Medical Expert Examination of dead body of newborn infant in cases of infanticide. Major issues, particular aspects of cadaver examination.

LECTURE No 17 - 2 hours: Disputable paternity or maternity. Blood type test – genetic rules and methods of examination. ABO system – clinical and medicolegal importance.

LECTURE No 18 - 2 hours: Forensic Medical Expert Examination of trace (material) evidence. Biological materials- blood, sperm, saliva and other materials. DNA typing.

LECTURE No 19 - 2 hours: Forensic Medical Expert Examination in cases of forensic anthropology identification. Identification data.

LECTURE No 20 - 2 hours: Legal and deontological issues in the medical practice - legitimacy of medical actions. Euthanasia.

LECTURE No 21 - 2 hours: Professional negligence (Malpractice) by medical staff. Classification of Malpractice. Willful crimes regarding medical activity.

LECTURE No 22 - 3 hours: Professional incompetence of medical staff. Medical errors. Fatal accidents (misadventure) in the medical practice. „Calculated risk” cases in the medical practice.

Practices

SEMINAR No 1 – 2 hours: Introduction to Forensic Medicine – general concept of Forensic Medicine. Subjects of Forensic Medical Expert Examinations. Acquainting students with the requirements of the department, the proceedings of the seminars, the current control and the final exams.

SEMINAR No 2 – 2 hours: Basics of legal proceedings in Forensic Medicine. Introduction of the normative base concerning Forensic Medical Expert Examinations in the Republic of Bulgaria. Subjects of Forensic Medical Expert Examinations. Types of Forensic Medical Expert Examinations. Experts – rights, obligations, responsibility, right of challenge, forensic problems in the work of medical practitioners. Medicolegal reports.

SEMINAR No 3 – 2 hours: Forensic Medical Expert Examination in cases of blunt force trauma. Injuries caused by mechanical factors – general description, classification of injuries. Soft- tissue traumatic injuries – abrasions, bruises, lacerated wounds. Bone fractures typical of Forensic Medicine. Blunt force trauma of internal organs. Medicolegal aspects of blunt force traumas. Objectives of the Forensic Medical Expert Examinations in cases of such injuries. Blunt force trauma of internal organs. Medicolegal aspects of blunt force traumas. Objectives of the Forensic Medical Expert Examination in cases of such injuries. Demonstrations of specimens, photographs, and slides of both dead bodies and living people.

SEMINAR No 4 - 2 hours: Forensic Medical Expert Examination in cases of sharp force trauma. Stab, incised, puncture and chop wounds. Morphological characteristics. Demonstrations of specimens, photographs, and slides of both dead bodies and living people.

SEMINAR No 5 – 2 hours: Forensic Medical Expert Examination in cases of traumatic injuries due to the traffic accidents. Demonstrations of specimens, photographs, and slides of both dead bodies and living people.

SEMINAR No 6 – 2 hours: Forensic Medical Expert Examination in cases of firearm injuries. Distant, close, near and contact range gunshots. Morphological characteristics of entry and exit firearm wounds. Additional gunshot factors. Demonstrations of specimens, photographs, and slides of both dead bodies and living people.

SEMINAR No 7 – 2 hours: Forensic Medical Expert Examination in cases of mechanical asphyxias. Types of mechanical asphyxia- hanging, ligature strangulation and manual strangulation – general and type characteristics, manner of death. Problems. Objectives of the Forensic Medical Expert Examination. Other types of mechanical asphyxia - drowning, airway obstruction, postural asphyxia, asphyxia due to exhaustion or displacement of environmental oxygen. Medicolegal autopsy- cadaver demonstration.

SEMINAR No 8 - 2 hours: Forensic Medical Expert Examination of a dead body – Medicolegal autopsy- demonstration.

SEMINAR No 9 – 2 hours: Forensic Medical Expert Examination of a dead body. Medicolegal autopsy in cases of traumatic injuries, postmortem changes, diagnosis of death.

SEMINAR No 10 - 2 hours: Forensic Medical Expert Examination of living people – demonstration.

SEMINAR No 11 - 2 hours: Forensic Medical Expert Examination of living people – the students work alone under the supervision of the assistant-professor.

SEMINAR No 12 – 2 hours: Forensic Medical Expert Examination of living people- the students work alone and afterwards their work is checked and corrected by the assistant-professor.

SEMINAR No 13 – 2 hours: Forensic Medical Expert Examination of written data. Documentary evidence. Introduction and preparing a specific Forensic Medical Expert Examination for a particular case.

SEMINAR No 14 - 2 hours: Forensic Medical Expert Examination of trace (material) evidence. Examination of blood stains- general, chemical and serological examinations (ABO system).

SEMINAR No 15 – 2 hours: Forensic Medical Expert Examination in cases of poisoning. Cases. Practical introduction of the methods of chemical examination of biological materials.

Bibliography

Compulsory:

1. Doichinov I., Forensic Medicine, Plovdiv, 1997
2. Forensic medicine for medical students. Edited by Prof. Dr. Stoycho Radanov, 1992
3. Guide for practical exercises in forensic medicine. Edited by Prof. Dr. Stoycho Radanov, Medicine and Physical Education, Sofia, 1984

4. Forensic examination of living persons. Edited by Prof. Dr. Stoycho Radanov, S., Medicine and Physical Education, 1986
5. Pechilkov, I., Bodily injuries under the Criminal Code of the Republic of Bulgaria
6. Dr. Svetlozar Spasov - Selected issues in medical deontology and medical law - a guide for students, bachelors and masters in medicine - University Publishing House "Paisii Hilendarski" - Plovdiv 2015
7. Svetlozar Spasov - General Medical Deontology - University Publishing House "Paisii Hilendarski" - Plovdiv 2018
8. Ivan Tsranchev, Plamena Dineva, Kristina Hadjieva, Svetlozar Spasov - Collection of sample test questions in forensic medicine - Department of Forensic Medicine and Deontology Medical University - Plovdiv - Lax Book - Plovdiv - 2018
9. Ivan Tsranchev - Forensic aspects of violence under the editorship of Assoc. Prof.
10. Dr. P. Timonov, MD - Lax Beech - Plovdiv - 2020 Lecture course and notes. MCQs. Pavel Timonov. Lax Book.
11. The essentials of Forensic medicine and Toxicology- Dr K. S. Narayan Reddy, 1999.
12. Handbook of Forensic medicine and Toxicology- V.V. Pillay, 2001.
13. Criminal Code of the Republic of Bulgaria (<http://legislationonline.org>)
14. V.Di Maio. Forensic Pathology. 2002.

Conspectus

1. Objects of forensic examination. Forensic documentation. Description and characteristics of the different types of forensic documentation.
2. Injuries and deaths from various external factors. Definition and qualification of injuries. Damage from mechanic factors - general characteristics, classification. Factors, producing body injuries. Mechanisms, causing the damage.
3. Forensic examination in cases of injuries and death from blunt objects. Abrasions, bruises, wounds - definition, mechanism of production, morphology, forensic significance. Questions of forensic importance.
4. Forensic examination in cases of injuries and death from blunt objects. Damages to internal organs and bones from blunt objects. Forensic significance.
5. Car accidents. Definition, classification and general characteristics of injuries. Features of the expertise - stages and complexity. Questions of forensic importance.
6. Genesis and morphology of injuries associated to pedestrians. Questions of forensic importance.
7. Genesis and morphology of injuries in run-overs by vehicles. Questions of forensic importance.
8. Genesis and morphology of injuries inside the car. Questions of forensic importance.
9. Injuries and death from sharp objects. Puncture and cut wounds. Morphological characteristics of the injuries. Questions of forensic importance.

10. Injuries and death from sharp objects. Stab and chop wounds. Morphological characteristics of the injuries. Questions of forensic importance.
11. Damage from firearms. Firearms and ammunitions - a brief description. Forensic ballistics - shot production and damaging factors.
12. Ballistics of the gunshot wound - mechanism of formation of injuries - entry gunshot wound, wound track (permanent and temporary cavity), exit gunshot wound. Shot distances.
13. Damage from firearms. Shot from a distant range. Characteristics of the injuries - entry gunshot wound, wound track and exit gunshot wound.
14. Damage from firearms. Close range shot. Characteristics of the injuries - entry gunshot wound, wound track and exit wound.
15. Damage from firearms. Contact range shot. Characteristics of the injuries - entry gunshot wound, wound track and exit gunshot wound.
16. Damage from firearms- atypical weapons, homemade weapons, special purpose weapons, damage from explosives. Brief description of weapons and injuries.
17. Main issues of the forensic examination in case of injuries from firearms.
18. Vitality of mechanic injuries.
19. Cause and mechanism of death in mechanic injuries.
20. Injuries and death from high and low temperature. Characteristics of disabilities. Possibility to burn a corpse. Questions of forensic importance.
21. Injury and death from electric current - technical and atmospheric electricity. Features of the expertise. Questions of forensic importance.
22. Health disorders and death from oxygen deficiency (mechanic asphyxia). Hypoxia and mechanical asphyxia. Classification of mechanic asphyxia.
23. Mechanic asphyxia from neck compression (strangulation). Thanatogenetic mechanisms. Types. Characteristics. Questions of forensic importance.
24. Mechanic asphyxia from compression of the body, from obstruction of the airways. Asphyxia in enclosed space. Autoerotic asphyxia. Characteristics. Questions of forensic importance.
25. Forensic examination in case of drowning - phases, morphologic findings, diagnostics. Death in water. Questions of forensic importance.
26. Health disorders and death from poisoning. General questions. Conditions on which the action of poisons depends. Toxokinetics and toxodynamics.
27. Poisoning with narcotic substances - morphine, heroin, cocaine, etc. Characteristics of poisonings. Features of the examination of the corpse in death from drugs.
28. Ethyl alcohol poisoning. Characteristics of poisoning. Forensic examination to establish alcohol in a living person and a corpse.
29. Forensic examination of living persons. General data. Reasons. Stages and methodology of research, forensic documentation - types, structure. Procedural requirements.
30. Forensic examination of bodily injuries under Penal Code of Republic of Bulgaria. Legal and medical criteria. Determining the nature of the body injury. Medico-biological characteristics of mild body injury.
31. Medico-biological characteristics of severe body injury under Penal Code of Republic of Bulgaria.

32. Medico-biological characteristics of medium body injury under Penal Code of Republic of Bulgaria.
33. Forensic examination of simulated diseases and self-harm. Main purposes of forensic examination.
34. Forensic examination of sexual crimes. Fornication. Legal criteria. Forensic issues.
35. Forensic examination of sexual offenses. Rape. Legal criteria. Forensic issues.
36. Forensic examination of sexual crimes. Homosexual acts. Legal criteria. Forensic issues.
37. Forensic examination of a corpse. Determining of the death. Dying and death. Diagnosis of death. Medical death certificate. Imaginary death.
38. Supravital reactions. Early postmortal changes. Forensic significance.
39. Late postmortal changes. Forensic significance.
40. Determining the time interval since the moment of death. Methods and their forensic significance.
41. Organization and stages of the examination of the corpse. Examination of the corpse at the crimescene. Examination of the corpse during autopsy. Reasons for forensic examination of a corpse. Rules for forensic examination of the corpse.
42. Forensic examination of corpses of newborns. Infanticide. Legal criteria. Forensic issues.
43. Forensic examination of corpses died of non-violent sudden death. General data. Diagnosis and purposes of the forensic examination in case of sudden death. Factors leading to sudden death.
44. Deontology and medical law - relationships and trends. Deontological documents. Legal and medical documents. Legal regulation of the medical-diagnostic activity.
45. Medical and legal nature of the Medical Standards and Regulations. Clinical pathways - nature and legal significance.
46. Legal capacity of medical persons - Bulgarian citizens and foreigners.
47. Limits of the legal capacity of the medical persons. Specialization. Work in the risk zone. Medical activities performed in conditions of extreme necessity.
48. Informed consent of patients under the Health Act. Modern legal requirements for medical personnel in connection with the provision of information to patients.
49. Patients' rights under the European and National Charter of Patients' Rights - in general, in hospitalization and in emergencies.
50. Emergencies. Patients' rights in case of medical emergency.
51. Scope and normative regulation of the obligatory and compulsory treatment.
52. Classification of professional violations, omissions and crimes in the exercise of the medical profession.
53. Criminal and disciplinary responsibility of the medical persons in case of professional omissions and mistakes.
54. Administrative and civil liability in case of professional omissions and mistakes. Tort. The concept of guilt. Procedure for imposing administrative penalties for professional omissions and mistakes. Ways to challenge an act, statement of findings and penal decree in case of imposed administrative penalties on medical persons.
55. Accidents in medical practice.

Head of Department:

Assoc.Prof. Spasov, Sv., PhD

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
UROLOGY

Approved by the Department Council - Protocol № 5/07.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

UROLOGY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								4/5 year	
		Total	Lectures	Practices	ECTS			VIII	IX
Urology	VIII / IX	50	20	30	1.7	0.8	2.5	20/30	20/30

Name of the discipline:

"UROLOGY"

Type of discipline according to EDI:

Mandatory

Level of training:

Master / M /

Forms of training:

Lectures, exercises

Training course:

IV / V course

Duration of training:

One semester

Hours:

20 hours of lectures, 30 hours of exercises

Teaching tools:

Audio visual equipment; models; catheters; imaging equipment; ureteral catheter, suprapubic catheter, nephrostomy set, work with patients under the surveillance of the professor.

Assessment: Current and final assessments: Test and oral exam

Final assessment:

Assessment by the assistant during the semester;
Test including open and closed questions and clinical cases;
Oral exam with final grade.

Aspects of the assessment:

The final grade determines the extent to which the student has achieved the goal of the education set at the beginning. It is multi-component and includes a written final exam grade as well as the following components:

Assessment from ongoing control
Assessment from a written exam
Assessment from the final oral exam

If one of the components of the final grade is weak 2, then the final grade will be weak 2.

Semester exam:

Written and oral

State Exam:

Part of the "Surgical Diseases" exam

Professors:

Assoc. Prof. at the Department of Urology and General Medicine

Department:

UROLOGY AND GENERAL MEDICINE

ANNOTATION

Urology is a medical specialty with a predominant surgical focus. It studies the symptoms, etiology, pathogenesis, diagnosis, prevention and treatment of the diseases of the male genitourinary system and female urinary system.

MAIN TASKS OF THE UROLOGICAL PROGRAMME

To teach the students: Patient physical examination, laboratory and imaging investigation.

To develop the ability of clinical interpretation of the general and urological symptoms. The differential diagnosis and the final diagnosis of urological patient.

To understand the acute and urgent urological cases and the appropriate treatment.

To assimilate practical skills for obtaining the right diagnosis.

To be able to perform basic urological procedures and manipulations.

To understand the interdisciplinary approach in urology with nephrology, general surgery, pediatrics, obstetrics and gynecology, oncology, radiology, etc.

EXPECTATIONS

Assessment of basic urological information from the history and the physical examination.

To be able to perform the most commonly used urological methods of examination and treatment – digital rectal examination, ultrasound examination, catheterization, suprapubic drainage of the urine (cystofix).

Laboratory and imaging investigation.

To have the necessary knowledge about the common urological diseases in pediatrics, general medical practice, methods of screening, diagnosis and treatment.

Skills for recognition, correct assessment, approach and initial treatment of emergencies and urgent cases in urology - acute urinary tract infections, renal colic, trauma, hematuria, urinary retention, paraphimosis, testicular torsion, priapism, etc.

Understand the indications for surgical or conservative treatment of urological diseases.

LECTURES

Lecture № 1- 2 hours

Semiotics of urological diseases. Overactive bladder.

General symptoms and scales for assessing the general condition of the patient. Classification of urological symptoms. Pain - characteristic, localization and mechanism of onset. Disorders of urination. Changes in urine output - quantitative and qualitative (characteristics of hematuria according to different stratification criteria).

Genito-sexual disorders. Erectile dysfunction - definition, diagnosis, urological diseases and operations as a cause of functional and organic erectile dysfunction, diagnosis and therapeutic recommendations for treatment. Overactive bladder - pathogenesis and treatment options.

Lecture № 2 - 2 hours

Instrumental methods of investigation in urology. Laboratory investigation.

Anatomical and physiological characteristics of male and female urethra. Instrumental methods for examination of urethra, bladder, ureter and kidney - technique, indications and contraindications (relative and absolute).

Types of catheters, necessary materials and tools for catheterization. Laboratory investigations - specific tests, a panel of tumor biomarkers, functional examination of renal function and hormonal tests. Standardized criteria for evaluation of ejaculate according to WHO (2010). - disorders in the sperm analysis and their clinical evaluation (OAT - syndrome).

Lecture № 3 - 2 hours

Congenital disorders of the urinary and male genital system.

Embryonic development of the urinary system. Kidney abnormalities - in number, size and position. Structural abnormalities - polycystic kidney disease, kidney cysts. Classification of cysts by Bosniak. Ureteral abnormalities.

Bladder abnormalities. Embryonic development of the testes. Congenital diseases of the testicles - classification, diagnosis, surgical management. Genetic syndromes leading to abnormalities in the size and structure of the testis. Congenital diseases of the epididymis. Congenital diseases of the vas deferens. Congenital diseases of the prostate gland.

Congenital anomalies of the penis. Congenital anomalies of the urethra - modern classifications and surgical approach. Sexual development disorders - introduction, definitions and classification, clinical manifestation and diagnostic evaluation.

Lecture № 4 - 2 hours

Injuries to the urinary system and male genital system.

Kidney trauma - introduction, classification, mechanisms of onset, pathological forms of closed kidney trauma, clinic, diagnosis, treatment. Urethral trauma - Iatrogenic ureteral trauma, diagnosis, management, prevention.

Bladder trauma - mechanism of onset, classification, Iatrogenic bladder damage, diagnosis, surgical approach. Urethral trauma - classification, clinical manifestation according to the location of the injury in the urethra, diagnosis, surgical approach. Penile trauma. Trauma of the scrotum and intrascrotal organs.

Lecture № 5 - 2 hours

Urolithiasis – etiology, pathogenesis, clinical manifestation and diagnosis.

Epidemiology. Localization and shape of urinary stones. Etiology of urolithiasis (causal and formal genesis). Chemical composition of stones. Diagnostic algorithm. Complications of urolithiasis. Acute Obstructive Renal Failure (anuria) - subrenal causes. Surgical treatment of urolithiasis - goals, types of surgery. Minimally invasive methods of treatment of urolithiasis - extracorporeal and intracorporeal.

Lecture № 6 - 2 hours

Urological tract infections.

Pyelonephritis - definition, epidemiology, etiology, surgical predisposing factors. Purulent - inflammatory diseases of the kidney - acute purulent pyelonephritis - pathoanatomical forms, pathogenesis, clinical manifestation (symptoms and forms), diagnosis, surgical approach and prevention. Urosepsis - definition, localization of purulent infection in the genitourinary system, specific difference between sepsis and urosepsis, clinical manifestation and treatment. Hospitalism. Inflammatory diseases of the bladder - etiology, classification, conservative treatment and surgical aspects. Inflammatory diseases of the prostate gland - classification, etiology, diagnosis and treatment. Inflammatory diseases of the urethra. Inflammatory diseases of the testicles and epididymis. Fournier's gangrene. Inflammatory diseases of the penis.

Lecture № 7 - 2 hours

Real parenchymal tumors and primary urothelial tumors.

Terminology of renal cell carcinoma. Epidemiology. 2016 WHO classification of renal tumors. Clinical manifestation and clinical interpretation of symptoms. Paraneoplastic syndrome. Clinical and pathological staging of the primary tumor according to TNM - 2017. Surgical treatment. Tumors of the renal pelvis and ureter - specifics in tumor spread, diagnosis and treatment. Bladder tumors - histological classification and differentiation of the tumor, clinical manifestation, clinical and pathological staging of the primary tumor, diagnosis, treatment - methods for urine derivation after cystectomy.

Lecture № 8 - 2 hours

Benign prostatic hyperplasia and prostatic carcinoma.

Benign prostatic hyperplasia (BPH) - consensus definition of the condition, endocrine control of normal prostate growth, pathogenesis of BPH, symptoms of lower urinary tract (LUTS), clinical markers for BPH progression, assessment of LUTS, diagnosis and modern medical and surgery treatment of BPH.

Prostate cancer - epidemiology; histological classification 2016 WHO, risk factors, onset and development, clinical forms of PC; diagnosis; staging; surgical treatment - definitive and palliative (maximum androgen blockade - MAB) radiotherapy - definitive and palliative; systemic therapy - hormone therapy and systemic therapy in castrated resistant PC (CRPC), combined therapeutic approaches.

Lecture № 9 - 2 hours

Neoplasia of the male genital system.

Testicular tumors - epidemiology, risk factors, staging, pathways of tumor spread, histological classification of testicular tumors according to WHO 2016, clinical manifestation (clinical masks), specific diagnostic and prognostic tumor biomarkers and their clinical interpretation, general principles of treatment and control of fertility after retroperitoneal lymph dissection and adjuvant therapy. Penile cancer - epidemiology, proven risk factors. histological classification of penile tumors according to WHO 2016, pathways for the spread of penile cancer, clinical manifestation, diagnostic tests, surgical treatment of the primary tumor and regional lymph nodes, follow-up and monitoring.

Lecture № 10 - 2 hours

Male infertility. Erectile and ejaculation disorders.

Male infertility - definition according to the WHO 2015, epidemiology, etiology of the male infertility, diagnostic assessment of male fertility, modern treatment approach in male with reduced fertility (surgical collection of sperm for the assisted reproduction).

Anatomical, physiological and nerve regulation of ejaculation. Anatomical abnormalities of ejaculation. Functional disorders of ejaculation - premature, late, painful, retrograde ejaculation and anejaculation. Pharmacological abnormalities in ejaculation. Treatment of ejaculation disorders (non-surgical and surgical). Male hypogonadism.

PRACTICAL SEMINARS

Seminar 1 – 2 hours

Semiotics of urological diseases.

Seminar 2 – 2 hours

Non-invasive methods of investigation in urology - physical, laboratory, radiology.

Seminar 3 – 2 hours

Invasive – instrumental methods of investigation in urology:

- Endoscopic

- Histological

Methods of drainage to the urinary bladder. Methods of drainage to the upper urinary system.

Seminar 4 – 2 hours

Congenital urological disease.

Seminar 5 – 2 hours

Trauma of the urinary system and male genital system.

Seminar 6 – 2 hours

Urolithiasis – Clinical manifestations and diagnosis.

Seminar 7 – 2 hours

Urolithiasis – complications and treatment. Inflammatory diseases of the urinary system. – Classification and treatment. Cystitis. Urosepsis- Diagnostic panel and treatment.

Seminar 8 – 2 hours

Benign Prostatic Hyperplasia and Prostatic Carcinoma.

Seminar 9 – 2 hours

Renal parenchymal tumors, Upper urinary tract carcinoma and urinary bladder carcinoma.

Seminar 10 – 2 hours

Bladder carcinoma. Methods of urinary diversion after cystectomy.

Seminar 11 – 2 hours

Obstructive uropathy – Classification, clinical manifestation, diagnostic and surgical approach.
Acute and chronic renal failure with urological origin.

Seminar 12 – 2 hours

Diseases of the male genital system- phimosis, paraphimosis, Peyronie's disease, priapismus, penile carcinoma, testicular carcinoma.

Seminar 13 – 2 hours

Acute scrotum – injuries, inflammatory and non-inflammatory diseases. Inflammatory diseases of the prostate.

Seminar 14 – 2 hours

Urine fistulas. Neurogenic disorders of urination. Urodynamic investigation.

Seminar 15 – 2 hours

Male infertility. Erectile and ejaculation disorders.

References:

1. Smith & Tanagho's General Urology EIGHTEENTH EDITION
2. Campbell-Walsh UROLOGY Ninth Edition
3. The European Association of Urology (EAU) Pocket Guidelines 2020
4. LECTURES

Syllabus - UROLOGY

General Urology

1. Symptoms of Disorders of the Genitourinary Tract
2. Physical Examination of the Genitourinary Tract
3. Physiology and pathophysiology of the kidneys.
4. Laboratory tests in urology - urine, blood, ejaculate, prostate secretion. Tumor biomarkers and hormonal panel for examination
5. Microbiological tests in urology - urine, blood, ejaculate wound, prostate, urethral secretions
6. Functional methods for examination of the lower urinary tract (urodynamics).
7. Imaging methods in urology - X-ray (contrast and non-contrast), ultrasound diagnostics, CT, MRI
8. Functional methods for examination of the kidneys (quantitative, samples for dilution and concentration, clearance methods, glomerular filtration).
9. Instrumental methods for research in urology.
10. Biopsy methods for examination in urology.

11. Nuclear medical (radioisotope) tests in urology - isotope nephrogram, scintigraphy - kidney and bone, PET, PET / CT
12. Mechanism of normal urination. Urinary disorders (disorders of the act of urination).
13. Quantitative changes in urine.
14. Qualitative changes in urine - hematuria, proteinuria, pneumaturia, pyuria.
15. Chronic renal failure due to urological causes - presentation, diagnosis, treatment.
16. Acute renal failure due to urological causes - presentation, diagnostic treatment.
17. Urine retention - etiology, classification, pathogenesis, diagnosis, emergency methods of treatment. Catheterization of the bladder and suprapubic derivation of urine.
18. Urinary incontinence in men and women - etiology, classification, pathogenesis, diagnosis, treatment. Overactive bladder - definition, clinical signs and symptoms, behavior.
19. Anuria of urological origin - definition, classification, diagnosis, emergency behavior.
20. Obstructive uropathy - classification, diagnosis, treatment.
21. Hydronephrosis - definition, pathoanatomical changes, clinical picture, diagnosis, treatment.
22. Kidney transplantation.

Clinical Urology

1. Congenital anomalies of the kidneys and ureters.
2. Congenital anomalies of the bladder.
3. Induced abnormalities of the urethra.
4. Congenital diseases of the testicles, penis and scrotum.
5. Kidney stone disease - epidemiology, specific risk factors for lithogenesis, pathogenesis, types of stones according to chemical composition.
6. Kidney stone disease - clinical picture and diagnosis (surgical aspects).
7. Kidney stone disease - complications, modern methods of treatment (medical; surgical - open and minimally invasive surgery).
8. Urosepsis and septic (endotoxic shock) - definition, etiology, pathogenesis, types and behavior.
9. Injuries to the kidneys and ureters.
10. Bladder injuries.
11. Injuries to the urethra.
12. Injuries to the penis and scrotum
13. Tumors of the kidneys, renal pelvis and ureter.
14. Tumors of the bladder - classification, clinic and diagnosis.
15. Tumors of the bladder - treatment (surgical - methods for derivation of urine after cystectomy, post-adjuvant).
16. Neoplasms of the penis.
17. Tumors of the testicles and epididymis.
18. Benign prostatic hyperplasia.
19. Prostate cancer - epidemiology, classification, clinical symptoms and signs, diagnosis, methods of treatment - surgical and alternative.
20. Acute scrotum syndrom of traumatic, inflammatory and non-inflammatory noxa.
21. Hydrocele and varicocele.
22. Some diseases of the penis - phimosis, induration of the penis, priapism, cavernitis and gangrene.
23. Male infertility. Sperm parameters - clinical interpretation Anatomical pathway for ejaculate transport.

24. Inflammatory diseases of the kidneys.
25. Inflammatory diseases of the bladder - etiology, classification, surgical aspects.
26. Inflammatory diseases of the prostate gland (acute and chronic / chronic pelvic pain syndrome) and urethra.
27. Tuberculosis of the kidneys, urinary tract and male reproductive system.
28. Disorder of male sexual function (Erectile dysfunction) - definition, types, behavior - medical and surgical.
29. Urinary fistulas.
30. Neurogenic disorders in urination - causes, types, complications, treatment

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

**ANESTHESIOLOGY AND INTENSIVE
CARE**

Approved by the Department Council on 31/05/2022

Confirmed by the Faculty Council – Protocol №6/15.06.2022

Anesthesiology and intensive care
Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								4th year	
Anesthesiology and intensive care	VIII/IX	Total	Lectures	Practices	ECTS	1.0	3.0	VIII	IX
		60	30	30	2.0			2/2	2/2

DISCIPLINE:

Anesthesiology and intensive care

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Obligatory

LEVEL OF QUALIFICATION:

Master /M/

FORMS OF TRAINING:

lectures, practical lessons, seminars, self- training

YEAR OF TRAINING:

IV / V

DURATION OF TRAINING:

one semester

ACADEMIC HOURS:

30 hours lectures, 30 hours practical lessons

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, discussions, case reports, seeing patients in the department, working with the mannequins for endotracheal intubation and CPR

FORMS OF EVALUATION:

- Current control (assessment during the practical lessons and colloquiums)
- Final exam (test, written, oral and practical exam)

EVALUATION CRITERIA:

The final mark in Anesthesiology and intensive care is multi-component and includes the marks from written, oral, practical exam and the mark from the current control. For each component involved in the formation of the final assessment, it is determined significant factor k (from 0 to 1), the total sum of the factors of significance must always be 1. The final grade is obtained as a sum of the scores on the six-point system from the various components, multiplied by the respective coefficients of significance.

$$Q_{\text{final mark}} = k_1 Q_{\text{mark from the current control}} + k_2 Q_{\text{mark from the written exam}} + k_3 Q_{\text{mark from the oral exam}} + k_4 Q_{\text{mark from the practical exam}}$$

$$k_1 = 0.10; k_2 = 0.30; k_3 = 0.40; k_4 = 0.20$$

If one of the components of the final exam is failure (2), the final grade is obligatory failure (2).

ASPECTS OF EVALUATION CRITERIA:

- **Failure (2)** receives a student with scarce knowledge of the material, poor language culture, inability to reproduce the main points of the developed topic, necessary to cover the minimum required minimum in the discipline, inability to solve clinical cases and without their own clinical thinking; is not familiar with the basic terminology and has not mastered the mandatory professional competencies.
- **Average (3)** is given to a student who reproduces the knowledge in a "ready-made scheme", lacking the main points of the developed topic; there is no readiness for independent use of the acquired knowledge and professional competencies; the terminology is not mastered, the exposition is characterized by poor language;
- **Good (4)** is given to a student who develops the topic descriptively, reproductively, using typical situations; limited independence in using the acquired knowledge and acquired professional competencies; in the exposition, although there is a good language culture, inaccuracies in the concepts used are allowed;
- **Very good (5)** gets a student who develops the topic independently productively, non-standard, looking for a new algorithm and analysis of the used literature data; makes an attempt to derive and substantiate his thesis; adequately uses the concepts from the scientific field of the studied discipline, has a good language culture;
- **Excellent (6)** is awarded to a student who independently, logically, with the presence of a creative element brings out the topic; reasonably and originally uses and interprets the literature related to the revealed issue; there is a formation and readiness to use the acquired knowledge and professional competencies; demonstrates accurate and substantial vocabulary of the exposition.

SEMESTER EXAM:

Yes (theoretical – test, written, oral and practical)

STATE EXAM:

No

LECTURER:

Habilitated teacher from the Department of Anesthesiology, Emergency and Intensive Care Medicine

DEPARTMENT:

Anesthesiology, Emergency and Intensive Care Medicine

ANNOTATION

The education (theoretical and practical) in the field of Anesthesiology and intensive care is aimed at providing the students with fundamental knowledge in anesthesiology and intensive care, required in the complete preparation and establishment of the contemporary physician. The main purpose is to provide the knowledge and basic proficiency in the field of anesthesiology and intensive care for students in their fourth and fifth year, who in their upcoming practice will encounter and treat acute disturbances of the vital functions of the organism, as well as management of acute and chronic pain. In that sense special attention is given regarding the different types of anesthesia, medication and techniques for providing it and the different strategies in pain management. The accentuation in the intensive care section falls on the most common and significant critical conditions, resulting from the disturbances in vital functions of the organism, their etiology, pathogenetic mechanism, clinical presentation, the methods for monitoring vital signs and treatment strategies. The topics are based on pathology of the respiratory and cardiovascular system, as well as problems concerning fluid-electrolyte balance, acid-base balance and blood gases and their disturbances during anesthesia and different critical conditions. Attention has been given regarding specific peculiarities of different diseases of the central and peripheral nervous system, the management of patients with severe polytrauma, as well as nutritional and metabolic support during intensive care. The practical training is conducted according to the same plan in the operation theaters, at the bed of the patient in the department and on special training dummies.

BASIC AIMS OF THE DISCIPLINE

1. To familiarize the students with the most common and significant clinical syndromes, that arise from disturbances of the main vital function of the organism
2. To show the students the main methods of monitoring of vital functions, the information they present and the interpretation of the results
3. The establishment of clinical decision making, aimed at assessing the pathogenetic mechanisms of different critical condition and construction of a well-grounded and adequate diagnostic and treatment plan
4. To familiarize the students with the fundamental techniques of performing basic life support in patients with cardiac arrest
5. To familiarize the students with the main methods and means in conduction general and regional anesthesia during operative interventions and other invasive diagnostic and treatment procedures

EXPECTED RESULTS

1. To acquire the knowledge to recognize the main clinical symptoms and diagnostic criteria and the most common critical conditions, establishment of clinical diagnosis and draw up of an etiologically and pathogenetically proven diagnostic and treatment plan.
2. To acquire the skills and competence to conduct basic life support care during cardiopulmonary resuscitation in patients with cardiac arrest.
3. To acquire the knowledge and skills required for preoperative assessment of the health status and anesthesiologic risk and to conduct a plan regarding the preoperative preparation of patients that will undergo operative or other painful and invasive diagnostic and treatment procedures

Lectures

LECTURE № 1 – Introduction in anesthesiology and intensive care - 2 hours

Anesthesiology and intensive care as a science – topics and main tasks. Basic principles of reanimation and intensive care. Organization and structure of the intensive care unit. Indications and contraindications for intensive care. Critical condition concept. Practical aspects of diagnostic and treatment approach in critically ill patients. Monitoring in the ICU. Hemodynamic, respiratory, neurological and temperature monitoring.

LECTURE № 2 – Balance of the internal environment of the organism - Part I - 2 hours

Balance of the internal environment of the organism. Basic concepts - osmolarity, osmolality, tonicity. Distribution of body water in the compartments of the body. Fluid-electrolyte balance – disturbances of the metabolism of sodium, potassium, calcium, magnesium and phosphorus and their treatment.

LECTURE № 3 – Balance of the internal environment of the organism - II part - 2 hours

Acid-base balance. Basic concepts and definitions of acids and bases. Hydrogen exponent. Conjugated pairs and buffers. Definition, classification, mechanisms, criteria for diagnosis and treatment of acidosis. Definition, classification, mechanisms, criteria for diagnosis and treatment of alkalosis.

LECTURE № 4 – Acute respiratory failure - 2 hours

Acute respiratory failure - definition, classification, etiology, pathogenesis, clinical picture, diagnosis and monitoring, principles of treatment. Mechanical ventilation-basic principles. Acute respiratory distress syndrome in adults - definition, criteria for diagnosis, etiopathogenesis, clinical presentation and treatment.

LECTURE № 5 – Circulatory shock - 2 hours

Shock - definition, classification, etiology and pathogenesis. Clinical presentation. Criteria for diagnosis. Hemodynamic monitoring in shock patients. Basic principles of treatment. Purpose, tasks and means for treatment of circulatory shock. Principles of infusion, vasopressor and inotropic therapy

LECTURE № 6 – Sepsis and septic shock - 2 hours

Sepsis and septic shock. Basic concepts and definition. Etiology and pathogenesis. Classification. Rating scales. Clinical presentation. Diagnosis and monitoring. Basic principles of treatment.

LECTURE № 7 – Specifics of the intensive care for severe multiple trauma - 2 hours

Definition of multiple trauma (polytrauma). Mechanism of occurrence. Injury patterns. Strategy and phases of care. Trauma system components (ATLS). Patient triage. Assessment scoring of traumatic patients. Management of traumatically ill patients in the intensive care unit - phases. Damage control resuscitation - basic principles. Specifics of the intensive care in patients with severe chest, abdominal and pelvic injuries.

LECTURE № 8 – Acute disorders of the central nervous system - 2 hours

Intensive treatment in patients with acute disorders of the central nervous system - coma, severe traumatic brain injury, cerebrovascular disease. Rating scales. Brain death - definition, etiology and pathogenesis, criteria for diagnosis. Organ donation.

LECTURE № 9 – Nutritional and metabolic support in patients in intensive care - 2 hours

Malnutrition in critically ill patients - definition, pathogenesis, significance. Indications, contraindications and basic principles of nutritional and metabolic support in critically ill patients. Basic principles of parenteral, enteral and mixed nutrition - definition, indications, techniques, monitoring and complications.

LECTURE № 10 – Cardiopulmonary resuscitation - 2 hours

Clinical death and cardiac arrest - definition, terms, signs. Indications and contraindications for cardiopulmonary resuscitation. Basic and advanced life support - techniques for airway management, mechanical ventilation, extra-thoracic compression of the heart. Pharmacological treatment in cardiopulmonary resuscitation. Electrical therapy. CPR

algorithm in asystole, pulseless electrical activity, pulseless ventricular tachycardia, ventricular fibrillation. Postresuscitation syndrome treatment.

LECTURE № 11 – Fundamentals of contemporary anesthesiology - 2 hours

Essential goals and problems of contemporary anesthesiology. Types of anesthesia. Definition of general anesthesia. Types of general anesthesia. Effect of general anaesthetics on the CNS. Mechanism of general anesthesia. Stages of general anesthesia. Anesthesia workstation and delivery system.

LECTURE № 12 – Practical implementation of general anesthesia - 2 hours

Preoperative patient assessment and management. Anesthesia risk. Anesthesia plan and choice of anesthetic technique. Premedication. Practical conduct of general anesthesia. Induction of anesthesia - types, advantages and disadvantages. Maintenance of general anesthesia and patient monitoring. Emergence from general anesthesia - stages. Criteria for discharge from the operating room.

LECTURE №13 – General inhalational anesthesia – 2 hours

Definition of general inhalational anesthesia. Inhalation anaesthetic agents. Pharmacokinetics and pharmacodynamics of inhalation anaesthetics. Inhalational anesthesia techniques – facial mask and endotracheal intubation.

LECTURE №14 – General intravenous anesthesia – 2 hours

Definition. Intravenous anaesthetic agents. Pharmacokinetics and pharmacodynamics of intravenous anaesthetics. Intravenous anesthesia techniques. Physiology of neuromuscular transmission. Neuromuscular blocking agents – definition, classification and mechanisms of action. Indications and contraindications for application. Reversal of the neuromuscular blockade.

LECTURE №15 – Regional anesthesia – 2 hours

Regional anesthesia – definition and classification. Indications and contraindications. Pharmacology of the local anaesthetics. Local anesthetics systemic toxicity. Regional anesthesia techniques. Peripheral nerve blocks - brachial plexus block. Neuraxial anesthesia – definition, types, indications and contraindications, techniques and complications.

Practices

PRACTICAL №1 – Introduction to intensive care medicine – 2 hours

Organization and structure of the intensive care unit. Indications and contraindications for intensive care. Critical condition concept. Tissue oxygen delivery, oxygen requirements and oxygen consumption. Practical aspects of the diagnostic and treatment approach in critically ill patients. Monitoring in the ICU. Demonstration of monitoring equipment.

PRACTICAL №2 – Homeostasis – 2 hours

Management of patients with fluid and electrolyte and acid-base disorders. Demonstration of clinical cases.

PRACTICAL №3 – Acute respiratory failure – 2 hours

Practical aspects of the intensive care for patients with acute respiratory failure. Specifics of the diagnostic and treatment process. Practical conduct of mechanical ventilation –

indications, types, ventilation modes, monitoring and complications. Demonstration of clinical cases.

PRACTICAL №4 – Circulatory shock – 2 hours

Practical aspects of the intensive care for patients with circulatory shock. Specifics of the diagnostic and treatment process in hypovolemic, cardiogenic, obstructive and distributive shock. Basics principles of the fluid infusions, vasopressors and inotropes application in the clinical practice. Demonstration of clinical cases.

PRACTICAL №5 – Sepsis and septic shock – 2 hours

Practical aspects of the intensive care for patients with sepsis and septic shock. Specifics of the diagnostic and treatment process. Contemporary challenges in the antimicrobial, hemodynamic, immunomodulatory and supportive therapy. Demonstration of clinical cases.

PRACTICAL №6 – Severe multiple trauma (Polytrauma) – 2 hours

Practical aspects of the intensive care for patients with polytrauma. Stages and phases of care. Components of trauma system (ATLS). Patient triage. Management of the traumatically ill patients in the intensive care units – phases. Specifics of the diagnostic and treatment process in severe thoracic, abdominal and pelvic injuries. Demonstration of clinical cases.

PRACTICAL №7 – Acute disorders of CNS – 2 hours

Practical aspects of the intensive care for patients with acute CNS disorders. Specifics of the diagnostic and treatment process in coma, traumatic brain injuries and cerebrovascular accidents. Management of intracranial hypertension – basic principles. Brain death. Intensive care for organ and tissue donors. Demonstration of clinical cases.

PRACTICAL № 8 – Nutritional and metabolic support in the critically ill patient – 2 hours

Nutritional support in the intensive care unit. Malnutrition – practical considerations for the diagnosis and treatment. Basics of enteral, parenteral and combined nutrition – indications, contraindications, techniques, formulas, monitoring, complications. Clinical case demonstrations.

PRACTICAL № 9 – Basic principles of cardiopulmonary resuscitation – 2 hours

Clinical death, cardiac arrest – definition, signs, symptoms, time limits. Indications and contraindications for cardiopulmonary resuscitation. Basic and advanced life support – techniques for airway management, mechanical ventilation and extra thoracic compressions of the heart. Pharmacological treatment in cardiopulmonary resuscitation. Electrical therapy. CPR algorithm in asystole, pulseless electrical activity, pulseless ventricular tachycardia, ventricular fibrillation. Post resuscitation syndrome treatment.

TEST - “INTENSIVE CARE”

PRACTICAL № 10 – Introduction to Anesthesiology – 2 hours

Definitions of anesthesia. Types of anesthesia. General anesthesia – definition, components, classification. Stages of general anesthesia. The anesthesia workstation – basic components. Anesthesia breathing systems.

PRACTICAL № 11 – Practical considerations for performing general anesthesia (1st part) – 2 hours

Stages of planning and performing general anesthesia. Preoperative patient assessment and management. Preoperative anesthetic risk assessment. Anesthesia plan and choice of anesthetic technique. Premedication – definition, goal, types, drugs. Preoperative evaluation and preparation for patients with co-existing diseases. Anesthetic management of patients with full stomach. Clinical case demonstrations.

PRACTICAL № 12 – Practical considerations for performing general anesthesia (2nd part) – 2 hours

Induction of general anesthesia. Demonstration of different induction techniques. Maintenance of general anesthesia and patient monitoring. General anesthetics – pharmacological essentials. Emergence from general anesthesia – stages, criteria. Practical assessment of patient readiness for discharge from the operating room. Clinical case demonstrations.

PRACTICAL № 13 – Airway management in anesthesia and intensive care – 2 hours

Basic techniques and equipment for airway management in anesthesia and intensive care. Face mask ventilation – techniques, indications, contraindications. Laryngeal mask – definitions, types, techniques for insertion, advantages, disadvantages, indications, contraindications. Endotracheal intubation – indications, techniques, equipment. Practical aspects of the endotracheal intubation anesthesia. Clinical case demonstrations.

PRACTICAL № 14 – Regional anesthesia – 2 hours

Practical aspects of performing regional anesthesia – definitions, indications, contraindications, preanesthetic evaluation and patient preparation. Local anesthetics – pharmacological essentials. Practical aspects of performing spinal and epidural anesthesia – definition, indications, contraindications, preparation, techniques. Peripheral nerve blocks – performance technique of axillary brachial plexus block. Complications of peripheral and central nerve blocks – prevention and treatment.

PRACTICAL № 15 – Anesthesia in different surgical specialties – 2 hours

Practical aspects of anesthesia in different surgical specialties – abdominal surgery, thoracic surgery, neurosurgery, ophthalmology, ENT, orthopedic and trauma surgery, obstetrics and gynecology. Ambulatory anesthesia. Anesthesia in invasive diagnostic and therapeutic procedures. Clinical case demonstrations.

TEST – “ANESTHESIOLOGY”

Bibliography

Textbooks:

1. Sikka P., Beaman Sh., Street A. Basic Clinical Anesthesia. Springer, 2015. ISBN: 1493917366
2. Barash P., Cullen B., Stoelting R. Clinical Anesthesia Fundamentals, 1st ed. LWW, 2015. ISBN: 978-1451194371
3. Pardo M., Miller R. Basics of Anesthesia, 7th ed. Elsevier, 2017. ISBN: 978-0323401159
4. Butterworth J., Mackey D., Wasnick J. Morgan and Mikhail's Clinical Anesthesiology, 6th ed. McGraw-Hill Education, 2018. ISBN: 978-1259834424

5. Marino P. Marino's ICU Book, 4th ed. LWW, 2013. ISBN: 978-1451121186
6. Parrillo, Joseph E., Dellinger, R. Phillip. Critical Care Medicine: Principles of Diagnosis and Management in the Adult, 5th ed. Elsevier, 2019. ISBN: 978-0323446761
7. Mitchell P. Fink, Jean-Louis Vincent, Frederick A. Moore. Textbook of Critical Care 7th ed. Elsevier, 2017. ISBN: 978-0323376389

Handbooks:

1. Keith Allman, Iain Wilson, and Aidan O'Donnell. Oxford Handbook of Anaesthesia, 4th ed. Oxford University Press, 2016. ISBN: 978-0198719410
2. Mervyn Singer, Andrew Webb. Oxford Handbook of Critical Care Anaesthesia, 3rd ed. Oxford University Press, 2009. ISBN: 978-0199235339

Conspectus

1. Anesthesiology and intensive care as a science – basic principles, essential problems and tasks. Basic tasks of the anesthesiologist in the OR.
2. Hemodynamic, respiratory, neurological and temperature monitoring in OR and ICU.
3. Tissue oxygen delivery, oxygen requirements and oxygen consumption. Critical condition concept. Indications and contraindications for intensive care.
4. Definition of anesthesia. Classification. General anesthesia – definition, components, types. Mechanism of general anesthesia. Stages of general anesthesia. Effects of the general anesthetic on the central nervous system.
5. Anesthesia workstation and anesthesia breathing systems – basic components.
6. Preoperative patient assessment and management. Preoperative anesthesia risk assessment. Anesthesia plan and choice of anesthetic technique.
7. Preoperative patient assessment and management. Premedication – definition, types, goals, pharmacological agents.
8. Preoperative evaluation and preparation for patients with co-existing diseases – ischemic heart disease, valvular heart diseases, arterial hypertension, coagulation disorders, COPD, diabetes mellitus.
9. Anesthetic management of patients with “full stomach”. Aspiration syndrome.
10. Definition of general inhalational anesthesia. Inhalation anesthetic agents - anesthetic gases and volatile anesthetics. Pharmacokinetics and pharmacodynamics of the contemporary inhalational anesthetics- nitrous oxide, isoflurane, sevoflurane, desflurane.
11. Inhalational anesthesia techniques. Face mask general anesthesia – techniques, indications, contraindications. Endotracheal anesthesia – indications, techniques, equipment and pharmacologic agents.
12. Physiology of neuromuscular transmission. Neuromuscular blocking agents – definition, classification and mechanisms of action. Reversal of the neuromuscular blockade.
13. Induction of general anesthesia - definition, techniques, pharmacological agents., advantages and disadvantages.

14. Maintenance of general anesthesia and patient monitoring.
15. Emergence from general anesthesia - phases. Criteria for discharge from the OR.
16. Basic techniques and equipment for airway management. Management of difficult airways. Mechanical ventilation-basic principles, types, indications, monitoring and complications.
17. Intravenous Anesthesia - definition. Advantages and disadvantages. Intravenous anesthetics. Pharmacokinetics and pharmacodynamics of intravenous anesthetics. Intravenous anesthesia techniques. Modern multicomponent balanced intravenous anesthesia.
18. Locoregional anesthesia – definition, classification, indications and contraindications. Pharmacology of the local anesthetics – classification, pharmacodynamics and pharmacokinetics. Systemic toxicity of the local anesthetics – clinical picture, treatment.
19. Epidural and spinal anesthesia – definition, comparative characteristics, advantages and disadvantages. Indications and contraindications. Performance technique. Complications – prophylaxis and treatment.
20. Locoregional anesthesia. Peripheral nerve blocks. Upper extremity nerve blocks – performance technique of axillary brachial plexus nerve block. Complications of peripheral nerve blocks – prophylaxis and treatment.
21. Ambulatory anesthesia – characteristics, special requirements, choice of anesthetic agents and techniques. Criteria for discharge. Anesthesia for invasive diagnostic and therapeutic procedures.
22. Balance of the internal environment of the organism. Fluid-electrolyte balance. Basic concepts - osmolarity, osmolality, tonicity. Distribution of body water in the compartments of the body.
23. Disturbances of the metabolism of sodium, potassium, calcium, magnesium and phosphorus and their treatment.
24. Acid-base balance. Basic concepts and definitions of acids and bases. Hydrogen exponent. Conjugated pairs and buffers.
25. Definition, classification, mechanisms, criteria for diagnosis and treatment of acidosis.
26. Definition, classification, mechanisms, criteria for diagnosis and treatment of alkalosis.
27. Nutritional and metabolic support in the critically ill patients. Malnutrition in critically ill - definition, pathogenesis, significance, diagnosis and treatment.
28. Basic principles of nutritional and metabolic support in critically ill patients. Parenteral, enteral and mixed nutrition - definition, indications, contraindications, techniques, formulas, monitoring and complications.
29. Circulatory shock - definition, classification, etiology and pathogenesis, stages of evolution, clinical presentation, criteria for diagnosis - hypovolemic, cardiogenic, obstructive and distributive shock.
30. Circulatory shock – principles of treatment. Purpose, tasks and means of treatment of circulatory shock. Principles of fluid infusion, vasopressor and inotropic therapy.
31. Hemorrhagic shock – definition, etiology, pathogenesis, clinical presentation, patient monitoring, principles of treatment.
32. Transfusion therapy - indications, risks and iatrogenic events.
33. Cardiogenic shock – definition, etiology, pathogenesis, clinical presentation, patient monitoring, principles of treatment.
34. Sepsis and Septic Shock. Basic concepts and definition. Multiple-Organ Failure Syndrome Classification. Etiology and pathogenesis. Rating scales. Diagnostic criteria. Clinical presentation, patient monitoring.

35. Sepsis and Septic Shock- principles of treatment.
36. Acute respiratory failure - definition, classification, etiology, pathogenesis, clinical picture, diagnosis and monitoring, principles of treatment.
37. Acute Respiratory Distress Syndrome in adults (ARDS) - definition, etiology, pathogenesis, phases of evolution, criteria for diagnosis, patient monitoring, clinical presentation and treatment.
38. Multiple trauma – definition, pathogenesis, strategies and phases of treatment. Principles of prehospital and advanced trauma life support (ATLS). Triage. Damage control resuscitation – basic principles.
39. Chest trauma – classification, pathogenesis, initial assessment and resuscitation. Diagnosis and treatment of life-threatening complications – tension pneumothorax, open pneumothorax, cardiac tamponade, massive hemothorax, flail chest.
40. Severe Traumatic Brain Injury – definition, etiology, pathogenesis, assessment scales, patient monitoring. Treatment - basic principles of management of intracranial hypertension.
41. Preeclampsia and eclampsia – etiology, pathogenesis and treatment.
42. Acute kidney injury – definition, classification, etiology, pathogenesis, diagnostic criteria, principles of treatment.
43. Acute liver failure – definition, classification, etiology, pathogenesis, diagnostic criteria, principles of treatment.
44. Acute CNS disorders. Specifics of the diagnostic and treatment process in coma, traumatic brain injuries and cerebrovascular accidents. Management of intracranial hypertension – basic principles. Brain death. Intensive care for organ and tissue donors.
45. Clinical death, cardiac arrest – definition, signs, symptoms, time limits. Indications and contraindications for cardiopulmonary resuscitation. Basic and advanced life support – techniques for airway management, mechanical ventilation and extra thoracic compressions of the heart.
46. CPR algorithm in asystole, pulseless electrical activity, pulseless ventricular tachycardia, ventricular fibrillation
47. Pharmacological treatment in cardiopulmonary resuscitation. Electrical therapy. Post resuscitation syndrome treatment.



MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

PHYSIOTHERAPY AND REHABILITATION

for acquiring a master's degree

Professional qualification
"PHYSICIAN"

from a professional direction
MEDICINE
regular form

Approved by the Department Council on № 5/18.05.2022

Confirmed by the Faculty Council - Protocol №7/13.07.2022

PHYSIOTHERAPY AND REHABILITATION

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS			V year	
Physiotherapy and Rehabilitation	IX	45	15	30	1.5	0.7	2.2	IX	
								45	-

DISCIPLINE: PHYSIOTHERAPY AND REHABILITATION

Name of the discipline

"Physiotherapy and Rehabilitation"

Type of discipline according to EDI:

Mandatory

Level of training:

Master / M /

Forms of training:

Lectures, exercises, self-preparation.

Duration of training:

One semester

Hours:

15 hours of lectures, 30 hours of practical seminars

Teaching aids:

Multimedia presentations, discussions, solving practical tasks.

Forms of assessment:

Ongoing assessment, solving tests.

Final mark forming

There are many components of the final mark which include*:

-.Q1 marks from ongoing control and ongoing marks of tests;

- Q2 mark from the end exam during the exam session;

K1=0.2; K2 = 0,8

Final mark Q = K1.Q1 + K2.Q2

Aspects of evaluation criteria

- Excellent (6) – Student knows very good the information sources, has very deep key and extra knowledge and skills, understands the subject clearly, can solve difficult tasks, has his own logic and arguments when solving clinical cases.
- Very good (5) – Student knows very good the information sources, has very deep key and extra knowledge and skills, understands the subject clearly, can solve difficult tasks by using his knowledge, adequately uses the terms of physical and rehabilitation medicine.
- Good (4) – Student has very key and extra knowledge for solving clinical cases, but not being able to use them logically; there are also some inaccuracies in using the specific terms.
- Average (3) – Student has key knowledge for solving simple clinical cases, but he's not prepared for separately using the knowledge in solving clinical cases
- Poor (2) – student doesn't respond to any of the mentioned before.

Students get familiar with the evaluation standards, the procedures for ongoing control and final mark of knowledge and skills, feedback for their improvement during the semester at the beginning of the PRM classes.

Semester exam:

Yes

State exam:

No

Lecturer:

Habilitated lecturer from the Department of Physical and Rehabilitation Medicine.

Department:

Department of Physical and Rehabilitation Medicine.

ANNOTATION

Physical and Rehabilitation Medicine is a basic medical specialty of interdisciplinary character that studies the biological influence of natural and preformed physical factors on human organism and their practical use for the needs of preventive care, diagnostics, therapy (on its own or in combination with pharmacological and other means), and medical rehabilitation in case of various diseases.

BASIC AIMS OF THE DISCIPLINE

1. Main goal of studying the PRM discipline is getting the students familiar with the natural physical factors (sun light, mineral and plain water, curative mud, climate complexes, movements) and transformed physical factors (electrical currents, high-frequency and low-frequency electromagnetic fields, ultrasound energy, light beam, lasers, thermal impact).
2. To acquire the specific physical methods for functional assessment of the patient and defining the rehabilitation potential. Also making complex rehabilitation program for different disorders.
3. To get familiar with the possibilities of the physical factors for stimulating of the overall capability of the organism to respond during the premorbid stage by preventive and recreative activities; improving the medico-biological recovery and prophylaxy of complications during

the acute phase of different disorders; providing of maximal functional recovery, secondary prophylaxy and maximal resocialization during the recovery phase.

EXPECTED RESULTS

Upon completion of the training, students must have the following knowledge and skills:

- to know the physical, physiological and therapeutic actions of the low, medium and high frequency main currents used in electrotherapy.
- to know the physical, physiological and therapeutic actions of the light sources used in light therapy.
- to know the physiological and therapeutic effects of active and passive kinesitherapy.
- the effect that kinesitherapy has on various organs and systems, as well as on the whole organism.
- to know the physical, physiological and therapeutic actions of the basic aggregate states of water and the influence they have on various organs and systems, as well as on the whole organism.
- to know the physical, physiological and therapeutic effects of the main heat carriers - paraffin, healing mud, ozokerite, sand, dry hot air bath / sauna /, on various organs and systems, as well as on the whole organism.
- to know the physical, physiological and therapeutic actions of the main types of mineral waters and the influence they have on various organs and systems, as well as on the whole organism in internal and external application.
- to know the physical, physiological and therapeutic actions of the main climatic factors and the influence they have on various organs and systems, as well as on the whole organism. Types of climatotherapy.
- to know the basic principles of primary and secondary physical prevention.
- to know and apply the methods for functional assessment of SSS, DS, Children's organism, ODA, CNS and PNS, etc.
- to know the essence of rehabilitation, its basic principles, types, stages, rehabilitation team.
- be able to determine the rehabilitation potential of patients, the purpose, tasks and means of rehabilitation.
- to be able to compile a comprehensive rehabilitation program according to the underlying and concomitant diseases.

LECTURES

№	TOPIC	HOURS
1.	Essence, subject, sections of physical medicine. Modern trends in its development. Rehabilitation - essence, principles, rehabilitation potential. International classification for functional status, disability and health.	2h.
2.	Electrotherapy. Physiological effect of low voltage and low frequency currents and their practical use for treatment and diagnosis.	2h.
3.	Medium frequency currents. Magnetic and electromagnetic fields in medical practice. High intensity magnetic field. Ultrasound therapy and ultraphonophoresis. Shock wave therapy	2h.
4.	Biological effect of light energy. modern aspect on the use of light / infrared, visible and ultraviolet rays / for prevention and treatment. Laser therapy.	2h.
5.	Kinesitherapy - essence, types, influence of physical activity on various organs and systems. Robotic rehabilitation	2h.
6.	Resort factors and their importance for clinical practice, physioprophyllaxis and rehabilitation. Physical therapy and rehabilitation in diseases of the musculoskeletal system. Joint arthroplasty	2h.
7.	Physical therapy and rehabilitation for neurological diseases and injuries of the central and peripheral nervous system.	2h.
8.	Physical therapy and rehabilitation for some socially significant internal diseases - cardiovascular, respiratory, endocrine-metabolic	1h.

TOTAL: 15 h.

PRACTICAL SEMINARS

№	TOPICS	HOURS
1.	Structure of the physical therapy ward. Types of devices - basic device. Rules of operation and safety. Work in the sector of water, mud, paraffin and cryotherapy. More important methods.	2 h.
2.	Electrotherapy - types of currents used in physical medicine. Treatment and diagnostics with galvanic current and low frequency pulse currents / LFP /.	2 h.

3.	Electrotherapy. Medium frequency currents (MFD). Ultrasound. Aerosol and aeroionotherapy. Shockwave Therapy.	2 h.
4.	Electrotherapy. High frequency currents (HF) and magnetic field. High-intensity magnetic field.	2 h.
5.	Light therapy. Types of light energy sources, dosage, methods of prevention and treatment. Lasers in physical medicine and reflexology. High-intensity laser therapy.	2 h.
6.	Kinesitherapy - essence, types. Practical illustration of active types. Methods for some diseases.	2 h.
7.	Kinesitherapy. Practical illustration of passive types. Some of the widespread functional studies of the musculoskeletal system. Robotic rehabilitation.	2 h.
8.	Rehabilitation potential. Functional methods for determining the rehabilitation potential. Compilation of a rehabilitation program	2 h.
9.	Physioprophylaxis, physical therapy and rehabilitation of the most common cardiovascular, non-specific lung diseases, endocrine, gastrointestinal, renal, gynecological and onco-hematological diseases.	2 h.
10.	Physioprophylaxis, physical therapy and rehabilitation of some diseases in childhood: -respiratory - acute respiratory infections, bronchitis, bronchopneumonia, bronchial asthma; -Rheumatocardiological - rheumatism, cardiopathy, juvenile polyarthritis; -disorders of the exchange of substances - rickets, diabetes	2 h.
11.	Physical therapy and rehabilitation of pediatric neurological diseases: cerebral palsy and birth trauma of the brachial plexus.	2 h.
12.	Physical therapy and rehabilitation of cerebrovascular disease, discogenic radiculitis and peripheral nerve damage.	2 h.
13.	Physical therapy and rehabilitation of surgical diseases, prevention and treatment of postoperative complications, physical therapy and rehabilitation of post-traumatic and extensive processes of the central nervous system, thermal trauma, ENT and eye diseases.	2 h.
14.	Physical therapy and rehabilitation of diseases of the musculoskeletal system of traumatic nature and overuse syndromes, osteoporotic fractures, epicondylitis, peri-arthritis, joint arthroplasty.	2 h.
15.	Inflammatory and degenerative diseases of the musculoskeletal system.	2 h.

TOTAL: 30 hours

LECTURES

LECTURE № 1 - 2 hours

ESSENCE, SUBJECT, DIVISIONS OF PHYSICAL MEDICINE. MODERN GUIDELINES IN ITS DEVELOPMENT. REHABILITATION - ESSENCE, TYPES, PRINCIPLES, REHABILITATION POTENTIAL. INTERNATIONAL CLASSIFICATION OF FUNCTIONAL CONDITION, DISABILITY AND HEALTH (WHO 2001)

1. The essence of physical medicine.

Definition (the modern directions in the development of the specialty are emphasized). Subject (characterizes the energy essence of natural and reformed physical factors). Sections (emphasis is placed on the multidisciplinary nature of the specialty with brief data for each section).

2. Rehabilitation.

WHO definition. Principles that help to build a new worldview regarding the disability and fate of people with disabilities. Stages of rehabilitation, contingent, restaurants. Types of rehabilitation, staff. Normative documents concerning rehabilitation. International Classification of Functional Status, Disability and Health (WHO 2001) - the need for its application in physical and rehabilitation medicine, which aims at functional recovery and resocialization of the individual

LECTURE № 2 - 2 hours

ELECTROTHERAPY. PHYSIOLOGICAL EFFECT OF LOW VOLTAGE AND LOW FREQUENCY CURRENTS AND THEIR PRACTICAL USE IN TREATMENT AND DIAGNOSTICS

1. Brief data on the physical basis of treatment and diagnosis with low frequency currents.

2. Electrophysiological bases for the practical use of low-frequency currents.

3. Excitability of the nerve fiber. Conducting nervous excitement. Muscle excitability.

4. Biological patterns in LFC irritation. Therapeutic effects and indications for their use.

5. Excitomotor diagnostics.

6. Classical electrodiagnostics - essence, rules for conducting, informative value.

Chronaximetry - essence, rules of conduct, informative value.

7. Modern guidelines in the production of LFC devices.

LECTURE № 3 - 2 hours

THE PLACE OF MAGNETIC AND ELECTROMAGNETIC FIELDS IN MEDICAL PRACTICE. ULTRASOUND THERAPY AND ULTRAPHONOPHORESIS. SHOCK WAVE THERAPY

1. Physical characteristics of magnetic and electromagnetic fields. Modern devices.

2. Biological impact of the magnetic field on the human body.

3. Types of electromagnetic fields with high, ultrahigh and ultrahigh frequency, necessary in medical practice. Features in their biological and therapeutic action. Indications and contraindications for treatment.

4. High-intensity magnetic field.

4. Harm when working with electromagnetic fields.
5. Ultrasound therapy and ultraphonophoresis. Modern views on their application.
6. New physical factors - TEKAR therapy - nature, types;
7. Shock wave therapy - essence, types - focused and radial. Methods of application

LECTURE № 4 - 2 hours

BIOLOGICAL EFFECT OF LIGHT ENERGY. MODERN VISIONS FOR THE USE OF LIGHT FOR PREVENTION AND TREATMENT. LASER THERAPY.

Physical basics of light therapy.

Nature of light. Physical laws to which light therapy is subject. Natural and artificial light sources. Types of filters.

2. Biological impact of absorbed light energy.

Influence of light energy on various life processes of the organism.

3. Individual skin sensitivity. Dosage.

Need for light energy dosing. Dosage methods. Biodosimetry. Types of radiation. Heliotherapy (helioprophyllaxis).

4. Indications and contraindications for light therapy.

5. Laser therapy - nature, generators, features of laser radiation, dosages, indications and contraindications for use in physical medicine. High-intensity laser therapy

LECTURE № 5 - 2 hours

KINESITHERAPY - ESSENCE, TYPES, INFLUENCE OF PHYSICAL LOAD ON DIFFERENT ORGANS AND SYSTEMS. TRAINING. ROBOTIC REHABILITATION.

1. Physiological bases of kinesitherapy.

The formation of the motor act in humans. Basic productions in kinesitherapy.

2. Kinesitherapy - essence. Active and passive kinesitherapeutic types. Mechanisms of action.

3. Influence of physical activity and training for the implementation of physioprophyllaxis, therapy and rehabilitation.

4. Modern methods for assessment of the functional state, static and locomotor imbalance.

5. Robotic rehabilitation. Types of robots - end effector type and exoskeleton

Advantages and disadvantages. Evidence of the effect in neurological diseases.

LECTURE № 6 - 2 hours

RESORT FACTORS AND THEIR IMPORTANCE FOR CLINICAL PRACTICE, PHYSIOPROPHYLLACTICS AND REHABILITATION. PHYSICAL THERAPY AND REHABILITATION FOR DISEASES OF THE MUSCULOSKELETAL SYSTEM.

1. The essence of balneology.

Types of resort factors. Climatic resources. Balneological resources. Peloid resources.

2. Biological action of resort factors.

Adaptation mechanisms of the organism and their improvement under the influence of resort factors. Approach to the use of resort factors. Conducting spa treatment, balneotherapy and climatotherapy.

3. Possibilities for using the resort factors in the physioprophylaxis and rehabilitation of some diseases - cardiovascular, pulmonary, endocrine-metabolic, degenerative, neurological, etc. General contraindications for spa treatment. Opportunities of the resort and balneological resources for maintaining the health of the healthy - recreation, spa and wellness.

4. Physical therapy and rehabilitation for diseases of the musculoskeletal system with degenerative, inflammatory, traumatic nature and overexertion.

Purpose and tasks of physical therapy. Means. Compilation of a complex rehabilitation program.

LECTURE № 7 - 2 hours

PHYSICAL THERAPY AND REHABILITATION FOR NEUROLOGICAL DISEASES AND INJURIES OF THE CENTRAL AND PERIPHERAL NERVOUS SYSTEM.

Aim and tasks of physical therapy and complex rehabilitation for cerebrovascular disease and stroke, injuries of the CNS / brain and spinal cord /, disc disease with radiculopathy, peripheral nerve damage. Means of physical medicine to achieve functional recovery during the various stages.

LECTURE № 8 - 1 hour

PHYSICAL THERAPY AND REHABILITATION FOR SOME SOCIALLY SIGNIFICANT INTERNAL DISEASES - CARDIOVASCULAR, RESPIRATORY, ENDOCRINE. METABOLIC DISORDERS.

Purpose and tasks of physical treatment and complex rehabilitation. Means of physical medicine to achieve functional recovery during the various stages and prevention of complications. Rehabilitation in cancer patients.

PRACTICAL SEMINARS

PRACTICAL SEMINAR № 1 - 2 hours

Structure of the physical therapy ward. Types of devices - basic device. Rules of operation and safety. Work in the sector of water, mud, paraffin and cryotherapy. More important methods.

Introduction to the structure of the modern Department of Physical Medicine. Necessary equipment - types of devices, basic device. Mechanism of action of thermal factors. Rules for work in the sectors of water, heat, mud and cryotherapy. Introduction to safety techniques. Types of water and thermal procedures, dosing principles. Indications and contraindications

The student must be able to:

- to know in general the structure and furniture of the water, heat and balneotherapy sector;
- to know the differences between heat, water and balneotherapy;
- be convinced of the possibilities for treatment with affordable physical means and be able to perform procedures from the "small home physiotherapy";
- to know the indications for cryotherapy
- to be able to perform local cryotherapy

PRACTICAL SEMINAR № 2 - 2 hours

Electrotherapy - types of currents used in physical medicine. Treatment and diagnostics with galvanic current and low frequency pulse currents (LFC).

1. Electrotherapy - essence, physical bases, types of electric currents.
2. Galvanic current: a) galvanic current devices; b) physiological action and therapeutic possibilities of galvanization; c) application technique, methods, dosage; d) electrophoresis - essence, therapeutic possibilities, application technique, methods; e) indications and contraindications for galvanization and electrophoresis.
3. Low voltage and low frequency currents with adjustable parameters: a) devices; b) physiological bases of NRT work; c) application technique, selection of the more important current parameters depending on the physiological indicators of the neuromuscular apparatus; d) electrical stimulation, selection of the more important parameters; e) indications and contraindications.
4. NMS with fixed parameters - diadynamic currents: a) physical characteristics; b) physiological and therapeutic action; c) application technique, methods; d) indications, contraindications
5. Excitomotor electrodiagnostics: a) methodology of classical electrodiagnostics; b) chronoxymetry methodology

The student must be able to:

- to be acquainted with the essence, therapeutic and diagnostic possibilities of galvanic and LFPC with adjustable parameters;
- to know and make a connection between the parameters of LFC and the electrophysiological parameters of the neuromuscular apparatus;
- to know the possibilities for electrical stimulation, analgesic and tissue trophism-enhancing action of LFPC;
- to know the advantages and disadvantages of the electrophoretic treatment method

PRACTICAL SEMINAR № 3 - 2 hours

Electrotherapy. Medium frequency currents (MFD). Ultrasound. Aerosol and aeroionotherapy. Shock wave therapy.

1. Medium frequency currents - the interference and sinusoidal-modulated currents: a) Physical characteristic. Apparatus; b) Physiological and therapeutic action; c) Application technique, methods; d) Indications and contraindications
2. Ultrasound: a) Physical characteristics. Apparatus; b) Physiological and therapeutic action; c) Application technique, methods; d) Indications and contraindications.
3. Aerosol and aeroionotherapy: a) Nature, apparatus, physico-chemical bases; b) Physiological and therapeutic action; c) Indications and contraindications.
4. Shock wave therapy - essence, types - focused and radial. Methods of application

The student must be able to:

- to know the advantages and risks of administering drugs by inhalation;
- to know and be able to perform some procedures with ultrasound and phonophoresis;
- be familiar with the difference and similarity between diadynamic currents, interference currents and sinusoidal-modulated currents;
- be familiar with the basic application techniques and methodologies

PRACTICAL SEMINAR № 4 - 2 hours

Electrotherapy. High frequency currents (HF) and magnetic field.

1. High frequency currents: a) Physical characteristics of ICP. Basic device of ICP generators. Types of ICP used in physiotherapy; b) Physiological and therapeutic effects of d'Arsonval currents, ultra-high frequency (UHF) currents and ultra-high microwave currents) from the centimeter and decimeter range; c) Application technique, methods; d) Peculiarities in the application of the individual ICP, general contraindications.
2. Magnetic field: a) Physical characteristics, types of magnetic fields; b) Physiological and therapeutic action; c) Methods and dosage; d) Indications and contraindications.
3. High-intensity magnetic field

The student must be able to:

- ⇒ to know in general terms ICP used in FTR practice;
- ⇒ be able to make a connection between the physical parameters and the biological action of ICP;
- ⇒ to know the possibilities of ICP for anti-inflammatory, analgesic and trophic effect and what is shown for their application;
- ⇒ be familiar with safety techniques and rules for working with ICP;
- ⇒ to be acquainted with the physiological and therapeutic action of the constant and pulsed alternating magnetic field and their healing possibilities

PRACTICAL SEMINAR №5 - 2 hours

Light therapy. Types of light energy sources, dosage, methods of prevention and treatment. Lasers in physical medicine and reflexology.

1. Physical foundations of light therapy.
2. Types of caloric and luminescent light sources.
3. Biological impact of light energy from the visible, infrared and ultraviolet spectrum on various organs and systems. Albedo on the skin, filters.
4. Individual and regional skin sensitivity. Dosing of light energy.
5. Types of UV irradiation. Methods.
6. Indications and contraindications.
7. Lasers in physiotherapy practice: a) Basic design of optical quantum generators
8. Types of laser generators; b) Physiological and therapeutic action of laser radiation. Methods. Dosage; c) Indications and contraindications.

The student must be able to:

- ⇒ be familiar with the application of light from different spectral ranges;
- ⇒ be able to make a connection between the physical parameters and the biological and therapeutic action;
- ⇒ be able to describe skin reactions to light from different spectra;
- ⇒ be able to perform and report biodosimetry;
- ⇒ to know the basic treatment methods for ultraviolet radiation;
- ⇒ be familiar with the possibilities of low-intensity laser radiation to affect trophism, microcirculation and tissue regeneration;
- ⇒ be familiar with the application of "soft" lasers in physical medicine

PRACTICAL SEMINAR № 6 - 2 hours

Kinesitherapy - essence, types. practical illustration of active species. Methods for some diseases.

1. Classification of active kinesitherapeutic types.
2. Forms of active species: a) gymnastic exercises; b) exercises of an applied nature; c) games.

3. Due to the dominance of gymnastic exercises in kinesitherapy programs, they will be illustrated in terms of: a) the type of muscle contraction; b) the anatomical feature; (c) the prescribed starting position; (d) the specific purpose.
4. Dosage of a specific kinesitherapy procedure.
5. Use of aids - crutches, canes, tutors, etc.

The student must be able to:

- ⇒ to know the place and importance of CT in medicine;
- ⇒ to know the possibilities for impact of different forms, methods of exercise therapy and other types of active CT: occupational therapy, field treatment, specialized methods: proprioceptive neuromuscular relief, Bobat's method, postisometric relaxation, suspension and pulithrapy.
- ⇒ be able to perform manual muscle testing of certain muscles and muscle groups;
- ⇒ to be able to perform kinesiological testing of a patient and to make a connection between the kinesiological status and the available pathology

PRACTICAL SEMINAR № 7 - 2 hours

Kinesitherapy. Practical illustration of passive types, acquaintance with the more widespread functional studies of the musculoskeletal system. Robotic rehabilitation.

1. Classification of passive types of kinesitherapy: a) Therapeutic massage - illustration of the basic techniques, demonstration of a massage procedure for a specific disease; b) Review of the main types of reflex massage - informative acquaintance with acupressure on some biologically active points in headache and migraine; c) Demonstration of cervical extension; d) Demonstration of manual mobilization techniques in case of peripheral joint blockage.
2. Robotic rehabilitation. Types of robots in rehabilitation - end effector type and exoskeleton. Advantages and disadvantages. Application in neurological diseases

The student must be able to:

- ⇒ to know the essence of the main forms of passive CT: massage, manual therapy and mechanotherapy (extension therapy);
- ⇒ to be able to perform the basic massage techniques of the classical therapeutic massage;
- ⇒ to know the possibilities of other types of reflex massages;
- ⇒ to be acquainted with the essence of manual medicine as a method for research in vertebrogenic diseases and its healing possibilities;
- ⇒ to be acquainted with the treatment risks in case of incompetently performed manual manipulations on the spine;
- ⇒ be familiar with the indications for the use of extension therapy.

PRACTICAL SEMINAR № 8 - 2 hours

Rehabilitation potential. Functional methods for determining the rehabilitation potential. Compilation of a rehabilitation program.

Assessment of the rehabilitation potential.

1. Practical acquaintance with the following methods for functional examination: Somatoscopy and anthropometry; Measurement of the volume of movement in the peripheral joints (angle agglomeration of the shoulder joint and acquaintance with the code registration of the volume of movement); Tests to measure the mobility of the spine (Ot, Schober, Hirz, etc.); Manual-muscle testing (MMT) - analysis of the more important elements of the method. Mastering the testing of flexors and extensors of the

- elbow joint Bicycle ergometry - a method for studying the physical capacity and training of the cardio-respiratory system.
2. Modern methods for estimating deviations in statics and locomotion.
 3. Organizing a rehabilitation team to develop the rehabilitation program.
 4. Discussion of specific procedures with physical factors and their inclusion in the rehabilitation program.

The student must be able to:

- ⇒ to conduct the functional tests listed above;
- ⇒ to get acquainted with the principles and tasks of the rehabilitation team.

PRACTICAL SEMINAR № 9 - 2 hours

Physioprophylaxis, physical therapy and rehabilitation of the most common cardiovascular, non-specific lung diseases, endocrine, gastrointestinal, renal, gynecological and onco-hematological diseases.

1. Aim and tasks of physical treatment and rehabilitation in patients with myocardial infarction according to the stage of the disease process: a) Acute phase - a program for gradual physical activity by controlling the main hemodynamic parameters; b) Phase of coalescence (early and late) - bicycle ergometric determination of the physical working capacity, strain frequency index, determination of the training pulse; c) Supporting stage - individual training programs, principles in their determination, functional classes.
2. Place of physical factors for physioprophylaxis and complex treatment of arterial hypertension.
3. The role of natural and reformed physical factors in the complex treatment of patients with non-specific lung diseases.
4. Possibilities of physical factors in the treatment of obesity, diabetes, gout and complications.
5. The place of balneotherapy in gastrointestinal and renal and urological diseases.
6. Introduction to some physiotherapeutic methods for more common diseases
7. Physical treatment of inflammatory diseases in gynecology and the fight against infertility.
8. Peculiarities of physical treatment in some onco-hematological diseases: hemophilic arthrosis, myeloma, drug polyneuropathy, etc.

Note - in all topics related to specific diseases, the indications and contraindications for physical treatment are discussed

The student must be able to:

- ⇒ to know the cardiological control in the rehabilitation of acute myocardial infarction;
- ⇒ to know the stages and phases of rehabilitation in uncomplicated and complicated AMI;
- ⇒ to distinguish the functional classes and to be able to determine the regime of the cardiac patients;
- ⇒ to be able to compile a rehabilitation program for a patient who has suffered AMI in the convalescent and maintenance phase;
- ⇒ to know the basic principles of physiotherapy and rehabilitation of hypertension, varicose veins and phlebitis;
- ⇒ to know the physical methods of treatment for asthma attacks and outside the asthmatic period
- ⇒ to be acquainted with the possibilities for balneotherapy of some endocrine, gastroenterological and nephro-urological diseases;
- ⇒ to be acquainted with the absolute and relative contraindications for physiotherapy of some onco-hematological diseases

PRACTICAL SEMINAR № 10 - 2 hours

Physioprophylaxis, physical therapy and rehabilitation of some diseases in childhood: respiratory - acute respiratory infections, bronchitis, bronchopneumonia, bronchial asthma; rheumatic cardiology - rheumatism, cardiopathy, juvenile polyarthritis; metabolic - rickets, diabetes.

Against the background of the anatomical and physiological features of the child's body are considered: Briefly the nature of the disease. The more significant pathogenetic changes. The tasks of behavior in treatment and rehabilitation plan. Physioprophylaxis - consideration of the tasks of primary and secondary physioprophylaxis

The student must be able to:

- ⇒ to be informed about the anatomical and physiological features of the child's organism, important for the physical therapy and rehabilitation;
- ⇒ to be acquainted with the treatment-rehabilitation behavior in children with non-specific lung diseases in the stage of exacerbation and in the stage of remission;
- ⇒ to be able to compile a long-term rehabilitation program;
- ⇒ to be acquainted with the criteria for sanatorium treatment in children;
- ⇒ be familiar with the cardiac control of physical activity in children with cardiopathy, rheumatism and juvenile rheumatoid arthritis

PRACTICAL SEMINAR № 11 - 2 hours

Physical therapy and rehabilitation of children's neurological diseases: cerebral palsy and obstetric paralysis.

The structure of practical seminar № 10 is preserved, as in a more extended form the peculiarities in the formation of the motor act are presented, based on the tonic, postural and conditioned reflexes and kinesitherapeutic possibilities in this direction. Physioprophylaxis. Possibilities of physical factors to prevent contractures and malnutrition. Demonstration of a kinesitherapy program - methods of Voita and Bobat

The student must be able to:

- ⇒ be familiar with the social significance and rehabilitation problems of children with neurological disabilities;
- ⇒ to know the algorithm of behavior of GPs in children with neurological disabilities;
- ⇒ be informed about the possibilities of reflex kinesitherapy in neurologically disabled children and the possibilities for prevention of severe disability

PRACTICAL SEMINAR № 12 - 2 hours

Physical therapy and rehabilitation of cerebrovascular disease, discogenic radiculitis and peripheral nerve damage

1. Purpose and tasks of physical treatment in patients with stroke: a) in the acute stage - prevention of respiratory congestion, contractures and pressure ulcers; b) in the rehabilitation - assessment of the rehabilitation potential, testing of the spasticity according to Brunnstrom, Locomotor test; c) in the residual stage - prevention of recurrences and complications. Compilation of a rehabilitation program. Demonstration of a complex rehabilitation program in a patient with a stroke.
2. Physical treatment and rehabilitation for peripheral nerve injuries a) Criteria and principles in preparing the rehabilitation program; b) Features in the physical treatment of Neuritis n. facialis and prevention of complications.
3. Compilation of a rehabilitation program for discogenic radiculitis.

The student must be able to:

- ⇒ to be able to determine the rehabilitation problems of a patient with post-stroke hemiplegia (paresis) according to the severity of the injury, location, age, concomitant diseases, etc .;
- ⇒ to know the tests for determining the spasticity of Brunström, ADL and the locomotor test;
- ⇒ be able to draw up a model of a rehabilitation program for a specific patient with hemiparesis, including in the long run;
- ⇒ to be informed about the diagnostic and prognostic possibilities of the electrodiagnostic methods in physical medicine and their place in the rehabilitation of peripheral nerve injuries;
- ⇒ be familiar with the rehabilitation behavior in peripheral nerve injuries;
- ⇒ to be acquainted with the principles of rehabilitation in disc disease in acute and subacute stages and during remission;

PRACTICAL SEMINAR № 13 - 2 hours

Physical therapy and rehabilitation of surgical diseases, prevention and treatment of postoperative complications, physical therapy and rehabilitation of post-traumatic and extensive processes of the central nervous system, thermal trauma, ENT and eye diseases.

1. Principled behavior in patients with traumatic brain injury and volume occupying processes in the early postoperative period. Role of physical factors for functional recovery and readaptation of patients.
2. Behavior in patients with spinal cord injuries: a) in the acute period - tasks of physical therapy within a complex approach b) tasks of physical therapy and rehabilitation during the early recovery period; c) behavior during the late recovery stage - a long-term program covering the problems of medical, vocational and social rehabilitation.
3. The place of physical factors in the treatment of urological diseases. Getting acquainted with the balneological resorts, where drinking balneotherapy is conducted.
4. Physical therapy for complications after thermal injuries.
5. Possibilities of physical factors in the treatment of ENT and eye diseases

The student must be able to:

- ⇒ to be acquainted with the rehabilitation problems of patients with traumas or extensive processes of the CNS;
- ⇒ to know the possibilities of the early applied rehabilitation measures for the prevention of some complications - pressure sores, contractures, congestive pneumonia, etc .;
- ⇒ to know the criteria for determining the rehabilitation potential of a particular patient;
- ⇒ to know the principles of rehabilitation in the acute phase and in the long run;
- ⇒ be familiar with the possibilities of the reformed physical factors in "septic" surgery;
- ⇒ to be familiar with the rehabilitation behavior in patients with thermal injuries

PRACTICAL SEMINAR № 14 - 2 hours

Physical therapy and rehabilitation of diseases of the musculoskeletal system of traumatic nature and overexertion, osteoporotic fractures, epicondylitis, periarthrititis, joint replacement.

1. Possibilities of the physical factors for influencing the consequences of the injuries of the musculoskeletal system: a) in case of injuries of the soft tissues, including the ligament apparatus; b) in case of dislocations and fractures: during immobilization (features of osteosynthesis); during the period of functional recovery; c) physical therapy of algo-dystrophic syndrome and contractures. Osteoporotic fractures
2. Joint arthroplasty.
3. Physical therapy for overexertion diseases: epicondylitis, myotendinosis, vibration disease, autonomic polyneuropathy and periarthrititis

The student must be able to:

- ⇒ to know the possibilities of physical medicine for influencing some complications in traumas of ODA - joint contractures, delayed callus formation, trophoneuroses, etc.;
- ⇒ to be acquainted with the principles of rehabilitation during the immobilization and post-mobilization period;
- ⇒ to know the criteria for compiling a rehabilitation program for early and long-term rehabilitation;
- ⇒ to know the rehabilitation complex for stable fractures of the spine;
- ⇒ to know the rehabilitation problems of patients with diseases of muscle strain, joint and ligament apparatus, autonomic polyneuropathy and other occupational diseases, in view of their ability to work and their professional reorientation

PRACTICAL SEMINAR №15 - 2 hours

Inflammatory and degenerative diseases of the musculoskeletal system.

1. Inflammatory diseases:

Possibilities of physical factors for influencing various forms of rheumatoid arthritis in adults. The physical treatment of M. Bechterew.

2. Joint-degenerative diseases:

Osteoarthritis of the spine and methods of treatment with physical factors. Physical treatment and rehabilitation for gonarthrosis and coxarthrosis. Rehabilitation of patients with alloplasty of hip and knee joints

The student must be able to:

- ⇒ be convinced of the possibilities of physical therapy and rehabilitation for slowing down the evolution of degenerative joint diseases and preventing the patient's disability;
- ⇒ to know the algorithm of rehabilitation behavior of GPs;
- ⇒ to be able to determine the rehabilitation potential and to compile a rehabilitation program, including a long-term plan of a specific patient with coxarthrosis, gonarthrosis, M. Bekhterev;
- ⇒ to know the indications and contraindications for physiotherapy of collagenosis

SUGGESTED BOOKS

1. Lecture course.
2. Fundamentals of physical therapy and rehabilitation - Prof. Ivet Koleva, MD, 2011.
3. Physical therapy - general and special part, edited by Assoc. Prof. M. Ryazkova and Assoc. Prof. I. Kirova, Arso, Sofia, 2002.
4. The Physical Factors in Practical Medicine (Guide for Students from the Higher Medical Institutes), edited by Assoc. Prof. M. Marinkev, Plovdiv, 1999.
5. Physical therapy, edited by Prof. Y. Gacheva, Sofia, 1993.
6. Manual of Physical Therapy, edited by Assoc. Prof. M. Ryazkova and I. Kirova, Sofia, 1998.
7. PRM for Medical students. Maria Gabriella Ceravolo - Nicolas Christodoulou (Editors) 2018 Edi.Ermes - Milan (Italy) ISBN 978-88-7051-636-4 - Digital edition

TOPICS FOR ABSTRACTS

1. Modern aspects in the complex rehabilitation of patients with degenerative joint diseases.
2. Basic principles in the use of low-frequency pulse currents in the rehabilitation of peripheral and central nerve injuries.
3. Optimal parameters for pain inhibition with medium frequency currents.
4. Possibilities of ICP in the treatment of inflammatory process in various organs and tissues.
5. The use of lasers in physical and rehabilitation medicine - modern concepts.
6. Pathokinesiological analysis - a basis for adequate kinesitherapy.
7. Manual therapy - in fact, indications and contraindications.
8. Modern guidelines in the rehabilitation of acute myocardial infarction.
9. The peculiarities of the child's organism - the basis for an adequate rehabilitation program for respiratory diseases in childhood.
10. Cerebral palsy - social significance and rehabilitation problems.
11. Physioprophylaxis, rehabilitation and social significance of cerebrovascular disease.
12. Physioprophylaxis and complex treatment of some complications of hypokinesia and immobilization - pressure ulcers, contractures, congestive pneumonia.
13. Possibilities of physical medicine for physioprophylaxis and treatment of some complications in trauma of ODA - joint contractures, delayed callus formation, trophoneuroses.
14. Complex physical treatment in the different stages of the rehabilitation of degenerative joint diseases
15. Modern assessment of the rehabilitation potential in patients with spinal cord injuries - development of an adequate rehabilitation program.
16. Complex physical treatment in the different stages of the rehabilitation of degenerative joint diseases.
17. Complex physical treatment of peripheral nerve injuries

SYLLABUS

Physical and Rehabilitation Medicine

A. General part

1. Rehabilitation – definition, aim, rehabilitation potential, types of rehabilitation, principles of rehabilitation.
2. Galvanization and iontophoresis - definition, therapeutic effects and clinical application. Indications and contraindications..
3. Low-frequency pulsed currents - definition, physical parameters of LFC, therapeutic effects and clinical application. Indications and contraindications..
4. Electrostimulation with low frequency pulsed currents for neuromuscular injuries and hypotrophic muscles with preserved innervation.
5. Diadynamic currents - definition, therapeutic effects and clinical application. Indications and contraindications.
6. Medium frequency currents - interferential and sinusoidal-modulated currents. - definition, therapeutic effects and clinical application. Indications and contraindications.
7. High frequency currents – definition, types, principles of generation. Local D'Arsonvalization - definition, therapeutic effects and clinical application. Indications and contraindications.
8. Ultrahigh frequency currents (shortwave diathermy) - definition, therapeutic effects and clinical application. Indications and contraindications.
9. Microwave diathermy (decimeter and centimeter microwaves) - definition, therapeutic effects and clinical application. Indications and contraindications.
10. Low frequency pulsed magnetic field. - definition, therapeutic effects and clinical application. Indications and contraindications.
11. Ultrasound therapy, phonophoresis - definition, therapeutic effects and clinical application. Indications and contraindications.
12. Shock wave therapy - definition, therapeutic effects and clinical application. Indications and contraindications.
13. Inhalation therapy, aeroionotherapy. - definition, therapeutic effects and clinical application. Indications and contraindications.
14. Electrodiagnostics; chronaximetry, I/t curves.
15. Light therapy: physiologic and therapeutic effects of light energy. Clinical application of light therapy for prevention and treatment.
16. Skin reactions after the application of light energy. Biodosimetry. Methods of application. Indications and contraindications.
17. Lasertherapy - definition, therapeutic effects and clinical application. Indications and contraindications for low and high intensity laser therapy.
18. Kinesitherapy - definition, types, effects of physical activity. The role of kinesitherapy as one of the main physical and rehabilitation medicine interventions in the individual rehabilitation plan.
19. Active kinesiotherapy – definition, methods. Principles of training activities. Clinical application. Indications and contraindications. Robotic rehabilitation.
20. Passive kinesiotherapy - definition, methods. Clinical application. Indications and contraindications.
21. Hydrotherapy - definition, methods. Physiological effects and clinical application. Indications and contraindications.
22. Thermotherapy - definition, methods. Clinical application. Indications and contraindications. Cryotherapy
23. Resort therapy: balneotherapy. Classification of mineral water types. Physiological effects of some of the main types of mineral waters. Therapeutic effects. Clinical application. Indications and contraindications.
24. Peloidotherapy. Types of mud, physiological action and clinical application. Indications and contraindications.
25. Resort therapy: climate therapy: main climatic factors. Mountain climate – application for treatment and prevention. Mountain resorts.
26. Resort therapy: climate therapy: main climatic factors. Thalassotherapy as part of PRM interventions.

B. PRM in the treatment and prevention of different medical conditions

1. Cardiac rehabilitation including post-myocardial infarction. PRM in patients with hypertension.
2. PRM in patients with vascular disorders: Raynaud's disease, Buerger's disease and varicose veins.
3. PRM in patients with respiratory dysfunction: bronchitis, pneumonia, bronchial asthma.
4. PRM in patients with disorders of the digestive system (gastric and duodenal ulcers, gastritis, gallstones). PRM in patients with nephrolithiasis.
5. PRM in patients with metabolic and endocrine disorders (diabetes and its complications, obesity, gout).
6. PRM in patients in the intensive care unit. Post-intensive care unit syndrome.
7. Rehabilitation after stroke.
8. Rehabilitation of patients after traumatic brain injury and spinal cord injury (TBI and SCI).
9. PRM in patients with disc herniation and radiculopathy.
10. PRM in patients with peripheral nerve damage: mono- and polyneuropathy.
11. PRM in surgical disorders – physical modalities in wound care: surgical wounds, pressure ulcers, diabetic wounds; physical modalities in the treatment of abscess, phlegmon, panaritium.
12. PRM in traumatic injuries of the musculoskeletal system (sprains, dislocations, fractures). PRM in complications of injuries of the musculoskeletal system, including reflex sympathetic dystrophy syndrome (RSDS).
13. PRM in spine disorders (scoliosis, spondylosis, ankylosing spondylitis).
14. PRM in osteoarthritis. PRM after joint replacement.
15. PRM in rheumatoid arthritis.
16. PRM in overuse syndromes.
17. PRM in children with birth trauma of the brachial plexus.
18. PRM in children with cerebral palsy.
19. PRM in ENT disorders.
20. PRM in gynecology and obstetrics (postnatal injuries, acute mastitis, inflammatory gynecological diseases, infertility).
21. PRM in dermatology (pyoderma, acne, psoriasis)

QUESTIONS FOR SELF-PREPARATION

Topic 1

DEVICE OF THE PHYSICAL THERAPY DEPARTMENT. TYPES OF APPLIANCES - PRINCIPAL DEVICE. RULES FOR WORK AND SAFETY. WORK IN THE SECTOR OF WATER, MUD, PARAFFIN AND SCREEN TREATMENT. MORE IMPORTANT METHODS

1. What sectors are there in the Department of Physical and Rehabilitation Medicine?
2. What are the main physical factors used for prevention and treatment?
3. What is hydrotherapy?
4. What is the name of the therapy using the different aggregate states of the water for this purpose?
5. What are the main factors that affect water?

6. How is water classified according to its thermal impact?
7. Which mechanical factors affect water procedures?
8. What is the specific effect of water on various organs and systems?
9. What is the hydrotherapeutic reaction?
10. What is the hydrotherapeutic dosage?
11. What are the types of hydrotherapy procedures?
12. What are the methods in cryotherapy?
13. Which natural products can be used for heat treatment?
14. What are the methods in heat treatment?

Topic 2

***ELECTRIC TREATMENT - TYPES OF CURRENTS USED IN PHYSICAL MEDICINE.
TREATMENT AND DIAGNOSIS WITH GALVANIC CURRENT AND LOW
FREQUENCY PULSE CURRENTS (NCP)***

1. What is the physical characteristic of galvanic current?
2. What is the physiological effect of galvanic current on various organs and systems?
3. What is the therapeutic effect of galvanic current? Indications and contraindications.
4. What is electrophoresis?
5. What conditions must the drug substance and the electric current meet in order for the therapeutic effect of electrophoresis to take place?
6. What are the physical parameters of NMS with adjustable parameters?
7. What are the physiological effects of NRT with adjustable parameters in different states of electrically excitable structures
8. Which physical parameters of NRTs with adjustable parameters correspond to the physiological characteristics of the electrically excitable structures?
9. What are the optimal parameters of NRT with adjustable parameters for electrical stimulation of intact and denervated muscles to varying degrees?
10. What is the physical characteristic of diadynamic currents?
11. What is the physiological action of diadynamic currents?

12. What is the methodology of excitomotor electrodiagnostics?

13. What is the chronoxymetry methodology?

Topic 3

ELECTRIC TREATMENT. AVERAGE FREQUENCY CURRENTS. ULTRASOUND. AEROSOL AND AEROIONOTHERAPY.

1. What is the physical characteristic of medium frequency modulated currents?

2. What is the physiological action of medium frequency modulated currents?

3. What is the physical characteristic of interference currents?

4. What is the physical characteristic of interference currents?

5. What are the indications and contraindications for treatment with IBD?

6. What is the physical characteristic of ultrasound?

7. What is the principle of obtaining an ultrasound?

8. What are the main factors of action of ultrasound?

9. What is the biological and therapeutic effect of ultrasound?

10. What are the physico-chemical bases of the aerodisperse system?

11. What are aerosol generators?

12. What are the main properties of aerosols?

13. What is aeroionotherapy?

Topic 4

ELECTRIC TREATMENT. HIGH FREQUENCY CURRENTS (HF) AND MAGNETIC FIELD.

1. What is the principle of ICP generation?

2. What is the physical characteristic of high frequency currents?

3. What are the types of high frequency currents?

4. What is the physical characteristic of D'Arsonval currents?

5. What is the therapeutic effect of currents of D'Arsonval?
6. What is the physical characteristic of ultra-high frequency currents?
7. What is the therapeutic effect of ultra-high frequency currents?
8. Who is a generator of ultra-high frequency currents?
9. What is the physical characteristic of decimeter waves?
10. What is the therapeutic effect of decimeter waves?
11. What is the physical characteristic of centimeter waves?
12. What is the therapeutic effect of centimeter waves?
13. What is the physical characteristic of magnetic therapy?
14. What is the therapeutic effect of magnetic therapy?
15. Indications and contraindications for treatment with ICP

Topic 5

LIGHT THERAPY. TYPES OF LIGHT ENERGY SOURCES, DOSAGE, METHODS OF PREVENTION AND TREATMENT. LASERS IN PHYSICAL MEDICINE AND REFLEXOTHERAPY.

1. What is the physical characteristic of the light waves used for prevention and treatment?
2. What are the main types of caloric and luminescent light sources?
3. What are the main types of light rays used for prevention and.
4. What is the biological action of visible rays?
5. What is the biological action of infrared rays?
6. What is the biological action of ultraviolet rays?
7. What is the individual and regional sensitivity of the skin to UVL?
8. How is UVL radiation dosed?
9. Types of UVL irradiation schemes?
10. What are the features of laser radiation. Basically a device?
11. Requirements for working with LASER safety equipment.
12. Indications and contraindications

Topic 6

KINESITHERAPY - ESSENCE, TYPES. PRACTICAL OVERVIEW OF ACTIVE SPECIES. METHODS FOR SOME DISEASES

1. Types of kinesitherapy.
2. Types of active kinesitherapy. Essence.
3. Influence of kinesitherapy on various organs and systems.
4. Rules for conducting the kinesitherapy procedure
5. Kinesitherapy program

Topic 7

KINESITHERAPY. PRACTICAL OVERVIEW OF THE PASSIVE TYPES, INTRODUCTION TO THE WIDER PRESENT FUNCTIONAL INVESTIGATIONS OF THE musculoskeletal system

1. Types of passive kinesitherapy. Essence.
2. Types of therapeutic massage.
3. Effect of massage techniques on various tissues
4. Types of reflex massage
5. Kinesitherapeutic analysis - functional assessment of ODA, CNS, PNS, DS

Topic 8

REHABILITATION POTENTIAL. FUNCTIONAL METHODS OF DETERMINATION OF REHABILITATION POTENTIAL. DRAWING UP A REHABILITATION PROGRAM

1. Define the term "rehabilitation potential".
2. What functional tests do we use to determine the rehabilitation potential of the patient in various diseases?
3. What modern methods do we use to assess static and locomotor imbalance?
4. How does the rehabilitation team develop the rehabilitation program?
5. How are the goals of the rehabilitation program determined?
6. How are the tasks of the rehabilitation program determined?

7. How the funds of the rehabilitation program are determined?

Topic 9

Physiopreventive therapy, physical therapy and rehabilitation for common cardiovascular, lung diseases, endocrine, gastrointestinal, renal, gynecological and onco-hematological diseases

1. What are the goals and tasks of physical treatment and rehabilitation in patients with myocardial infarction according to the stage of the disease process according to the different phases of the disease and in the maintenance stage.
2. By what means can they be achieved?
3. What is the place of physical factors for physioprophylaxis and complex treatment of arterial hypertension.
4. What natural and reshaped physical factors are used to treat high blood pressure?
5. What natural and reformed physical factors are applied in the complex treatment of patients with non-specific lung diseases?
6. What are the possibilities of physical factors in the treatment of obesity, diabetes, gout and complications.
7. What is the place of balneotherapy in gastrointestinal diseases.
8. Which physical factors are appropriate to use for the treatment of inflammatory diseases in gynecology and the fight against infertility.
9. What are the features of physical treatment in some onco-hematological diseases: hemophilic arthrosis, myeloma, drug polyneuropathy, etc.

Topic 10

PHYSIOPROPHYLAXIS, PHYSICAL THERAPY AND REHABILITATION OF CERTAIN DISEASES IN CHILDHOOD: RESPIRATORY - ACUTE RESPIRATORY INFECTIONS, BRONCHIOSIS, BRONCHY RHEUMOCARDIOLOGICAL - RHEUMATISM, CARDIOPATHIES, JUVENILE POLYARTHRITIS; EXCHANGE - DIABETES

1. What are the physiological features of the child's body?
2. What is the essence of acute respiratory infections.
3. What are the more significant pathogenetic changes.
4. What is the behavior in terms of treatment and rehabilitation.
5. What are the tasks of primary and secondary physioprophylaxis.
6. What is the essence of bronchopneumonia.

7. What are the more significant pathogenetic changes.
8. What is the behavior in terms of treatment and rehabilitation.
9. What are the tasks of primary and secondary physioprophyllaxis.
10. What is the essence of bronchial asthma.
11. What are the more significant pathogenetic changes.
12. What is the behavior in terms of treatment and rehabilitation.
13. What are the tasks of primary and secondary physioprophyllaxis.
14. What is the essence of rheumatic heart disease.
15. What are the more significant pathogenetic changes.
16. What is the behavior in terms of treatment and rehabilitation.
17. What are the tasks of primary and secondary physioprophyllaxis in rheumatic heart disease.
18. What is the essence of metabolic diseases.
19. What are the more significant pathogenetic changes.
20. What is the behavior in terms of treatment and rehabilitation.
21. What are the tasks of primary and secondary physioprophyllaxis in metabolic diseases

Topic 11

PHYSICAL THERAPY AND REHABILITATION OF CHILDREN'S NEUROLOGICAL

DISEASES: CHILDHOOD CEREBRAL PALSY AND OBSTETRIC PALSY

1. What are the physiological features of the child's body?
2. What is the essence of cerebral palsy?
3. What are the more significant risk factors?
4. What is the rehabilitation program? What specialized kinesitherapy techniques are used?
5. What are the tasks of primary and secondary physioprophyllaxis.
6. What is the essence of birth trauma of the shoulder plexus? What is the rehabilitation program?
7. What are the more significant etiological factors?
8. What is the behavior in terms of treatment and rehabilitation?
9. What are the tasks of physioprophyllaxis?

Topic 12

PHYSICAL THERAPY AND REHABILITATION OF VASCULAR DISEASE, DISCOGENOUS RADICULITIS AND PERIPHERAL NERVE INJURIES

1. What are the goals and objectives of physical therapy in patients with stroke at different stages of the disease?
2. What functional assessment is used to determine the rehabilitation potential.
3. What is the prevention of recurrences and complications.
4. What is the etiology of peripheral nerve damage?
5. What is functional treatment and rehabilitation for peripheral nerve damage?
6. What are the criteria and principles in preparing the rehabilitation program?
7. What are the features of the physical treatment of Neuritis n. Facialis.
8. What is the prevention of complications?
9. What is the behavior and complex treatment of discogenic radiculitis?

Topic 13

Physical Therapy and Rehabilitation of surgical diseases, prevention and treatment of postoperative complications, Physical Therapy and Rehabilitation of post traumatic and compressive processes in the CNS, heat injury, ENT and eye diseases

1. What is the basic behavior in patients with traumatic brain injury and volume occupying processes in the early postoperative period.
2. What is the role of physical factors for the functional recovery and readaptation of patients.
3. What is the behavior of patients with spinal cord injuries in different periods
4. What are the tasks of physical therapy within a complex approach?
5. What are the tasks of physical therapy and rehabilitation during the late recovery stage - a long-term program covering the problems of medical, professional and social rehabilitation.
6. What is the place of physical factors in the treatment of urological diseases?
7. What is the complex treatment, which is carried out in the balneological resorts, where drinking balneotherapy is carried out.
8. What complex treatment is suitable for physical therapy of thermal injuries and their complications.
9. What are the possibilities of physical factors in the complex treatment of ENT diseases.
10. What are the possibilities of physical factors in the complex treatment of eye diseases.

Topic 14

PHYSICAL THERAPY AND REHABILITATION OF DISEASES OF THE MUSCULOSKELETAL SYSTEM OF TRAUMATIC NATURE AND OVEREXERTION

1. What are the possibilities of physical factors for the treatment of soft tissue injuries affecting injuries of the musculoskeletal system?
2. Complex treatment of dislocations and fractures: during immobilization (features of osteosynthesis).
3. What are the possibilities of physical factors for the treatment of soft tissue injuries affecting musculoskeletal injuries during the period of functional recovery?
4. What is the complex treatment of algo-dystrophic syndrome.
5. What is the complex treatment of overexertion diseases - epicondylitis?
 6. What is the complex treatment of overexertion diseases - myotendinosis?
 7. What is the complex treatment of surges - vibration disease?
 8. What is the complex treatment of overexertion diseases - vegetative polyneuropathy?

Topic 15

INFLAMMATORY AND DEGENERATIVE DISEASES OF THE MUSCULOSKELETAL SYSTEM

1. What are the possibilities of physical factors to influence the various forms of rheumatoid arthritis in adults.
2. What is the complex physical treatment of M. Bechterew.
3. Complex physical treatment for coxarthrosis.
4. Complex physical treatment for gonarthrosis
5. Complex physical treatment of arthritic changes in peripheral joints?
6. Rehabilitation of patients with alloplasty of the hip joint.
 7. Rehabilitation of patients with alloplasty of the knee joint

MCQ's for selfpreparation

ELECTRICAL TESTING TEST

I. UNDERLINE THE CORRECT ANSWER

1. According to Gildemaster, low-frequency currents have a frequency of:

- a) up to 100 Hz b) up to 1000 Hz c) over 10000 Hz
2. In electrophoresis with / + / pole, the following electrolytes are introduced:
a) Sol. Novocaine hydr. b) Sol. Potassium iodate c) Salt. Glucose d) Salt. Sodium phosphorics
 3. The sinusoidally modeled currents are:
a) amplitude modulated attenuation currents b) pulse galvanizing currents c) medium frequency modulated at low frequency.
 4. El. stimulation of hypotrophic muscles is performed with:
a) / + / pole b) / - / pole
 5. High frequency currents:
a) have anti-inflammatory action b) use electrical stimulation of denervated muscles c) generate exogenous heat
 6. The magnetic field generated by the device Magnet-H-80 is:
a) variable low-frequency 50 Hz b) constant c) variable high-frequency 433 Hz
 7. The thixotropic effect is characteristic of:
a) interference currents b) ultrasound c) HF currents

II. FILL IN

Galvanization, resp. electrophoresis is not performed in: (specify 3 cases)

List 4 of the parameters of the low-frequency currents:

3. Write the wavelength of microwave currents from the decimeter and centimeter range:
4. The protection of the generators of RF currents is done by:
5. Write some commonly used preparations for phonophoresis in adhesions:
6. Inhalation treatment is indicated in:
7. Which reformed physical factors are used in acupuncture:

KINESITHERAPY TEST

I. UNDERLINE THE CORRECT ANSWER

1. Passive types of kinesitherapy include:
a) acupressure;
b) PIR;
c) underwater gymnastics;
d) field treatment;
2. Manual-muscle testing is a methodology for:
a) functional assessment of the cardiovascular system;
b) assessment of muscle weakness;
c) assessment of the volume of movement in the joints.
3. Suspension therapy is a method in which physical exercises are performed:

- a) against gravity;
- b) in case of eliminated gravity;
- c) against resistance

4. The cane shall be used as an aid by:

- a) the healthy party;
- b) the sick party;
- c) no matter.

5. Manual vertebrotherapy is a method of treating:

- a) disc herniation;
- b) spondylarthrosis;
- c) functional blockade of the intervertebral joints;

6. Indicate the meaning of the designation for the mobility of shoulder joint S: 50°-0-180°:

- a) adduction 50° and abduction 180°
- b) flexion 50° and extension 180°
- c) extension 50° and flexion 180°

7. "Joint play" is:

- a) movement of the joint along its anatomical axis;
- b) translational movement between the joint surfaces;
- c) rotational movement in the joints

II. FILL IN THE REQUIRED DATA:

1. List five rules for massage:

List the names of gymnastic exercises according to the type of muscle contraction:

3. The best stimulating effect on muscle trophism is achieved by the following kinesiherapeutic agents:

4. What kinesiherapeutic means and methods can be used to achieve muscle relaxation?

5. ADL testing aims to:

6. Give an example of appropriate combination of kinesitherapy procedures with others with physical factors:

7. List the basic principles of training:

8. Contraindications for active kinesitherapy:

TEST AND TESTING for LIGHT, WATER AND HEAT THERAPY

I. UNDERLINE THE CORRECT ANSWER

1. Infrared rays cause:

- a) photochemical processes in tissues;
- b) exogenous heat in the tissues;
- c) endogenous heat in the tissues.

The strongest influence on the skin pigmentation is exerted by UVL from:

- a) the long-wave spectrum;
- b) the mid-wave spectrum;
- c) the shortwave spectrum.

3. Ultraviolet rays have their effect on:

- a) the dermis;
- b) the hypodermis;
- c) the epidermis.

4. The heat capacity of paraffin is:

- a) larger than water;
- (b) less than that of water;
- c) identical to that of water.

5. The most valuable properties have:

- a) estuarine mud;
- b) peat mud
- c) the mineral mud.

6. Psammotherapy is:

- a) steam treatment;
- b) sand treatment;
- c) treatment with seaweed.

7. The emission of the helium-neon laser is in the spectrum of:

- a) UVL;
- b) the red visible light;
- c) ICL.

II. FILL IN THE REQUIRED DATA:

1 Describe the Gorbachev-Dalfeld method of biodosimetry

2. List 5 criteria influencing the individual sensitivity of the skin to UVL:

3. Types of schemes for subertemic irradiation:

4. Features of laser radiation:

5. Protective equipment for staff and patients when working with light sources are:

6. List the application methods in cryotherapy:

7. List 3 main factors in peloidotherapy:

8. Indications for "sauna" therapy

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
CLINICAL PHARMACOLOGY

Approved by the Department Council - Protocol №94/25.03.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

CLINICAL PHARMACOLOGY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters
								5 th year
Clinical Pharmacology	9 th semester	Total	Lectures	Practices	ECTS	0.7	2.2	IX
		45	30	15	1.5			2/1

DISCIPLINE: Clinical Pharmacology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS: Mandatory

LEVEL OF QUALIFICATION: Master's degree /M/

FORMS OF TRAINING: Lecture courses, practical courses.

YEAR OF TRAINING: 5th year

DURATION OF TRAINING: 1 semester

ACADEMIC HOURS: 30 hours of lecture courses, 15 hours of practical courses

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Audiovisual equipment, tools and technical devices to illustrate the efficacy and safety of drugs, clinical cases.

FORMS OF EVALUATION: Ongoing evaluation – weekly tests, oral examinations, colloquia on clinical cases.

Final evaluation – entry test, written essays, oral examination.

EVALUATION CRITERIA: The final exam grade is formed and calculated as the mean result of the written essays, oral examination and the year mark of the student's on-going assessment.

ASPECTS OF EVALUATION CRITERIA: Participation in discussions, solving tests, practical skills on prescribing drugs, ability to solve clinical cases

SEMESTER EXAM: Yes (Entry test; written examination; oral examination).

STATE EXAM: No

LECTURER: Professors and Associated Professors from the Department of Pharmacology and Clinical Pharmacology

DEPARTMENT: Pharmacology and Clinical Pharmacology

ANNOTATION

The discipline Clinical Pharmacology allows students to acquire knowledge and skills in the following concepts:

- The aim and objectives of Clinical Pharmacology;
- Principles of evidence-based medicine, WHO criteria for P-drug ;
- Principles of drug discovery;
- The role of clinical pharmacokinetics for drug dosage regimens and therapeutic drug monitoring;
- The role of clinical pharmacodynamics, clinical chronopharmacology, clinical pharmacogenetics for rational drug therapy.
- Pharmacotherapy during pregnancy and breast feeding, pharmacotherapy in the elderly, pharmacotherapy in patients with liver, renal or heart failure;
- Adverse drug reactions and important drug interactions;
- Principles of pharmacoeconomics;
- Approaches for treatment of socially significant diseases – hypertension, chronic congestive heart failure, stable angina, pain, insomnia, bronchial asthma, peptic ulcer disease, infections.

BASIC AIMS OF THE DISCIPLINE

- To use pharmacokinetic parameters in rational drug therapy;
- To be able to compare drugs from different pharmacological groups according to their efficacy, safety, drug suitability and cost;

- To be able to evaluate risk/benefit ratio in the treatment of socially significant diseases;
- To be able to choose a P-drug and alternatives in the treatment of pain, insomnia, hypertension, stable angina, ulcers etc.;
- To be able to use data from clinical trials.

EXPECTED RESULTS

Theoretical knowledge – A thorough working knowledge of the efficacy and safety of drug therapy in patients with various physiological and pathological conditions.

Practical skills – The ability to determine a personal drug (p-drug) for a hypothetical patient and to prepare an appropriate therapeutic plan; the ability to use scientific literature to obtain data for drug efficacy and safety; the ability to use the data from clinical trials according to the principles of evidence-based medicine.

LECTURES

Lecture 1 (2 hours).

Clinical Pharmacology – Introduction. Evidence- based medicine. Drug discovery – the role of clinical pharmacology.

Lecture 2 (2 hours).

Clinical and pharmacological approaches for treatment of pain.

Lecture 3 (2 hours).

Clinical and pharmacological approaches for treatment of arterial hypertension. Antihypertensive drugs.

Lecture 4 (2 hours).

Clinical and pharmacological approaches for treatment with antianginal drugs.

Lecture 5 (2 hours).

Clinical and pharmacological approaches for treatment of chronic heart failure. Drug epidemiology. Drug safety.

Lecture 6 (2 hours).

Clinical pharmacokinetics. Pharmacokinetic indexes – clinical application.

Lecture 7 (2 hours).

Clinical pharmacokinetics. Pharmacokinetic indexes – clinical application (cont). Clinical and pharmacological approaches for treatment of insomnia.

Lecture 8 (2 hours).

Clinical and pharmacological approaches for treatment of bronchial asthma. Drug therapy in alcoholic patients and cigarette smokers.

Lecture 9 (2 hours).

Clinical and pharmacological approaches for treatment with antiulcer drugs. Food regimen and drug therapy.

Lecture 10 (2 hours).

Clinical and pharmacological approaches for treatment with antimicrobial drugs.

Lecture 11 (2 hours).

Pharmacoeconomics. Adverse drug reactions.

Lecture 12 (2 hours).

Clinical chronopharmacology. Clinical pharmacogenetics. Drug therapy in the elderly.

Lecture 13 (2 hours).

Drug interactions. Benefit / risk ratio.

Lecture 14 (2 hours).

Drug therapy in patients with liver, renal and heart failure.

Lecture 15 (2 hours).

Pharmacotherapy in pregnancy and breast feeding.

PRACTICES

Practical 1 (2 hours).

Clinical and pharmacological approaches for treatment of pain and insomnia. Discussion on clinical cases.

Practical 2 (2 hours).

Clinical and pharmacological approaches for treatment of arterial hypertension.
Antihypertensive drugs. Discussion on clinical cases.

Practical 3 (2 hours).

Clinical and pharmacological approaches for treatment of stable angina pectoris and chronic congestive heart failure. Discussion on clinical cases.

Practical 4 (2 hours).

Clinical and pharmacological approaches for treatment for treatment of bronchial asthma.
Clinical and pharmacological approaches for treatment for treatment of peptic ulcer disease.
Discussion on clinical cases.

Practical 5 (2 hours).

Clinical and pharmacological approaches for treatment of infections. Antimicrobial drugs.
Discussion on clinical cases.

Practical 6 (2 hours).

Pharmacological approaches in patients with acute myocardial infarction, hypertensive crises and asthmatic state – discussion on clinical cases in the Medical Simulation Training Center.

Practical 7 (2 hours).

Colloquium on Practicals 1, 2, 3, 4 and 5.

BIBLIOGRAPHY

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3. Introduction to Clinical Pharmacology, 6th edition, by Marilyn W. Edmunds, 2009.
4. Principles of Clinical Pharmacology, 2nd edition, by Atkinson, Abernety, Daniels, Dedrick and Markey, Academic Press, 2011.
5. Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th edition, by Brunton, Chabner and Knollman, 2010.
6. Color Atlas of Pharmacology by Albrecht Ziegler, Mohr, Bieger and Lullmann, 2000.

CONSPECTUS
CLINICAL PHARMACOLOGY EXAM

1. Clinical Pharmacology - introduction, subject, aim and tasks. Evidence-based medicine and drug therapy, based on evidence.
2. The role of clinical pharmacology in drug development. Clinical trials - phases, designs in clinical research.
3. Clinical and pharmacological approaches for treatment with antimicrobial drugs.
4. Clinical pharmacokinetics - absolute and relative bioavailability and their use in clinical practice. Therapeutic drug monitoring.
5. Clinical and pharmacological approaches for treatment of bronchial asthma.
6. Clinical pharmacokinetics – pharmacokinetic indexes, clinical consequences for the efficacy of drug therapy. Regimens of drug dosage - clinical importance.
7. Clinical and pharmacological approaches for treatment with antiulcer drugs.
8. Clinical and pharmacological approaches for treatment with antianginal drugs.
9. Food regimen and drug therapy. Changes in drug pharmacokinetics and pharmacodynamics in alcoholic patients and cigarette smokers.
10. Clinical and pharmacological approaches for treatment of pain.
11. Clinical and pharmacological approaches for treatment of insomnia.
12. Clinical pharmacodynamics. Changes in drug pharmacokinetics and pharmacodynamics in patients with liver and heart failure.
13. Clinical chronopharmacology. Circadian rhythms in the functions of the human body and their role in rational pharmacotherapy.
14. Clinical and pharmacological approaches for treatment of arterial hypertension.
15. Clinical pharmacogenetics - subject, aim, tasks, clinical importance.
16. Clinical and pharmacological approaches for treatment of chronic heart failure.
17. Pharmacotherapy in pregnancy and breast feeding.
18. Drug therapy in the elderly. Changes in drug pharmacokinetics and pharmacodynamics in patients with diabetes mellitus and thyroid gland dysfunction.
19. Changes in drug pharmacokinetics and pharmacodynamics in patients with renal failure.
20. Drug interactions – clinical importance.
21. Drug epidemiology and drug safety. Adverse drug reactions (ADRs). Classification, registration, clinical detection of ADRs.

22. Efficacy and rationality of drug treatment – evaluation criteria in clinical practice.
Pharmacoeconomics.

**MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE**

**SYLLABUS
IN
GENERAL PRACTICE**

Approved by the Department Council - Protocol № 5/07.06.2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

**GENERAL PRACTICE
Syllabus**

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								V th year	
		Total	Lectures	Practices	ECTS			IX	X
General Practice	IX	60	30	30	2.0	0.8	2.8	2/2	-

DISCIPLINE:
GENERAL PRACTICE

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:
Mandatory

LEVEL OF QUALIFICATION:
Master degree (MD)

FORMS OF TRAINING:
Lectures, exercises/ seminars

YEAR OF TRAINING:
V (5th course)

DURATION OF TRAINING:
One semester

ACADEMIC HOURS:
30 hours of lectures, 30 hours of exercises/seminars

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:
Audio-visual equipment, solving clinical cases, presentations, simulation center

FORMS OF EVALUATION:
Current and final assessment: Test and oral exam

EVALUATION CRITERIA:
Assessment by the assistant professor during the semester;
Test including open and closed questions and clinical cases; Oral exam with final grade

ASPECTS OF EVALUATION CRITERIA:
Assessment from ongoing control Assessment from a written exam Assessment from the final oral exam
If one of the components is evaluated with poor (2), then the final grade will be poor (2).

SEMESTER EXAM:
Yes – written and oral exam

STATE EXAM:

No

LECTURER:

Assoc. Prof. from the Department of Urology and General Medicine

DEPARTMENT:

UROLOGY AND GENERAL PRACTICE

ANNOTATION

General medicine is an academic discipline having its own teaching and research content, based on evidence and clinical activities specifically oriented to primary health care.

BASIC AIMS OF THE DISCIPLINE

The main goal of the education of General Medicine is to prepare doctors who are competent enough to supply high quality polyvalent health care, using holistic approach to population's health problems, capable of applying scientific achievements into their own practice.

EXPECTED RESULTS

After finishing the course, the students must be able to:

- Understand the essence of the discipline General Medicine, the position, role and functions of the General practitioner in the health care system
- Obtain skills for proper communication with the patient in the context of General Practice
- Obtain the necessary skills and be able to perform basic activities in the General Practice – preventive activities in different age groups
- Know the modern diagnostic and therapeutic approach
- Develop their training needs and self-development

LECTURES**Lecture № 1 – 2 hours****Modern concept of General Medicine**

History aspects in the development of the specialization in medicine. Modern primary health care – organization and management. The position of the general practitioner in the health care system.

Lecture № 2 – 2 hours**Preventive medicine**

Health care and prevention of diseases as a basic activity in the general practitioner's work. Types of preventive activities. Programs directed to prevention of different groups of diseases and/or different groups of patients.

Lecture № 3 – 2 hours**Shared decision-making in general practice**

Consulting features in primary health care. Consultation types and models. Process of decision-making for a health problem. The contribution of general practitioner and the patient; sharing.

Lecture № 4 – 2 hours

Socially significant diseases (non-communicable diseases) management in the general practice

Management models of chronic diseases. Preventive check-ups. Role of the general practitioner in the chronically ill patients.

Lecture № 5 – 2 hours

Multimorbidity

Definition. Significance of the multimorbidity problem in primary health care. Polymorbidity. Long-term care for multimorbidity patients.

Lecture № 6 – 2 hours

Cooperation of the patient in the therapeutic process

Definition of patient's cooperation in the therapeutic process. Specifics of patient's cooperation in the primary health care. Behavioral model in health problems and the necessity of changing patient's lifestyle.

Lecture № 7 – 2 hours

Pain – expected and unexpected dimensions

Pain – definition and types. Pain as a symptom of looking for a medical help in the primary health care. Somatic and psychological aspects.

Lecture № 8 – 2 hours

Geriatrics

Gerontology and geriatrics. Geriatric patients – functional and clinical assessment. Specifics of care for geriatric patients. Role of the general practitioner.

Lecture № 9 – 2 hours

Palliative care

Historical aspects and modern conceptions. Organization of palliative care. Symptoms and syndromes of palliative patients; therapeutic approaches. Role of the general practitioner.

Lecture № 10 – 2 hours

Doctor-patient relationship in the General Practice

Patient-centered, bio-psycho-social approach. Long-term relationship between doctor and patient in primary health care.

Lecture № 11 – 2 hours

Broad-based narrow-based approach. Patient's path in the health care system

Consultation with specialist or hospitalization of the patient. Functional team forming for solving patient's health problem.

Lecture № 12 – 2 hours

Diagnostic and therapeutic manuals and guidelines in General Practice

Making and using diagnostic and therapeutic manuals in daily practice. Possibilities and limitations.

Lecture № 13 – 2 hours

Social aspects in general practitioner's work

Patients with specific needs and patients from institutions, taken care of general practitioner. Social aspects of illness. Non-government organizations in health care system.

Lecture № 14 – 2 hours

Evidence based medicine. Research in the primary health care. Necessity of research, scientific projects, clinical trials and other trials in primary health care with participation of the general practitioner. Using modern technologies in primary health care.

Lecture № 15 – 2 hours**Working stress, time management, toleration of insecurity**

Providing full-time access to primary health care. Organization of daily schedule for patient with different types of problems – emergency patients, acute, chronic, prophylactic, administrative. Stress at work, burn-out syndrome and how to handle it.

PRACTICES

EXERCISE № 1 – 2 hours**General Practitioner, his patient and the illness**

Content: The general practitioner as a specialist. First contact, assessment and management of patients with different diseases or patients, who believe to be ill. Documentation in the primary health care.

Method: discussion, studying clinical cases, role games, work with medical documentation

EXERCISE № 2 – 2 hours**General practitioner's activities concerning children's health in primary health care**

Content: Introduction to the organization and management of the activities concerning children - the choice of general practitioner; prophylactic activities of infants and children until 18 years; the most common reasons for visiting the primary health care practice.

Method: studying clinical cases, discussion, role games

EXERCISE № 3 – 2 hours**Reproductive health and parenting**

Content: Introduction to the reproductive health's problems and the role of the general practitioner in organizing and managing family planning activities, women's consultation, screening of oncological diseases, sexually transmitted diseases

Method: studying of clinical cases, using layouts

EXERCISE № 4 – 2 hours**Decision-making in patients with chest pain in general practice**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with cardiovascular symptoms

Method: discussion, clinical cases studying, video materials, role games, EKG performing and reading EKG records, auscultation training of the heart and lungs, manipulation training

EXERCISE № 5 – 2 hours**Metabolic and endocrinological health issues**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with endocrinological symptoms

Method: discussion, clinical cases studying, video materials, role games, measurement of blood sugar

EXERCISE № 6 – 2 hours**Respiratory health**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with respiratory symptoms - shortness of breath, cough, hemoptoe

Method: discussion, clinical cases studying, video materials, role games, auscultation training of the heart and lungs

EXERCISE № 7 – 2 hours**Muscle-skeleton issues**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with musculoskeletal symptoms - pain, limited mobility, physiotherapeutic aspects

Method: discussion, clinical cases studying, video materials, role games

EXERCISE № 8 – 2 hours**Neurological health issues in primary health care**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with neurological symptoms - headache, seizures, loss of consciousness

Method: discussion, clinical cases studying, video materials, role games, performance of a neurological examination

EXERCISE № 9 – 2 hours**Unstructured health issues in general practice**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with infectious, adynamic and consumptive syndromes

Method: discussion, clinical cases studying, video materials, role games

EXERCISE № 10 – 2 hours**Mental health**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with anxiety, depression, psychosomatic disorders Method: discussion, clinical cases studying, video materials, role games

EXERCISE № 11 – 2 hours**Nutrition and gastrointestinal tract issues**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with gastrointestinal health problems - nausea, vomiting, diarrhea, constipation, hematemesis, melena, abdominal pain, acute abdomen phantom

EXERCISE № 12 – 2 hours**Kidney and urological health problems in general practice**

Content: communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with edema, lower urinary tract symptoms

Method: discussion, clinical cases studying, video materials, role games, manipulation training

EXERCISE № 13 – 2 hours

Otorhinolaryngology, speech, and hearing. Ophthalmological diseases and vision Content: communicative, differential-diagnostic, and therapeutic approach of the general practitioner in reference to patients with eye and ENT diseases

Method: discussion, clinical cases studying, video materials, role games, otoscopy, rhinoscopy, ophthalmoscopy, determination of vision and color vision

EXERCISE № 14 – 2 hours

Prescription and interpretation of clinical and laboratory results and device examinations

Content: information from the data in the diagnostic process, treatment and tracing of health problems in general practice; communicative, differential-diagnostic and therapeutic approach of the general practitioner in reference to patients with anemia, hemorrhagic diathesis and icterus

Method: interpretation of clinical and laboratory results and device examinations

EXERCISE № 15 – 2 hours

Emergency in general practice, basic manipulations

Content: introduction to basic manipulations and activities in general practice

Method: manipulations training - injections, catheterization, surgical suture, cardiopulmonary resuscitation

BIBLIOGRAPHY

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- Основи на общата медицина. ред. М. Горанов. Университетско издателство на ВМИ Плевен, 2001:480
- Актуални аспекти в общата медицинска практика. Том I ред. Л. Деспотова- Толева. Медицинско издателство ВАП, Пловдив, 2009:596
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- Съвременни проблеми на гериатричните пациенти в обща практика. Амбарева З. Дисертация за присъждане на онс „доктор“ МУ Пловдив, Пловдив, 2017
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- Пациент - центриран подход при гериатрични пациенти в общата медицинска практика. ред Р. Асенова. Изд. Лакс бук ЕООД, 2018:250
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- Диференциална диагноза и терапия. Изд. ЕЛДО, 2001:703
- Диференциална диагноза на вътрешните болести. Том I Ред. В. Зигенталер. Изд. Медицина и физкултура. София; 1993:17.25
- Диференциална диагноза на вътрешните болести. Том II Ред. В. Зигенталер. Изд. Медицина

и физкултура. София; 1993:40.20

- Диференциално-диагностичен компендиум. Ред. Ян Хорни. Изд. Медицина и физкултура. София; 1994:278
- Диференциална диагноза на детските болести. Н. Мумджиев. Изд. МИ АРСО. София 2004:516
- Диференциална диагноза на неврологичните заболявания. Н. Антонов, С. Божинов, В. Боснев, М. Вантов, В. Митков и др. Изд. Медицина и физкултура. София; 1994:299
- Ръководство по инфекциозни болести за общопрактикуващи лекари. Генчо Генев и Хусник Бояджиян. Изд. Литера принт АД. Стара Загора; 2001:488
- Практически справочник за диагноза, диференциална диагноза и лечение на вътрешните болести. Н. Беловежков, И. Диков, Д. Монова. Изд. МИ Райков, Пловдив; 2004:270

CONSPECTUS

1. Organization of primary health care and the role of the General Practitioner
2. Competences of General Practitioner
3. The management of general practice
4. Family as a patient in general practice
5. The path of the patient in health care system
6. Teamwork in general practice
7. Consultation models in general practice
8. Patient-centered and bio-psycho-social approach
9. Decision making in general practice
10. Goals and content of the basic areas of the preventive medicine in primary health care
11. Screening programs in general practice
12. General Practitioner's activities related to children's health
13. Routine childhood vaccines and the role of general practitioner
14. General practitioner's activities related to the regular observation of pregnancy
15. Family planning in general practice
16. Management models of chronic diseases in general practice
17. Risk factors for socially significant diseases and general practitioner's activities connected to their management
18. Behavior models of health issues and necessity of changing the lifestyle
19. Role of the general practitioner in patients with chronic diseases
20. Doctor-patient cooperation in primary health care
21. Long-term care observation of patients with endocrine diseases in general practice
22. Long-term care observation of patients with cardiovascular diseases in general practice

23. Geriatric patients in general practice - specifics, problems, functional and clinical assessment
24. Role of the general practitioner in geriatric patients
25. Role of the general practitioner in multimorbid patients
26. Multimorbidity and polypharmacy
27. Palliative care in general practice - modern conceptions and organization
28. Role of the general practitioner in taking care of palliative patients
29. Differential diagnosis of chest pain with cardiac origin in primary health care
30. Differential diagnosis chest pain except that with cardiac origin in primary health care
31. Differential-diagnostic approach of cough in primary health care
32. Differential-diagnostic approach of shortness of breath in primary health care
33. Differential-diagnostic approach of hemoptoe in primary health care
34. Pain - definition, types, and treatment
35. Somatization and psychological aspects of pain
36. Differential diagnosis of low back pain
37. General practitioner's approach of joint pain
38. Differential diagnosis of headache
39. Cerebrovascular incidents and dementia
40. Differential diagnosis of seizures and loss of consciousness
41. Differential diagnosis of unclear fever conditions
42. Differential diagnosis of skin rashes
43. General practitioner's approach in adynamic and consumptive syndrome
44. Psychosomatic disorders
45. Depression and anxiety in general practice
46. Differential diagnosis of abdominal pain
47. Differential-diagnostic approach of dyspeptic syndrome in general practice
48. Differential diagnosis of edema
49. Differential diagnosis of urinary tract symptoms
50. Social aspects of illness
51. Differential diagnosis of otalgia and reduced hearing in general practice
52. Differential-diagnostic approach of "red" and "white" eye
53. Basic manipulations in general practice
54. Emergency in general practice
55. Evidence-based medicine with a focus on general medicine
56. Burn-out syndrome - definition, significance, and ways of handling it in general practice

MEDICAL UNIVERSITY of PLOVDIV
FACULTY of MEDICINE

SYLLABUS

in

Clinical Oncology

Approved by the Section Council on 26.05.2022/ Proceedings № 3
Confirmed by the Faculty Council on 13.07.2022/ Proceedings № 7

CLINICAL ONCOLOGY

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								5 th year	
Clinical oncology	X	Total	Lectures	Practices	ECTS			IX	X
		30	20	10	1.0	0.3	1.3	-	30

Course name:

"Clinical Oncology "

Type of course according to the uniform state requirements:

Mandatory

Level of education:

Master / M /

Forms of training:

Lectures, seminars with consideration of clinical cases

Year of training:

Fifth semester

Duration of training:

One semester

Academic hours:

30 teaching hours (20 hours of lectures, 10 hours of practices)

Technical equipment applied in the training:

Multimedia presentations, clinical discussions, clinical cases

Forms of evaluation:

Tests, seminars

Evaluation criteria:

An assessment for the semester is formed on the basis of the written examination

Score assessment:

Participation in discussion, solving test tasks

Annual exam:

Exam - final test

State Exam: No**Lecturers:**

Habilitated lecturers from the Department of Clinical Oncology

Section:

"Clinical Oncology"

ANNOTATION

The course "Clinical Oncology" summarizes modern multimodal knowledge in the field of socially significant oncological diseases. The course builds on and summarizes conceptually existing knowledge on the topic in various medical fields. Structurally, clinical oncology combines radiotherapy (radiation oncology) and medical oncology (drug therapy = chemotherapy, targeted, immunotherapy, gene, etc.) as part of the complex treatment of patients with solid tumors. The multimodal approach also includes surgical treatment, psychotherapy, various methods of palliative care and others. Students should be familiar with modern oncology doctrine in all major groups of malignant diseases. The aim of the training is for the future colleagues to acquire the modern and complex "oncological view" for early diagnosis and timely referral of patients along the correct therapeutic corridor.

COURSE OBJECTIVES

Students should be familiar with the biology of malignant neoplasms, incl. molecular markers of the disease, the interpretation of clinical and the full range of diagnostic tests, the principles of radiation and chemotherapy and consensus the accepted therapeutic algorithm. The treatment of malignant diseases requires the expert participation of many different medical subspecialties. The approach is determined by a multidisciplinary team including an oncologist, radiotherapist (radiation oncologist), chemotherapist, pathologist, specialist in imaging and nuclear medicine diagnostics, molecular geneticist and others. Patients with malignant diseases are treated after a consensus decision of the Common Clinical Oncology Committee (CCC), in which these specialists participate.

The final diagnosis of malignancies requires precise histological and immunohistochemical verification of the tumor; study of the molecular genetic profile of the tumor in order to prove "driver" mutations and establish predictive markers - information needed for future physicians. The training in the discipline also updates the knowledge of modern imaging diagnostic methods with a view to timely and adequate staging, restoration, monitoring and evaluation of therapeutic response. The therapeutic spectrum in the field of oncology is constantly expanding its capabilities - new methods and machines in the field of radiation oncology (radiation therapy), a rapidly growing range of new molecules in the field of targeted and immunotherapy.

RESULTS EXPECTED

Upon completion of the training, students must have the following knowledge and skills:

1. To know the basic principles of treatment of oncological diseases;
2. To know the epidemiology, etiology, pathogenesis and histomorphology of the most common groups of oncological diseases;
3. To be acquainted with the indications for conducting clinical-laboratory, histological, molecular-genetic, imaging methods (X-ray, computed tomography, nuclear magnetic and PET-CT procedures) in the diagnosis, staging, treatment of patients with solid tumors and restoration intervals;
4. To discuss the variety of approaches in determining the stage of the disease and the role of chemotherapy and radiotherapy in patients with advanced disease;
5. To know the principles of radiation biology and the indications for radiation therapy in its varieties as a radical or palliative agent;
6. To know the different methods of radiotherapy according to the distribution of the dose over time - types of fractionation, brachytherapy, percutaneous radiotherapy, metabolic radiotherapy (advantages and disadvantages);
7. Students are trained according to modern standards for the place of radiotherapy in terms of surgical treatment and/or chemotherapy. They get acquainted with the immediate and late consequences of radiotherapy;
8. To be acquainted with the therapeutic possibilities of radiosurgery;
9. To know the indications and goals of effective treatment with cytostatics in primary, locally advanced, metastatic or recurrent disease;
10. To know the mechanism of action of antitumor drugs, incl. and their role as a radiosensitizer;
11. To have an accurate idea of the duration of treatment with specific antitumor drugs, the side effects of this treatment and the principles of their management;
12. To be familiar with the indications for the use of maintenance therapy, incl. contraindications and potential side effects;
13. To know the specifics of different groups of oncological diseases - etiopathogenesis, clinical symptoms, modern diagnostics, modern therapeutic options and prognosis;
14. To have the ability to inform and discuss "painful" topics in an appropriate way with patients and their families;
15. To acquire basic knowledge in the field of analgesia, palliative care, psychooncology, psychorehabilitation;

CLINICAL ONCOLOGY PROGRAM FOR MEDICAL STUDENTS V course, Second semester

№	TOPIC - TWO STUDY HOURS	Lectures / Hour
1.	Malignant diseases - what does the physician have to know? Principles of drug treatment of solid tumors. Conventional chemotherapy. Targeted therapy.	2h

2.	Principles of radiation oncology - indications, side effects, complications. Principles of radiosurgery.	2h
3.	Clinical application of radiation oncology in solid tumors - main indications for various malignant neoplasms.	2h
4.	Malignant tumors of the lung and pleura - staging, complex treatment.	2h
5.	Breast cancer - genetic features, diagnosis, staging, principles of therapy. Malignant tumors of the female reproductive system (uterus, ovaries) – clinical characteristics, staging, treatment principles	2h
6.	Malignant tumors of the Gastrointestinal Tract - genetic features, staging, principles of treatment.	2h
7.	Malignant tumors of the genitourinary system in men - staging, principles of treatment	2h
8.	Nuclear medicine: metabolic imaging (SPECT-CT; PET-CT, PET-MRT).	2h
9.	Role of metabolic radionuclide therapy in oncology.	2h
10.	Soft tissue sarcomas. Bone tumors. Cancer of unknown primary (CUP). Metastatic disease - a modern concept.	2h

TEST

LECTURES - THESIS

LECTURE № 1

Malignant diseases - what should a modern doctor know? Principles of drug treatment of solid tumors. Conventional CT. Targeted therapy - groups of drugs, mechanism of action, representatives

1. Biology of malignant diseases
2. Epidemiological data on malignancies - global trends, data for Europe and data from the National Cancer Registry
3. Modern staging systems
4. Principles of treatment and multimodal approach
5. Principles of conventional chemotherapy. Groups of drugs
6. Concept of targeted therapy as a component of modern antitumor treatment – molecular mechanisms of action, classification, indications
7. Immunotherapy

LECTURE № 2

Principles of radiotherapy of malignant tumors - indications, side effects, complications.

Principles of radiosurgery.

1. Contemporary trends
2. Biological effect of ionizing radiation
3. Radiation sensitivity
4. Sources of ionizing radiation
5. Local and general radiation reactions
6. Radical and palliative radiotherapy
7. Preoperative and postoperative radiotherapy

LECTURE № 3

Clinical application of radiation therapy (RT) in solid tumors - indications, side effects, complications

1. Role of RT in CNS tumors - primary and metastatic
2. Possibilities for combined RT – chemotherapy / immunotherapy for head and neck tumors)
3. Role of RT in lung and pleural tumors
4. Multimodal approach with the participation of RT in rectal carcinoma, prostate tumors and others.

LECTURE № 4

Malignant tumors of the lung - the role of staging, complex treatment.

A. Lung cancer

1. Clinical picture, basic diagnostic tests - interventional, imaging, pathomorphological, genetic (prognostic and predictive markers)
2. TNM staging
3. Basic principles of treatment by stage
4. Role of target therapy
5. Algorithm of follow-up and palliative care

B. Malignant tumors of the female genitalia

1. Clinical picture, basic diagnostic tests - interventional, imaging, pathomorphological, genetic (prognostic and predictive markers)
2. TNM staging
3. Basic principles of treatment according to stage - surgical, radiotherapy, systemic drug therapy, combined therapeutic approaches
4. Role of target therapy
5. Follow-up and Palliative Care Algorithm

LECTURE № 5

A. Breast cancer - genetic features, staging, principles of therapy.

Malignant tumors of the female genitalia - staging, complex treatment

1. Clinical picture and basic diagnostic tests - imaging, morphology, incl. testing for hormone receptors, genetic (prognostic and predictive markers)
2. TNM staging

3. Basic principles of treatment by stage - surgery, radiotherapy, hormone therapy, systemic drug therapy, combined therapeutic approaches
 4. Role of target therapy
 5. Follow-up algorithm
- B. Malignant tumors of the female reproductive system (uterus, ovaries) – clinical characteristics, staging, treatment principles**

LECTURE № 6

Malignant tumors of the Gastrointestinal Tract

A. Colorectal cancer

1. Clinical picture, basic diagnostic methods - interventional, serum tumor markers, imaging, morphological, genetic (pharmacogenomic predictive markers)
2. TNM staging
3. Basic principles of treatment by stage - surgical, systemic drug therapy, combined therapeutic approaches
4. Role of target therapy
5. Follow-up and Palliative Care Algorithm

B. Cancer of the stomach, pancreas

LECTURE № 7

Malignant tumors of the genitourinary system in men - staging, principles of treatment

A. Prostate cancer

1. Clinical picture, basic diagnostic methods - interventional, serum tumor markers, morphological, imaging
2. Staging
3. Basic principles of treatment by stage - surgery, radiotherapy, hormone therapy, systemic drug therapy, combined therapeutic approaches
4. Follow-up algorithm
5. Palliative care

B. Testicular cancer - principles of diagnosis and treatment

LECTURE № 8

Nuclear medicine. Metabolic Imaging (SPECT-CT; PET-CT, PET-MRT)

1. Principles of nuclear medical imaging
2. Specific characteristics and informative value compared to other image methods
3. Indications for use - nosological units
4. Contraindications for use
5. Possibilities of NM diagnostics at national level

LECTURE № 9

Role of Metabolic Radionuclide Therapy in Oncology

1. Indications for the use of metabolic radionuclide therapy
2. Principles of therapy and follow-up
3. Regulatory requirements for clinics conducting this therapy
4. Specific requirements for patients treated with metabolic radionuclide therapy

LECTURE № 10

A. *Soft tissue sarcomas. Bone tumors*

1. Clinical approach - anamnesis, physical examination, imaging
 2. Staging
 3. Treatment of osteogenic sarcoma
 4. Soft tissue sarcomas
 5. Bone metastasis - clinic, diagnostic methods, therapy according to the main localization of the oncological process
- B. Cancer of unknown primary (CUP).**
- C. Metastatic disease - a modern concept.**

Exercise program in Clinical oncology Summer Semester

Exercise № 1

1. Primary and metastatic brain tumors
 2. Cancer of unknown primary (CUP)
 3. Malignant neoplasms of the head and neck
 4. Malignant neoplasms of the thyroid gland
- Presentation of clinical cases by localization*

Exercise № 2

1. Non-small cell lung cancer
 2. Small cell lung cancer
 3. Malignant mesothelioma
 4. Breast cancer
- Presentation of clinical cases by localization*

Exercise № 3

1. Esophageal cancer
 2. Stomach cancer
 3. Pancreatic cancer
 4. Hepatocellular carcinoma
 5. Colorectal cancer
- Presentation of clinical cases by localization*

Exercise № 4

1. Cervical cancer
2. Carcinoma / sarcomas of the uterine body
3. Ovarian cancer
4. Malignant mesenchymal tumors - sarcomas (GIST)

Presentation of clinical cases by localization

Exercise № 5

1. Malignant tumors of the testicles
2. Prostate cancer
3. Renal cell carcinoma
4. Bladder cancer

Presentation of clinical cases by localization

Textbooks and teaching aids

1. Medical oncology. Edited by K. Timcheva. Sofia 2018. ISBN 978-954-553-145-3
2. General and clinical oncology (volumes 1 and 2) edited by P. Kurtev, 2021, Sofia
3. Collection of tests in clinical oncology. Edited by J. Grudeva-Popova. Plovdiv 2018 ISBN 978-619-7085-97-6
4. Anemia in malignant diseases. I. Nenova, J. Grudeva-Popova. Plovdiv 2016. ISBN 978-619-7085-62-4
5. Pharmacotherapy and problems of clinical pharmacy (part 2). Edited by M. Karaivanova. Sofia 2014
6. Guide to radiotherapy for medical students - Marinova L, Yaneva M., Varna 2008
7. CardioOncology or Oncocardiology - modern issues of diagnosis and treatment. J. Grudeva-Popova (ed.). Plovdiv 2012. ISBN 978-954-9549-58-4
8. Collection of clinical oncology tests. Zhanet Grudeva-Popova (ed). Plovdiv 2019
9. Radiation Oncology Self-assessment Guide, John Suh (Editor), 2012
10. The MD Anderson Manual of Medical Oncology. Hagop M. Kantarjian, Robert A. Wolff, Charles A. Koller, McGraw-Hill Medical. 2nd edition, 2011
11. Clinical Radiation Oncology: Expert Consult-Online and Print Consult, Leonard L. Gunderson (Author), Joel E. Tepper (Author) Saunders; 3-rd Revised edition, 2011
12. Textbook of Radiation Oncology 3 Ed. Richard MD Hoppe (Author), 1664 pages, Saunders; 3rd Revised edition, 2010
13. Harrison's Hematology and Oncology (Harrison's Specialties), Dan L. Longo (Author), McGraw-Hill Medical; 1st edition, 2010
14. Radiation Oncology - management decisions. Chao Cl., Perez C, Brady LW Lippincott Williams & Wilkins, 3 edition, 2009
15. Textbook of Medical Oncology. Franco Cavalli (Editor), Stanley B. Kaye, Heine H. Hansen, Heine H Hansen, James O. Armitage, Martine Piccart-Gebhart (Editor). Informa Healthcare; 4th edition, 2009

COMPENDIUM CLINICAL ONCOLOGY

1. Epidemiology of the malignancies
2. Etiopathogenesis of the malignancies
3. Modern diagnostic methods - clinical laboratory and instrumental methods
4. Modern diagnostic methods - imaging, histological, molecular-genetic, others
5. Nuclear Medicine: Metabolic imaging (SPECT-CT; PET-CT, PET-MRT)
6. Principles of radiation therapy for malignant tumors - indications and side effects.
Principles of radiosurgery
7. Metabolic radionuclide therapy in oncology
8. Principles of systemic anticancer therapy. Conventional chemotherapy
9. Targeted therapy, hormonal treatment, immunotherapy - drug groups, mechanism of action, examples
10. Malignant tumors of the lung - clinical presentation, classification, staging and complex treatment
11. Breast cancer - clinical presentation, classification, staging and principles of therapy
12. Malignant tumors of GIT (esophagus, stomach, pancreas) - clinical presentation, diagnosis, treatment principles
13. Malignant tumors of GIT (colorectal cancer) - clinical presentation, diagnosis, staging, treatment principles
14. Malignant tumors of the female reproductive system (uterus, ovaries) - clinical characteristics, staging, treatment principles
15. Malignant tumors of the genitourinary system in a man (kidney, bladder) – clinical presentation, staging, principles of treatment
16. Malignant tumors of the genitourinary system in the man (prostate, testicles) – clinical presentation, staging, principles of treatment
17. Soft tissue sarcomas. Osteosarcoma
18. A modern look at clinical trials in oncology - principles, basic characteristics, regulation
19. Emergency conditions in malignancies - clinical characteristics, diagnostics, therapeutic approach
20. Palliative care. Quality of life. Psychological support

HEAD OF DEPARTMENT

PROF. ZHANET GRUDEVA-POPOVA, MD, PhD



***Департамент за езиково и
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SYLLABUS

BULGARIAN FOR FOREIGN STUDENTS, ENGLISH COURSE

ADOPTED BY THE SECTION COUNCIL No 6/30.05.2022

APPROVED BY THE FACULTY COUNCIL No 6 /15.06.2022

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**Bulgarian for foreign students,
English course**

SYLLABUS

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters			
								1 st year		2 st year	
		Total	Lectures	Practices	ECTS			I	II	I	II
Bulgarian	IV	360	-	360	12	12	24	90	90	90	90

Name of course:

Bulgarian for foreign students, medicine, English course

Type of course:

Obligatory

Academic degree:

Master

Forms of training:

Practicals, individual and team work with students

Year of training:

Years 1 and 2

Duration of training:

4 semesters

Training hours:

0 hours of lectures, 360 hours of practicals

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Teaching aids and tools:

Multimedia presentations, discussions, role models of situations, interactive methods of work

Forms of assessment:

Written and oral examination (at the end of year 2). Admission to oral exam – after successful written exam.

Ongoing control, students' works and term tests in semesters 1, 2, 3.

Grade formation:

An annual assessment is made at the end of the second and fourth semesters. The annual grade is the arithmetic mean of the first and second semesters and the third and fourth semesters, respectively.

The final grade is formed at the end of the second academic year. It includes the result of the exam and the annual grades.

Semester grade

a – semester 1

b – semester 2

c – semester 3

d – semester 4

a = 0,5. a1 + 0,5. a2 (a1) ongoing control, (a2) term test

b = 0,5. b1 + 0,5. b2 (b1) ongoing control, (b2) term test

c = 0,5. c1 + 0,5. c2 (c1) ongoing control, (c2) term test

d = 0.5. d1 + 0.5. d2 (d1) ongoing control, (d2) term test

Annual grade

A – for the first academic year

B – for the second academic year

A = 0,5. a + 0,5. b

B = 0,5. c + 0,5. d

Exam grade (E)

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$$E = 0,5. e1 + 0,5. e2 \quad (e1) \text{ written exam, } (e2) \text{ oral exam}$$

Final grade

$$F = 0,7. E + 0,15. A + 0,15. B$$

The student is admitted to the oral exam only with a positive assessment of the written exam. If the score on one of the components of the exam is Poor (2), then the overall score on the exam is Poor (2).

The final assessment is entered in the Minutes, the Department and the General Ledgers.

Grade formation:

Written and oral exams, ongoing assessment

Semester exam:

Yes / Written and oral examination (at the end of year 2)

State exam:

No

Lecturer in charge:

The course is conducted by lecturers with a scientific degree, doctors in the specialty and masters with pedagogical qualifications.

Department:

Bulgarian Language Section

**Департамент за езиково и
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➤ **ANNOTATION**

The Bulgarian language curriculum includes practicals in general and specialized Bulgarian. It is in line with the necessary skills for level B1-B2 in the European Language Framework and the need to master specialized medical vocabulary.

Lexical, grammatical, textual and practical practicals have a communicative focus. The language tasks are performed by working with dialogues, narrative and specialized texts from different medical specialties, adapted to the learning objectives.

In the training of students methods of strengthening and upgrading the language communicative competence and innovative methods of work are applied. Forms of ongoing assessment are used as well as students' works in accordance with the level of language acquisition. The *Bulgarian language course* ends with an exam, which consists of two components - written and oral.

➤ **MAIN TASK OF THE PROGRAM**

Acquisition of knowledge and skills through:

- development of language skills and competencies;
- mastering communication strategies;
- ability to work in team;
- application of the acquired communication skills in a professional environment

➤ **EXPECTED RESULTS**

- to understand oral and written texts in Bulgarian;
- to read texts in Bulgarian;
- to develop skills for clear and simple expression on familiar topics;
- to present the information from a textual situation in medicine and to have a conversation on a studied topic with medical vocabulary.
- to master structures related to communication with medical specialists and patients, taking medical history and making a diagnosis.

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➤ **PROGRAM OF PRACTICAL COURSES**

First Semester

Practical №1 – 6 hours. *The Bulgarian alphabet.* Cyrillic - characteristics and features. Sounds and letters. Printed and handwritten letters. Vowels and consonants. Diphthongs. Pronunciation

Practical №2 – 6 hours. *Introduction and presentation* (What is your name? / What is your name?). Personal pronouns - nominative case. To be - the present tense of the verb. Construction of positive and negative sentences. Question sentences with the particle *li*. Creating dialogues for acquaintance and presentation

Practical №3 – 6 hours. *Greetings and polite expressions.* Addresses and common abbreviations. Calling maturity of some nouns. The question *How are you?* in singular and plural. Creating a short narrative text for presentation

Practical №4 - 6 hours. *Countries, nationalities, professions.* Sentences with question words: *who, what, where, what, where*. Nouns for nationalities and professions. The present tense of the verb *to follow*

Practical №5 - 6 hours. *At the University.* Demonstrative pronouns. Present tense of verbs of third conjugation. Constructing texts related to the daily life of students

Practical №6 - 6 hours. *Everyday objects.* Noun - gender and number. Use of singular and plural nouns in dialogues. Numerals from 1 to 100

Practical №7 – 6 hours. *Shopping.* Numerals. Masculine form of numericals. Use of numericals

Practical №8 – 6 hours. *Daily routine.* Present tense of the verbs of first and second conjugation. Use of some dialects

Practical № 9 – 6 hours. *My apartment.* Articulation of nouns. Spatial prepositions. Impersonal use of the verbs I have / I do not have. Creating dialogues related to the use of spatial prepositions and articulated forms of nouns

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Practical № 10 – 6 hours. *Me and the others.* Personal pronouns - accusative and dative case. Use of full and short case forms in narrative texts and dialogues

Practical № 11 – 6 hours. *Appearance and character.* Adjectives - coordination, membership, grading. Colors. Synonyms and antonyms. Constructing a text description

Practical № 12 – 6 hours. *Free time and interests.* Verbs and prepositions for movement. Use in texts related to the daily life of students

Practical № 13 – 6 hours. Revision and summarization

Practical № 14 – 6 hours. Preparation for the semester test. **Semester test**

Practical № 15 – 6 hours. Analysis of the results of the semester test

Second semester

Practical № 16 – 6 hours. *Family.* Possessive pronouns - short forms. Creating a narrative text related to the family

Practical № 17 – 6 hours. *Time* (What time is it? / At what time? / How many hours?). Ordinals - gender, number, membership

Practical № 18 – 6 hours. *The weather* (What is the weather like?). The days of the week, the months, the seasons. *To be* -- future tense and past tense of the verb. Use of ordinals. Holidays and wishes. Bulgarian traditions

Practical № 19 – 6 hours. *Vacation and travel.* Future tense of imperfective verbs - positive, negative and interrogative form. Use in dialogues and narrative texts

Practical № 20 – 6 hours. *Visiting.* Type of verb. Keywords and phrases for "recognizing" the type of verb. Use of dialects - constructing a dialogue

Practical № 21 – 6 hours. *At the pharmacy.* Formation and use of verbs of perfective and imperfective aspect. Use of yes-constructions with verbs of perfective and imperfective aspect. Future tense with verbs of the perfective aspect

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Practical № 22 - 6 hours. At the doctor's / dentist. The Imperative mood. Formation of imperative forms from verbs of perfective and imperfective aspect

Practical № 23 - 6 hours. Parts of the human body. Nouns, adjectives and numerals – summarization

Practical № 24 - 6 hours. Health problems. The aorist past tense of the verb. Formation of positive and negative form

Practical № 25 - 6 hours. The life of medics. Use of the aorist past tense in narrative texts and dialogues on medical topics

Practical № 26 - 6 hours. Examination of a patient. Sequence of verb tenses. Constructing a dialogue

Practical № 27 - 6 hours. Language practice

Practical № 28 - 6 hours. Revision and summarization

Practical № 29 - 6 hours. Preparation for the semester test. **Semester test**

Practical № 30 - 6 hours. Analysis of the results of the semester test

Third semester

PRACTICAL № 1 - 6 hours. Revision - noun, adjective, pronouns. Coordination

PRACTICAL № 2 - 6 hours. Revision - grammatical categories of the verb

PRACTICAL № 3 - 6 hours. Revision – The aorist past tense: formation and use

PRACTICAL № 4 - 6 hours. The aorist past tense - with verbs of imperfective and perfective aspect. Exercises

PRACTICAL № 5 - 6 hours. The aorist past tense - impersonal and modal verbs. Exercises

PRACTICAL № 6 - 6 hours. Parts of the human body. Physical conditions. Structures for expressing construction, composition, location. Exercises / with verbs of perfect and imperfect forms and pronouns /

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PRACTICAL № 7 – 6 hours. The active aorist past participle – formation. The Perfect tense – formation and meaning

PRACTICAL № 8 – 6 hours. The perfect tense – use. Exercises

PRACTICAL № 9 – 6 hours. A visit to the doctor. Impersonal constructions with accusative forms of personal pronouns

PRACTICAL № 10 – 6 hours. A visit to the doctor. Impersonal constructions with dative forms of personal pronouns

PRACTICAL № 11 – 6 hours. Respiratory diseases - names, symptoms, classification. Structures for expressing definition, classification and causality

PRACTICAL № 12 – 6 hours. Respiratory diseases. Formation of verbs from adjectives, formation of verb nouns. Transformation of direct into indirect speech

PRACTICAL № 13 – 6 hours. Revision, summarization

PRACTICAL № 14 – 6 hours. Preparation for the semester test. **Semester test**

PRACTICAL № 15 – 6 hours. Analysis of the results of the semester test

Fourth semester

PRACTICAL № 16 – 6 hours. Respiratory diseases - symptoms and treatment. Structures for describing the clinical manifestation. Formation of verbs from adjectives

PRACTICAL № 17 – 6 hours. Injuries. Names of injuries and causes of injuries. Questions to the doctor. Patient complaints. Doctor's instructions

PRACTICAL № 18 – 6 hours. Injuries - symptoms and treatment. Manipulations and procedures in the treatment of injuries. The active present participle - formation and use. Description of the type and nature of the pain

PRACTICAL № 19 – 6 hours.. Injuries. Structures for expressing simultaneity. Structures for describing therapy. Formation of complex words

PRACTICAL № 20 – 6 hours. Injuries. The passive past participle - formation. The passive voice - formation and use

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PRACTICAL № 21 – 6 hours. Acute and chronic diseases. Names of acute and chronic diseases

PRACTICAL № 22 – 6 hours. Acute and chronic diseases – symptoms, some therapeutic and preventive actions

PRACTICAL № 23 – 6 hours. Acute and chronic diseases. Structures for giving instructions to the patient. Complex words (continued). Prepositions and adverbs - use. Constructions with prepositions

PRACTICAL № 24 – 6 hours. History taking – names of the components of medical history.

PRACTICAL № 25 – 6 hours. History taking – doctor’s questions when taking the history and patient’s answers

PRACTICAL № 26 – 6 hours. History taking. Vocabulary for describing symptoms in various diseases (summarization)

PRACTICAL № 27 – 6 hours. Revision and summarization

PRACTICAL № 28 – 6 hours. Revision and summarization. Preparation for the semester test

PRACTICAL № 29 – 6 hours. Semester test. Analysis of the results

PRACTICAL № 30 – 6 hours. Preparation for the exam

➤ **BIBLIOGRAPHY**

Дечев, Иван, Андония Куцарова, Антоанета Краевска, Мая Андонова. Български език за чужденци. Специализиран учебник за медици, Пловдив, 2017

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Павлова, А. Справочник за българския глаголен вид, Пловдив, 2019

Паскалева, Д. Български език като чужд за напреднали, Пловдив 2017

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Петрова, С. Учете български език – първо ниво, София, 2004
Електронни ресурси, свързани с преподаването на български език на чужденци

➤ **SYNOPSIS FOR SEMESTER EXAM**

1. Parts of the human body.
2. Body cavities. Internal organs.
3. Medical specialties, offices and specialists. Choice of specialty.
4. A visit to the doctor. The doctor's questions to the patient. Complaints of the patient.
5. Diseases of the respiratory system. Symptoms.
6. Diseases of the musculoskeletal system. Names. Description of injuries. The doctor's questions and the patient's answers.
7. Diseases of the musculoskeletal system. Treatment. Prescriptions and instructions of the doctor.
8. Parts of the genitourinary system. A practical in urology or gynecology.
9. Kidney stone disease. Causes, predisposing factors, symptoms, treatment.
10. Cardiovascular diseases. Blood Pressure . Hypertension.
11. Description of a disease of choice. Causes, symptoms, treatment, prevention.
12. Healthy lifestyle. Bad habits. Diet. Disease prevention.
13. At the GP. Medical history. Components of history taking. Questions of the doctor when taking the history and answers of the patient.
14. Pain. Anamnesis morbi. Characteristics of symptoms.
15. Phonetic changes.
16. Formation of adjectives from nouns.
17. Matching adjectives with nouns.

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18. Impersonal constructions with accusative forms of personal pronouns.
19. Impersonal constructions with dative forms of personal pronouns.
20. Formation of verbs from adjectives.
21. Formation of verb nouns.
22. Formation of participles.
23. Formation of complex words.
24. Structures for expressing composition, construction and location.
25. Structures for definition, classification and causality.
26. Structures for describing clinical manifestation.
27. Structures for expressing simultaneity and for describing treatment.
28. Structures for expressing instructions.
29. Use of uninflected words - prepositions and adverbs - in the language of medicine.
30. Synonyms and antonyms in the language of medicine.

MEDICAL UNIVERSITY OF PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

HISTORY OF MEDICINE

(Elective course)

Approved by the Department Council on 29.06.2022/Protocol No. 3

Confirmed by the Faculty Council – Protocol №7/13.07.2022

SYLLABUS

Academic discipline	Exam during the semester	Academic hours				Credits for Extracurricular activity	Credit total	Academic hours by year and semester	
		Total	Lectures	Seminars	Credits			First year	
History of medicine	II							I	II
		30	15	15	1.0	1.0	2.0	20	10

Discipline:
„History of medicine”

Type of discipline according to the USR: Elective

Level of training:
Master's /M/

Training forms: lectures, seminars

Year of study: First

Training duration: two semesters

Academic hours:
15 hours of lectures, 15 hours of seminars

Teaching aids:
Multimedia presentations, discussions

Grading and assessment: continuous assessment, presentations, exam

Final grade formation: Exam

Aspects in the formation of the final grade: giving a presentation on a certain issue, a personal point of view on the problem posed.

Semester exam: yes

State exam: no

Leading lecturer:
Teacher of academic rank from The Department of Languages and Specialized Training

Department:

Department of Languages and specialized training (DLST)

➤ ANNOTATION

History of medicine is a branch of knowledge that deals with the historical development of medicine, while simultaneously examining the biographies of individuals who had an impact on the medicine of their time. History of medicine uses the methods of general historical science and aims to promote awareness of the fact that the practice related to human health has a long historical background, directly linked to the cultural development of humanity. The course will also present the philosophical ideas of ancient thinkers who had an impact on the development of medicine. Presenting the discipline in this manner will provide for good foundation in philosophical anthropology for second-year students.

➤ MAIN SYLLABUS TASKS

- 1.** To enrich students' knowledge of the history of medicine as soon as the first year, as to set the basis for studying other medical disciplines.
- 2.** To get students acquainted with the contributions to the development of medical knowledge from Antiquity to the present day.
- 3.** To introduce students to the most important figures, schools of philosophy and ideas, attempting to retrace modern advancements in medical science through the development of medicine from the first centuries.

➤ Expected results

Following training completion, students should have knowledge regarding:

- the place, role and importance of history of medicine in medical science and other humanities;
- the main trends and schools that had an impact on the development of medical science;

- the various concepts of medicine, formed at the intersection of philosophical, humanitarian, etc. sciences;

➤ LECTURE TOPICS

LECTURE № 1 – 2 academic hours

The subject, aim and tasks of the History of medicine discipline.

LECTURE № 2 – 2 academic hours

Medicine in the primitive society. Emergence of medicine. Health and primitive man's ideas about health and disease.

LECTURE №3 – 2 academic hours

Medicine in Ancient Egypt and Mesopotamia.

LECTURE №4 – 2 academic hours

Medicine in Ancient China and Ancient India.

LECTURE №5 – 2 academic hours

Development of medicine in Ancient Greece. Croton School of Medicine. Alcmaeon of Croton. Knidos Medical School. Kos Medical School - Hippocrates (Corpus Hippocraticum) ;

LECTURE №6 – 2 academic hours

Medicine in Ancient Rome. Celsus and Galen.

LECTURE №7 – 2 academic hours

Medicine in our lands before the establishment of the Bulgarian state. Medicine of the Thracians, Slavs and proto-Bulgarians.

LECTURE №8 – 2 academic hours

Medicine of the Middle Ages. Medicine in Byzantium. Medicine in medieval Bulgaria. Medicine in Western Europe.

➤ SEMINAR TOPICS

SEMINAR № 1 – 2 academic hours

Medicine and health care during the Bulgarian National Revival/Renaissance.

SEMINAR № 2 – 2 academic hours

Revival of European medical science (15th-16th century). Andreas Vesalius – De humani corporis fabrica libri Septem

SEMINAR № 3 – 2 academic hours

European medicine in the 17th, 18th and 19th centuries.

SEMINAR № 4 – 2 academic hours

Development of medicine in Bulgaria in the 19th and 20th centuries.

SEMINAR № 5 – 2 academic hours

Medicine and health care during the Ottoman rule.

SEMINAR № 6 – 4 academic hours

Current state of medicine in Bulgaria.

➤ LITERATURE

1. **Апостолов, М.**, История на медицината и социалното дело, С., 1994.
2. **Апостолов, М., П. Иванова**, Христоматия по история на медицината, София 1995г., изд. „МУ – София”
3. **Арсениев, А.**, Към философията на древнокитайската медицина. Асклепий, С., 1995.
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7. **Василев, Вл., В. Павлова и кол.** История на медицината в България, София 1980г., изд. „Медицина и физкултура”
8. **Василев, В.** Медицината в Древна Тракия, С., 1975.
9. **Василев, В.**, Древните българи, С., 2009.
10. **Димитрова, Зл.**, История на фармацията, София 1999г., УИ „Св. Кл. Охридски”

11. **Найденев, Т.**, Кратка история на медицината и лекарска етика, С., 2016.
12. **Павлова В.**, История на медицината в България, С., 1980, Мед и физк.
13. **Уорд, Б.**, История на медицината, С., 2008.
14. **Pawlowski, M., Mendel, Y., Kaisermann, J.** История на медицината, Cambridge Stanford Books
15. **Robert, D.**, Medicine, Surgery, and Public Health in Ancient Mesopotamia.

➤ EXAM SYLLABUS

1. Medicine in Ancient Egypt and Mesopotamia.
2. Medicine in Ancient China and Ancient India.
3. Development of medicine in Ancient Greece. Better known prominent medical schools.
4. Medicine in Ancient Rome. Celsus and Galen.
5. Medicine of the Thracians, the Slavs and the proto-Bulgarians.
6. Medicine in Byzantium.
7. Medicine in medieval Bulgaria.
8. Medicine in Western Europe.
9. European medical science (15th – 16th century). Andreas Vesalius – De humani corporis fabrica libri Septem.
10. Medicine and health care during the Bulgarian National Revival.
11. Development of medicine in Bulgaria in the 19th and 20th centuries.
12. Current state of medicine in Bulgaria.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS
IN
BIOLOGY OF PARASITES
(Elective Course)

Approved by the Department Council on 2 June 2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

ELECTIVE COURSE „BIOLOGY OF PARASITES”

SYLLABUS

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								1 st year	
		Total	Lectures	Practices	ECTS			I	II
Biology of parasites	II	15	15	-	0.5	0.5	1.0	-	15

DISCIPLINE:

Biology of Parasites

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Optional

LEVEL OF QUALIFICATION:

Master degree /M/

FORMS OF TRAINING:

Lecture courses, self-training.

YEAR OF TRAINING:

1st year

DURATION OF TRAINING:

2nd semester

ACADEMIC HOURS:

15 hours of lecture courses

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Audiovisual equipment, text books.

FORMS OF EVALUATION: individual work with excellent students.

EVALUATION CRITERIA:

Final evaluation – essay

ASPECTS OF EVALUATION CRITERIA:

Participation in seminars

SEMESTER EXAM:

Yes / written essay

STATE EXAM

No

LECTURER:

Full Professor and Assistant Professors from the Department of Medical Biology

DEPARTMENT:

Medical Biology

ANNOTATION

The discipline Biology of Parasites allows students to acquire knowledge in the following basic biological concepts, linked with the morphology of the most medically important parasites, their distribution, life cycle, stage of development, invasive and pathogenic forms, the parasitic disease, the main methods for diagnostics and prevention.

BASIC AIMS OF THE DISCIPLINE

The main aims of the discipline are to teach knowledge and skills to recognize and characterize the most medically important parasites and their influence on the human body:

- morphology and biological cycle
- invasive and pathogenic forms
- mode of invasion
- parasitosis
- localization and pathogenic mechanism
- basic diagnostic methods
- prevention

EXPECTED RESULTS*Theoretical knowledge*

- to recognize the micro- and macroscopic forms of parasites
- to characterize the biological cycles and the morphological forms
- to define the invasive and pathogenic forms

- to understand the mode of invasion and its influence on the human body
- to have a basic knowledge about the clinical symptoms of parasitic diseases
- to know the principle of the main laboratory methods for detection of parasites and their forms
- to be acquainted with the contemporary preventing methods.

LECTURES

I course, II semester

№	LECTURE COURSES	HOURS
1.	Parasites and parasitism. Terminology. Invasion of parasites. Biomorphology of intestinal Protozoa. <i>Entamoeba histolytica</i> .	3
2.	Biomorphology of Protozoa: blood and tissue parasites Subkingdom <i>Protozoa</i> . (order <i>Kinetoplastida</i> , order <i>Diplomonadida</i>). Comparison of biological cycles. Actual distribution.	2
3.	Malaria - contemporary epidemiology, diagnostics, prevention, and control. <i>Toxoplasma gondii</i> – medical importance.	2
4.	Phylum Platyhelminthes. Class <i>Cestoda</i> . Diversity of reproduction and specifics for proration of Biological Genus.	2
5.	Phylum <i>Platyhelminthes</i> . Specific features of the biological cycle and its conduction for various tapeworms.	2
6.	Phylum Nematelminthes. Ascariidosis, Trichocephalosis, and Enterobiasis, Trichinellosis.	2
7.	The most important vectors in transmissible diseases.	2
Total		15 hours

LECTURE №1 – 3 hours

Parasites and parasitism. Terminology. Interspecific interactions in parasitology. Invasion of parasites and disease. Biomorphology of intestinal Protozoa. Phylum *Platyhelminthes*. Subphylum *Sarcodina*. Phylum *Ciliophora*

LECTURE №2 – 2 hours

Biomorphology of Subkingdom Protozoa. Subphylum Mastigophora: blood and tissue parasites. Protozoa (order *Kinetoplastida*, order *Diplomonadida*). Comparison of biological cycles. Actual distribution.

LECTURE №3 – 2 hours

Subkingdom Protozoa. Class *Sporozoa*. Malaria - contemporary epidemiology, diagnostics, prevention and control. *Toxoplasma gondii* – medical importance.

LECTURE №4 – 2 hours

Phylum Platyhelminthes. Class *Trematodes*. Diversity of reproduction and specifics for proration of Biological Genus. Diagnostics.

LECTURE №5 – 2 hours

Phylum Platyhelminthes. Class *Cestoidea*. Specific features of the biological cycle and its conduction for various tapeworms.

LECTURE №6 – 2 hours

Phylum Nematelminthes. Class *Nematoda*. Trichinosis outbreaks. Ascariidosis, Trichocephalosis, and Enterobiasis.

LECTURE №7 – 2 hours

The most important vectors in transmissible diseases. Phylum *Arthropoda*. Class *Arachnoidea*. Class *Insecta*.

LITERATURE

- Sarafian V., M. Kazakova, M. Draganova, N. Mehterov. Practical Book. Medical Biology for first year students. 3rd edition Medical University Plovdiv ISBN; 978-619-237-016-9, 2020.

- Sarafian V., M. Kazakova, M. Draganova, N. Mehterov. Practical Book. Medical Biology for first year students. Second edition. Plovdiv. 2019, ISBN: 978-619-237-041-1.
- Alexandrov V., Feodorova Y., Filipova M., Kazakova M., Mehterov N., Sarafian V. Parasitology. Manual for first year students in medicine and dental medicine. Plovdiv, 2016.
- M.D. Paniker, C. K. Jayaram (Author), M.D. Ghosh, Sougata. Paniker's Textbook of Medical Parasitology. ISBN-10: 9350905345; ISBN-13: 978-9350905340.
- Manual in Parasitology, Basic clinical parasitology – Harold W. Brown, Franklin A. Neva. 6th edition. McGraw-Hill Education - Europe, ISBN: 9780838506240.

CONSPECTUS

1. Parasitism - biological phenomena. Host and parasites. Origin of parasites. Adaptation of parasites to hosts.
2. Parasite-host interactions. Ecology of parasitism.
3. Subkingdom *Protozoa*. Subphylum *Sarcodina*. Genus *Entamoeba* – *Entamoeba histolytica*, *Entamoeba coli*, *Entamoeba gingivalis*.
4. Subkingdom *Protozoa*. Subphylum *Mastigophora*. Order *Kinetoplastida*. Genus *Trypanosoma* – *Trypanosoma gambiense*, *Trypanosoma cruzi*.
5. Subkingdom *Protozoa*. Subphylum *Mastigophora*. Order *Kinetoplastida*. Genus *Leishmania* – *Leishmania donovani*, *Leishmania tropica*.
6. Subkingdom *Protozoa*. Subphylum *Mastigophora*. Order *Diplomonadida*. Genus *Trichomonas* – *Trichomonas hominis*, *Trichomonas tenax*, *Trichomonas vaginalis*. Genus *Giardia* - *Giardia lamblia*.
7. Class *Sporozoa*. Malarial plasmodia - types. Morphology and biological cycle.
8. Class *Sporozoa*. *Toxoplasma gondii*.
9. Subkingdom *Protozoa*. Phylum *Ciliophora*. *Balantidium coli*.
10. Phylum *Platyhelminthes*. Class *Trematoda*. Morphology and general characteristics. *Fasciola hepatica*. *Dicrocoelium dendriticum*. *Opisthorchis felinus*.
11. Genus *Schistosoma*. *Sch. haematobium*. *Sch. japonicum*, *Sch. mansoni*.
12. Phylum *Platyhelminthes*. Class *Cestoda*. Morphology and general characteristics. *Diphyllobothrium latum*.
13. Phylum *Platyhelminthes*. Class *Cestoda*. *Taenia solium*. *Taenia saginata*.
14. Phylum *Platyhelminthes*. Class *Cestoda*. *Echinococcus granulosus*.
15. Phylum *Nemathelminthes*. Class *Nematoda*. Morphology and general characteristics. *Ascaris lumbricoides*.
16. Class *Nematoda*. *Enterobius vermicularis*. *Trichuris trichiura*. *Trichinella spiralis*. Phylum *Nemathelminthes*. Class *Nematoda*. *Strongiloides stercoralis*. *Ancylostoma duodenale*. *Wuchereria bancrofti*. *Dracunculus medinensis*.

17. Phylum *Arthropoda*. Order *Acarina* - morphology, biological cycle, medical importance of ticks. *Sarcoptes scabiei*.
18. Class *Insecta*. Morphology and general characteristics. Order *Anoplura* /lice/. *Pediculus capitis*, *Pediculus vestimenti*, *Phthirus pubis*.
19. Order *Aphaniptera* /fleas/.
20. Order *Diptera* - genus *Culex*, genus *Anopheles*. *Phlebotomus papatasi*.
21. Family *Muscidae*, *Glossina palpalis*.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

**MOLECULAR, PERSONALIZED AND
REGENERATIVE MEDICINE**

(Elective Course)

Approved by the Department Council on 2 June 2022

Confirmed by the Faculty Council - Protocol №6/15.06.2022

**ELECTIVE COURSE „MOLECULAR, PERSONALIZED AND
REGENERATIVE MEDICINE”**

SYLLABUS

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								1 st year	
		Total	Lectures	Practices	ECTS			I	II
Molecular, Personalized and Regenerative Medicine	II	15	15	0	0.5	0.5	1.0	-	15

DISCIPLINE:

MOLECULAR, PERSONALIZED AND REGENERATIVE MEDICINE

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Optional

LEVEL OF QUALIFICATION:

Master degree /M/

FORMS OF TRAINING:

Lecture courses, practical demonstrations, self-training.

YEAR OF TRAINING:

1st year

DURATION OF TRAINING:

2nd semester

ACADEMIC HOURS:

15 hours of lecture courses and practical demonstrations

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Audiovisual equipment, textbooks.

FORMS OF EVALUATION:

lecture courses, individual work with excellent students.

EVALUATION CRITERIA:

Final evaluation – essay

ASPECTS OF EVALUATION CRITERIA:

Participation in seminars

SEMESTER EXAM:

Yes / written essay

STATE EXAM

No

LECTURER:

Full Professor and Assistant Professors from the Department of Medical Biology

DEPARTMENT:

Medical Biology

ANNOTATION

Molecular medicine is a new field in which molecular structures and mechanisms are studied through physical, chemical and medical techniques. Fundamental molecular mechanisms of diseases are identified and molecular strategies for their treatment are developed. Personalized medicine is a modern medical field that provides individualized therapy for the specific patient. Molecular diagnostics serves as a basis to step on in order to determine the optimal therapy according to the genetic profile of the patient. Pharmacogenomics and pharmacogenetics provide an opportunity to create new generations of drugs and to individualize the treatment of a large number of diseases. Regenerative medicine is closely related to the basic concept of molecular medicine and can be considered as a model of personalized medicine. Regenerative medicine is an interdisciplinary field in which fundamental science and clinical practice are focused on repairing, regenerating and replacing damaged cells, tissues or organs. It includes a variety of approaches, including small biologically active molecules, gene therapy, stem cells, cell reprogramming, tissue engineering, biomaterials, and transplant procedures. Regenerative medicine also uses nanotechnology and clinical approaches to improve patients' health.

BASIC AIMS OF THE DISCIPLINE

In this course students will learn the basics of molecular, personalized and regenerative medicine, methods of working with stem cells, gene therapy and animal models of diseases, tissue engineering and how all these areas are implemented in medical practice and patient care. An introduction to 3D-biological printing and its application in oncology and a short practical module is

provided. The entire course takes 15 hours in which lectures, interactive seminars, discussions and practical demonstrations are planned.

EXPECTED RESULTS

- to recognize stem cells and their characteristics
- to know the principles of *in vitro* cell cultures
- to define the scope and applications of molecular, regenerative and personalized medicine
- to be acquainted with the principles and applications of 3D bioprinting

LECTURES

I course, II semester

№	LECTURE COURSES	HOURS
1	Stem cell-based regenerative medicine: definition, criteria and function	1
2	Molecular medicine and gene therapy: principles, tools and applications	2
3	Animal models for pre-clinical studies	1
4	Principles of tissue and organ engineering in regenerative medicine	3
5	Molecular and personalized medicine	2
6	3D-bioprinting	2
Total		11

LECTURE №1 – 1 hour

Stem cell-based regenerative medicine: definition, criteria and function. Cell sources for transplantation. Embryonic stem cells. Adult stem cells. Induced pluripotent stem cells. Medical applications.

LECTURE №2 – 2 hours

Molecular medicine and gene therapy: principles, tools and applications. Gene modification techniques and gene delivery methods. Carriers for gene therapies. Clinical applications.

LECTURE №3 – 1 hour

Animal models for pre-clinical studies. Transgenic animals. Transgenic animals. Animal models for tissue repair. Pre-clinical studies.

LECTURE №4 – 3 hours

Principles of tissue and organ engineering in regenerative medicine. Biomaterials/scaffold design. Optimized cell growth in 3D & Bioreactors. Medical issues - skeletal regenerative medicine.

LECTURE №5 – 2 hours

Molecular and personalized medicine. Definition, development, mechanisms, medical application, molecular diagnostics, application in pharmacogenetics and oncology.

LECTURE №6 – 2 hours

3D-bioprinting. Definition, principles, application in regenerative medicine and 3D bioprinting.

PRACTICES

№	PRACTICAL COURSES	HOURS
1	Practical demonstration. Clinical cases.	4
<i>Total</i>		4

PRACTICAL №1 – 4 hours

3D-bioprinting. Molecular and personalized medicine. Practical demonstration. Clinical cases.

BIBLIOGRAPHY

- Ben Redwood, Filemon Schöffner, Brian Garret. The 3D Printing Handbook: Technologies, design and applications. 9082748509, 9789082748505
- Richard Horne, Kalani Kirk Hausman. 3D Printing for Dummies (For Dummies (Computers)) ISBN-13: 978-1119386315, ISBN-10: 1119386314

CONSPECTUS

1. Cell sources for transplantation. Embryonic stem cells.
2. Adult stem cells. Induced pluripotent stem cells. Medical applications.

3. Gene modification techniques and gene delivery methods.
4. Carriers for gene therapies. Clinical applications.
5. Transgenic and knock-out animals.
6. Animal models for tissue repair. Pre-clinical studies.
7. Biomaterials/scaffold design.
8. Optimized cell growth in 3D & Bioreactors.
9. Medical issues - skeletal regenerative medicine.
10. Pharmacogenetics - definition, development, mechanisms, medical application.
11. Molecular medicine and molecular diagnostics - application in and oncology.
12. Personalized medicine – goals, principles, applications.
13. Regenerative medicine - definition, principles, application.
14. 3D bioprinting - definition, principles, application.

PARTICIPANTS

The elective course is open to students of medicine, dental medicine and pharmacy from 2, 4, 6, or 8 semesters. Also, PhD students, specialists from preclinical and clinical departments can participate in the elective course. Finally, the participants are obliged to write a short essay on the topic which will be examined by the department members. Successfully passed students will receive a certificate of attendance for **15 hours** of courses and **1 ESTC credit**. The entire course includes 15 academic hours and candidates can enrol it either in Bulgarian or in English languages.

LECTURERS

Prof. Victoria Sarafian, MD, PhD, DMSc

Head of Department of Medical Biology

Medical University-Plovdiv

Guest lecturer **Prof. Denitsa Docheva, Ph.D.**

Department of Musculoskeletal Tissue Regeneration

Orthopaedic Hospital König-Ludwig-Haus

& University of Wuerzburg, Germany

Chief Asst. Prof. Yordan Sbirkov, PhD

Department of Medical Biology

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

Applied Neuroscience

Approved by the Department Council on 31.05.2022

Confirmed by the Faculty Council - Protocol № 9/26.10. 2022

Applied Neuroscience

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								2 nd year	
Applied Neuroscience	4	Total	Lectures	Practices	ECTS	0.6	1.3	I	II
		20	10	10	0.7			0	20

DISCIPLINE: Applied Neuroscience

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE

REQUIREMENTS: Elective

LEVEL OF QUALIFICATION: Master

FORMS OF TRAINING: Lectures and practicals

YEAR OF TRAINING: 3d

DURATION OF TRAINING: 1 semester

ACADEMIC HOURS: 10 hours lectures, 10 hours practicals

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING: Multimedia projector, presentations, reference books, audio and video materials, online platforms, fMRI data, fMRI data processing software.

FORMS OF EVALUATION: practical and oral exam

EVALUATION CRITERIA: 60% - practical exam , 40% - oral exam

ASPECTS OF EVALUATION CRITERIA: the assessment is formed on the basis of the demonstrated practical skills when performing a task during the exam, as well as the theoretical knowledge shown during the oral exam when answering a question from the synopsis.

SEMESTER EXAM: Yes

STATE EXAM: No

LECTURER: assoc. prof. Sevdalina Kandilarova, prof. Drozdstoy Stoyanov

DEPARTMENT: Psychiatry and Medical Psychology

ANNOTATION

"Applied Neuroscience" is a freely chosen discipline that gives students the opportunity to get acquainted on the one hand with the main directions in the field of neuroscience and on the other with the methodology of scientific research. The program includes basic topics such as neuroanatomy and neurophysiology, which are covered in the first lectures, after which an emphasis is placed on neuroimaging techniques and the details of applied research in the field are discussed. The main focus of the training is the acquisition of knowledge and skills in the field of magnetic resonance imaging - structural and functional (s/fMRI). In the course of the training, both the theoretical framework of the main approaches in neuroscience and the practical training is emphasized. In order to facilitate learning, group and individual trainings are provided with focus on the design of fMRI paradigms, processing of fMRI data at rest and while performing tasks, and interpretation of the obtained results. The program concludes with the topic of multimodal studies, where data from different imaging techniques are combined, for example from structural and functional imaging at rest or while performing tasks. In order to verify the level of mastery of the taught material, a practical and oral exam is planned.

BASIC AIMS OF THE DISCIPLINE

- Acquisition of basic knowledge in the field of applied neuroscience;
- Knowledge of the basic principles and approaches in planning and carrying out scientific research in the field;
- Acquisition of practical skills for creating paradigms and processing MRI data.

EXPECTED RESULTS

- Building of core competencies in the field of applied neuroscience
- Building interest in research activity

- Training of students for participation in research activities

LECTURES

LECTURE No. 1 – 2 hours

- Neuroanatomy - basic structures of the brain
- Neurophysiology – neuron function, neural networks

LECTURE No. 2 – 2 hours

- Neuroimaging – basic principles
- Structural magnetic resonance imaging of the brain (sMRI)

LECTURE No. 3 – 2 hours

- Functional magnetic resonance imaging of the brain (fMRI)
- Principles of building paradigms for fMRI

LECTURE No. 4 – 2 hours

- Principles of sMRI data processing
- Principles of resting state fMRI data processing

LECTURE No. 5 – 2 hours

- Principles of task related fMRI data processing
- Multimodal imaging

PRACTICES

PRACTICAL No. 1 – 2 hours

- Neuroanatomy – recognition of brain structures on MRI
- Neurophysiology – modeling of neural networks

PRACTICAL No. 2 – 2 hours

- Neuroimaging – introduction to CTN
- sMRI – development of protocols

PRACTICAL No. 3 – 2 hours

- fMRI – parameters
- fMRI - paradigms

PRACTICAL No. 4 – 2 hours

- Voxel based morphometry
- Dynamic causal modeling

PRACTICAL No. 5 – 2 hours

- Univariate analyzes in SPM
- Multimodal analyzes in SPM

BIBLIOGRAPHY

1. Handbook of functional MRI data analysis, R. Poldrack, Cambridge University Press

2. SPM manual <https://www.fil.ion.ucl.ac.uk/spm/>

SYNOPSIS

1. Neuroanatomy - main structures of the brain
2. Neurophysiology – neuron function, neural networks
3. Neuroimaging – basic principles
4. Structural magnetic resonance imaging of the brain (sMRI)
5. Functional magnetic resonance imaging of the brain (fMRI)
6. Principles of building paradigms for fMRI
7. Principles of sMRI data processing
8. Principles of resting state fMRI Data Processing
9. Principles of task related fMRI data processing
10. Multimodal imaging

MEDICAL UNIVERSITY-PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

in

**First medical aid in Emergency and
Disasters**

(Elective Subject)

Confirmed by the Department Council with protocol №1/ 14.09. 2022

Adopted at the Faculty Council № 9/26.10.2022

First medical aid in Emergency and Disasters

Syllabus

Discipline	Final exam/semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								4 th	
		Total	Lectures	Practicals	ECTS			VII	VIII
First medical aid in Emergency and Disasters	8 th	40	16	24	1,4	1,3	2,7	20 total: 8 / 12	20 total: 8 / 12

Discipline:

„First medical aid in Emergency and Disasters”

Type of discipline according to the uniform state requirements:

Elective subject

Level of Qualification:

Master degree /M/

Forms of training:

Lectures and practical courses

Year of training:

4th

Training duration:

40 academic hours. 2 semesters

Academic hours:

16 hours lectures, 24 hours practical courses

Technical equipment applied in the training:

Models, visual boards, audio and video database

Forms of evaluation:

Semester exam

Evaluation criteria:

Practical exam, theoretical exam and solving a case

Aspects of evaluation criteria: All of the exam components are equally important in forming the final grade. If one of the components of the final grade is poor (2), then the final grade is also poor (2).

Semester exam: Yes

State exam: No

Lecturer: Prof. Rostislav Kostadinov, PhD, DSc, MD

Department: „Epidemiology and Disaster Medicine”

ANNOTATION:

Providing adequate and prompt first medical aid in emergencies is a challenge for newly-graduated masters of medicine. The great amount of knowledge, life-saving skills and the psychological readiness for making stand-alone decisions are just few of the tasks that the young doctor has to solve in the very limited by the nature of the patient's condition time frame. The impact of abilities for proper orientation and actions in case of emergency is further increased by opportunities for narrow specialization immediately after graduation.

Throughout the disasters, discrepancy between the available and required medical means and capabilities along with the direct health threat and the necessity of live-saving procedures for mass casualties become a real challenge.

Last decades' increase in disasters' frequency and severity and the number of patients needing emergency medical care, have been recorded. Number of factors contribute to this increase such as aging population, urbanization and industrialization, climate change, intensive traffic, etc.

Disasters have a negative impact on the population, on the environment and on the ability of the health care system to provide emergency medical assistance. This requires the use of specific disaster medicine methods, algorithms and techniques.

The undergraduate student program (5th semester) limits the theoretical knowledge and practical abilities for Disaster Medical Support acquired by the schedules.

The performed analysis of the increasing knowledge and skills needed in case of disaster highlights the need to increase medical students' preparedness to respond to disasters, accidents and crises.

The elective subject aims to increase both students' theoretical knowledge and practical skills to provide first medical aid in case of disasters and emergency.

Course objectives:

1. Theoretical and practical training for situation assessment.
2. Theoretical and practical training for the urgency of the patients' condition.
3. Acquiring knowledge and skills to determine the severity of the damages.
4. Building a differential diagnosis approach in emergency situations.
5. Building psycho-emotional sustainability in emergency and disasters.
6. Theoretical and practical training for first pre-medical aid and first medical aid in case of disaster.
7. Building self-decision skills within a limited timeframe without use of paraclinical and imaging tests.
8. Validation of acquired knowledge, skills and competence through practical and theoretical examination.

COURSE TASKS:

To acquire:

- additional knowledge and skills to distinguish the incident from the disaster situation;
- knowledge and skills on assessing general and medical situation during stages of disaster;
- methods for the rapid health hazards identification;
- algorithms for assessing severity of damages;
- sorting casualties into categories;
- differential diagnosis approach in emergency and case of disaster;
- knowledge for diagnosis without use of paraclinical tests and imaging diagnostics;
- skills for action in life-threatening conditions;
- knowledge and skills for providing first aid and first medical aid to casualties;
- teamwork skills with medical and non-medical staff in case of disaster and emergency;
- skills to lead a medical team in case of disaster
- mass casualties event medical management

OBLIGATORY COMPETENCIES:

• Theoretical knowledge about:

- similarities and differences between accident, emergency, crisis and disaster;
- life-threatening conditions and traumas;
- differential diagnosis of the causal link situation – harm - medical activities;
- differential diagnosis of life-threatening conditions;
- identification of life and health hazards;
- the algorithms for determining severity of damage and priority for providing medical aid;
- basic techniques for life-saving assistance;
- first medical aid in case of disaster;
- teamwork in case of disaster and emergency - medical professionals' and rescue teams' tasks.

• Practical skills about:

- differentiation between emergency and disasters;
- identification of life and health threats;
- protection against the impact of damaging factors;
- management of life-threatening conditions;
- sorting casualties into categories;
- identification of the required medical aid;
- determination of equipment required for first medical aid;
- management of casualties in unconscious state;
- determination of life-threatening abdominal traumas;
- determination of life-threatening chest traumas;
- determination of life-threatening brain injuries;
- identification of urgent injuries to the locomotory system;
- basic steps and techniques of first medical aid in case of disaster;
- adequately and fully to implement the first medical aid algorithm;
- organization and logistics of medical teams;
- working in a team - as a leader and as a member;
- exchanging medical information during emergency and in case of disasters;
- to pass on the acquired practical skills to other students;

First medical aid in Emergency and disasters

Lecture schedule

Lecture № 1 – 2 academic hours. Situation assessment. Impact on the healthcare system.

1. Differentiation among an accident, an emergency, a crisis and a disaster.
2. Main features of emergency and disaster.
3. Negative consequences on healthcare system in case of disaster.
4. Challenges to emergency medical team.

Lecture № 2 – 2 academic hours. Shock

1. Pathogenesis of shock
2. Types of shock in disaster situations
3. Challenges to the provision of first medical aid to outpatient casualties in a shock during crises and disasters.
4. Hospital treatment of shock in emergency and disasters.

Lecture № 3 – 2 academic hours. Unconsciousness.

1. Pathogenesis of coma.
2. Types of coma in disaster situations.
3. Challenges to the provision of first medical aid to unconscious outpatient casualties.
4. Challenges to providing first medical aid to unconscious inpatient casualties in emergency and disasters.

Lecture № 4 – 2 academic hours. Fires.

1. Assessment of the general situation.
2. Assessment of the medical situation.
3. Challenges to providing first medical aid in outpatients.
4. Challenges in providing first medical aid in inpatients.

Lecture № 5 – 2 academic hours. Earthquakes.

1. Assessment of the general situation.

2. Assessment of the medical situation.
3. Challenges to providing first medical aid in outpatients.
4. Challenges in providing first medical aid in inpatients.

Lecture № 6 – 2 academic hours. Traffic accidents with mass casualties.

1. Assessment of the general situation.
2. Assessment of the medical situation.
3. Challenges to providing first medical aid in outpatients.
4. Challenges in providing first medical aid in inpatients.

Lecture № 7 – 2 academic hours. Floods.

1. Assessment of the general situation.
2. Assessment of the medical situation.
3. Challenges to providing first medical aid in outpatients.
4. Challenges in providing first medical aid in inpatients.

Lecture № 8 – 2 academic hours. Terrorism.

1. Assessment of the general situation.
2. Assessment of the medical situation.
3. Challenges to providing first medical aid in outpatients.
4. Challenges in providing first medical aid in inpatients.

Practices schedule

PRACTICAL EXERCISE № 1 – 3 (6 academic hours)

Assessment of the general and medical situation. Identification of hazards and risk factors. Assessment of vulnerability and risk levels in the most frequent crises and disasters: fires, floods, traffic accidents, earthquakes, industrial accidents, terrorism, epidemics, usage of weapons of mass destructions. Role play. Solving of practical cases.

PRACTICAL EXERCISE № 4 (2 academic hours)

Organization of primary, primary medical and prehospital medical triage of casualties in shock.

PRACTICAL EXERCISE № 5 (2 academic hours)

Organization of primary, primary medical and prehospital medical triage of unconscious casualties.

PRACTICAL EXERCISE № 6 (2 academic hours)

Patient rescue and evacuation techniques in crisis and disasters.

PRACTICAL EXERCISE № 7 (2 academic hours)

Organization of providing outpatient and inpatient first medical aid (arrangement and capacity of the medical activities, resource supply) in the event of fires.

PRACTICAL EXERCISE № 8 (2 academic hours)

Organization of providing outpatient and inpatient first medical aid (arrangement and capacity of the medical activities, resource supply) in the event of earthquake.

PRACTICAL EXERCISE № 9 (2 academic hours)

Organization of providing outpatient and inpatient first medical aid (arrangement and capacity of the medical activities, resource supply) in the event of terrorism.

PRACTICAL EXERCISE № 10 (2 academic hours)

Organization of providing outpatient and inpatient first medical aid (arrangement and capacity of the medical activities, resource supply) in the event of traffic accident with mass casualties.

PRACTICAL EXERCISE № 11 (2 academic hours)

Organization of providing outpatient and inpatient first medical aid (arrangement and capacity of the medical activities, resource supply) in the event of epidemics and pandemics.

PRACTICAL EXERCISE № 12 (2 academic hours)

Organization of providing outpatient and inpatient first medical aid (arrangement and capacity of the medical activities, resource supply) in the events of floods and industrial accidents.

BIBLIOGRAPHY

1. Kostadinov R. Disaster Medicine Highlights. 2018, Lax book, ISBN 978-619-189-110-8
2. 600 simple steps to disaster medicine exam success, Rostislav Kostadinov, Medical publishing VAP, Plovdiv
3. Disaster Medicine, Gregory R. Ciotto, Elsevier Health Sciences, 2006
4. Oxford American Handbook of Disaster Medicine, Robert A. Partridge, Lawrence Proano, David Marcozzi, Oxford University Press, USA, 2012

FIRST PHYSICIAN AID IN CASE OF DISASTER AND EMERGENCY- QUESTIONNAIRE

1. Crisis and Disaster – Definition, Characteristics, Impact on healthcare system.
2. Assessment of the general and medical situation.
3. First physician aid- Definition, Aim, Objective.
4. First physician aid in case of disaster.
5. Disaster medical support principles and Standard operating procedures.
6. Definition, diagnosis and differential diagnosis of shock in disasters.
7. Unconscious states- Definition, Diagnosis, Differential diagnosis in disasters.

8. Triage and first medical aid in unconscious casualties (outpatient and inpatient) in disasters.
9. Triage and first medical aid in case of shock (outpatient and inpatient) in disasters.
10. Organization and providing of triage and first medical aid (outpatient and inpatient) in case of fires.
11. Organization and providing of triage and first medical aid (outpatient and inpatient) in case of floods.
12. Organization and providing of triage and first medical aid (outpatient and inpatient) in case of industrial accidents.
13. Organization and providing of triage and first medical aid (outpatient and inpatient) in case of terrorism.
14. Organization and providing of triage and first medical aid (outpatient and inpatient) in case of epidemics.
15. Organization and providing of triage and first medical aid (outpatient and inpatient) in case of traffic accidents with mass casualties.
16. Organization and providing of triage and first medical aid (outpatient and inpatient) in case of earthquake.

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

IN

CLINICAL ALLERGOLOGY
(Elective course)

Accepted by the Department Council - Protocol № 49/25.05.2022

Confirmed by the Faculty Council – Protocol №6/15.06.2022

CLINICAL ALLERGOLOGY

SYLLABUS

Discipline	Final exam/ semester	Academic hours				Non- academic ECTS	Total ECTS
		Total	Lectures	Practices	ECTS		
Clinical Allergology	IX	20	12	8	0.7	0.6	1.3

DISCIPLINE:

Clinical allergology

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:

Elective course

LEVEL OF QUALIFICATION:

Master /M/

FORMS OF TRAINING:

Classroom academic lectures, practical clinical training, seminars, tests, self-preparation.

YEAR OF TRAINING:

5th year

DURATION OF TRAINING:

One semester (9th) of the program for training students in the specialty "Medicine".

TOTAL ACADEMIC HOURS - 20:

12 hours lectures, 8 hours practices /held every other week/

EDUCATIONAL AIDS/TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:

Multimedia presentations, discussions, demonstrations of clinical cases, diagnostic methods and tools, analysis and interpretation of clinical data and results of paraclinical studies in different nosological units and specific patients, solving practical problems, development of diagnostic and therapeutic algorithms for allergic diseases and for specific patients, discussion of rarer cases in practice, mastering the models approved by the relevant international and national consensus for diagnosis and treatment of life-threatening systemic allergic reactions and allergic diseases with chronic-recurrent course.

BASIS FOR CONDUCTING THE TRAINING:

- The lecture course will take place in the halls of the Auditorium complex;
- The practical exercises will be conducted in the Department of Occupational Diseases and Allergology by the assistants in the Section of Occupational Diseases, who have acquired specialties in Internal and Occupational Diseases and have the necessary basic competencies in Clinical Allergology.

FORMS OF EVALUATION:

- Current assessment - tests, oral examination, participation in seminars and discussions;
- Final grade from the passed semester exam.

EVALUATION CRITERIA:

Ongoing control includes evaluations of the tests performed and oral examination on the thematic material during clinical practices.

Aspects of current control evaluation:

- solving tests;
- participation in seminars and discussions;
- participation of the student in the treatment of patients with allergic diseases of general and occupational nature;
- evaluation of the student's practical skills in performing specific tasks set by the assistant related to the diagnosis and treatment of allergic diseases;
- evaluation of the written exam on the taught material according to a syllabus set in advance for the students.

SEMESTER EXAM:

The training in the discipline "Clinical Allergology" ends with passing an exam in front of a commission chaired by a habilitated person with acquired specialties in "Clinical Allergology" and "Internal Medicine".

FORMATION OF THE FINAL GRADE:

The final grade is set on the day of the semester exam. It is complex and is formed by:

1. The evaluation of a written theme from the conspectus;
2. The evaluation of the test made during the exam day;
3. The evaluation of the interview on specific issues of allergic pathology /at the discretion of the commission/.
4. The grade from the current academic semester control, with which the assistant presents the student on the day of the exam.

STATE EXAM:

No.

LECTURER:

Assoc. Prof. Svetlan Dermendzhiev, PhD, MD, DMSc, HMM

DEPARTMENT:

Second Department of Internal Diseases, Section of Occupational Diseases and Toxicology

ANNOTATION

The study of the discipline "Clinical Allergology" is dictated by the steady trend of continuous increase in allergic diseases of general and occupational nature. The following epidemiological data on the current situation and forecasts for the spread of allergic diseases worldwide and nationally are in support of that. The World Health Organization (WHO) predicts that by 2050, 50% of the world's population will be affected by at least one allergic disease. Between 30-40% of Europeans are allergic, a figure that has doubled in the last 20 years. 15-20% of these patients have manifestations of severe allergic rhinitis, which, if left untreated, can be complicated by sinusitis, nasal polyposis, asthma.

The curriculum is in line with the main competencies set in the programs for training and specialization of doctors in the specialties "General Medicine", "Clinical Allergology", "Internal Medicine". The program is in compliance with the requirements for covering basic levels of competence according to the approved medical standards for the respective specialties. The choice of the 9th semester as a period of time for teaching the discipline "Clinical Allergology" from the curriculum for the specialty "Medicine" at the Faculty of Medicine is based on the need for students to acquire basic knowledge and skills in "Propaedeutics of Internal Medicine" and "Microbiology", which are the basis of clinical thinking and support the assimilation of the teaching material on "Clinical Allergology". Students should have mastered the rules and competencies for taking a general history, methods for objective examination of the patient and diagnostic algorithms of the main groups of internal diseases. The parallel study of the types of allergic reactions and the pathogenetic mechanisms of allergic diseases in the course of "Microbiology" is a prerequisite for purposeful clinical thinking and correct diagnosis of allergic patients by future doctors.

BASIC AIMS OF THE DISCIPLINE

Students should:

- acquire skills for purposeful taking of allergy history;
- acquire a basic minimum of knowledge on the clinical picture and the peculiarities in the course of the most common allergic diseases of general and occupational nature;
- acquire knowledge and skills to build adequate diagnostic and therapeutic models for each patient with an allergic reaction or allergic disease;
- respond correctly, in a timely and accurate manner when emergency intervention is needed to control life-threatening systemic allergic reactions.

BASIC TASKS

- To acquaint students with the modern achievements of clinical allergology as a science;
- To build a model for adequate diagnostic-therapeutic schemes of behavior in the management of emergencies in allergology;
- To model in the future doctors an approach for correct interpretation of the results of the specialized allergological tests performed on the patients;
- To train students in adequate decision making about treatment of allergic patient and application of therapeutic procedures, to control the exacerbation of the chronically ill, as well as to take life-saving resuscitation measures in case of emergency allergic conditions in clinical practice.
- To build skills in future doctors for an adequate approach in the control of asthma patients in accordance with modern world, European and national concepts and consensus /GINA, Bulgarian Consensus on Asthma, etc./;
- To train and build in the future doctors a model of the relationship with the patient and the GP, which will solve quickly, accurately and competently any allergy problem;

TEACHING METHODS

- lecture presentation;

- practical exercises;
- incoming tests;
- seminars;
- presentation and discussion of clinical cases;
- multimedia.

MONITORING AND EVALUATION

- current control - tests, oral examination;
- final grade from the passed semester exam.

CONTROL METHODS

- **The current control** includes an oral examination on the thematic material from the exercises, the seminars and an assessment from the tests on the topic for each of the practical exercises.
- **The final grade** is given to the student on the day of the semester exam. It is rounded to one and entered in the study documentation. The final assessment is complex and based on the above criteria.

MANDATORY COMPETENCIES (EXPECTED RESULTS)

I. Theoretical knowledge of students:

1. To know the etiology, pathogenetic mechanisms, clinical picture, forms of manifestation and course of the most common allergic diseases in practice;
2. To master the diagnostic-therapeutic algorithms of allergic diseases of general and occupational nature;
3. To be able to correctly analyze and interpret the results of the paraclinical examinations, tests and samples performed for each patient;
4. To master the methods for control and expert assessment of patients with bronchial asthma and allergic rhinitis in accordance with the established international and national consensus;
5. To acquire the knowledge necessary for adequate response and intervention in cases of need in acute allergic reactions of urgent nature.

II. Students' practical skills:

1. To master the peculiarities of taking a purposeful allergy history.
2. To acquire the necessary skills and experience in the clinical examination of the allergic patient and the performance of the allergological physical assessment (status).
3. To be able to correctly register and reflect in the medical documentation of the patient the data from the anamnesis, the objective examination, the diagnostic procedures necessary for diagnostic clarification.
4. To acquire skills for correct interpretation of the results of the performed specialized allergological tests.
5. To be trained to apply the appropriate algorithm for the correct diagnosis of patients with allergic diseases.
6. To acquire skills for the appointment of an adequate therapeutic regimen for the patient's condition and allergic disease.

7. To be trained to perform basic manipulations necessary for the diagnosis of allergic diseases and the initial stage of treatment of emergency allergic conditions:
 - performing, reporting and interpreting skin allergy tests /scarification tests with antibiotics and other medications according to indications/;
 - placement of a peripheral venous line;
 - intravenous injection of a corticosteroid;
 - performing an intramuscular injection with an H1-blocker and/or corticosteroid;
 - measurement of blood pressure;
 - supply of O₂ with a face mask or nasal catheter;
 - appointment, application, dosing and control of aerosol therapy with short-acting β_2 -agonists /Salbutamol, Ventolin, Butoasthma, etc./ and medications from other groups for relieving bronchospasm in asthma attacks in emergencies;
 - administering solutions and medications through intravenous infusion for more severe allergic reactions and conditions /severe asthma attack, asthmatic status, anaphylactic shock/.
 - determining the therapeutic scheme and prescribing medications for the control treatment of an asthmatic patient;
 - solving a specific clinical case requiring determining the severity of the acute asthma attack /exacerbation of asthma or the degree and severity of chronic asthma, in accordance with generally accepted clinical and functional criteria/.

LECTURES

5th year, 9th semester

№	THEME	HOURS
1.	Introduction to clinical allergology - epidemiology of allergic diseases, social significance, clinical classification. Types of allergic reactions and clinical manifestations. Basic principles in the diagnosis of allergic diseases - features of the allergic history and physical examination of the allergic patient. Paraclinical tests - markers of allergic inflammation. Determination and clinical significance of eosinophilic cationic protein (ECP). Interpretation of eosinophilia and the results of pulmonary function testing. Bronchodilator test. Determination of nonspecific bronchial hyperreactivity /Methacholine test/. Skin allergy tests: types, methods, indications and contraindications, reading and interpretation of results. Allergy-specific in vitro studies - determination and clinical interpretation of total and allergen-specific IgE. Stages of diagnosis of a patient with allergic disease.	2 h.
2.	Allergic rhinitis - definition, epidemiology, etiology, pathogenesis. Etiological and clinical classification of rhinitis. Modern concept of "one airway - one disease" /ARIA/. Clinical picture of the two main types of AR. Criteria for diagnosis. Complications, differential diagnosis. Principles of treatment of allergic rhinitis. Pharmacotherapy. Criteria for assessing the occupational etiology of rhinitis.	2 h.

3.	Bronchial asthma - definition, epidemiology, etiological forms. Characteristics of atopic and non-atopic asthma. Factors causing inflammation in the respiratory tract /inducers/ and factors that trigger the onset of an acute attack /triggers/. Pathogenesis of atopic asthma - cells, mediators and effects of early- and late-phase allergic reaction. Diagnostic-therapeutic classification /clinical phenotypes/. Clinical picture of asthma.	2 h.
4.	Bronchial asthma - acute and chronic. Assessment of the severity of an asthma attack. Forms of chronic asthma according to the severity of the course /GINA, Bulgarian Consensus on Asthma/. Laboratory tests. Criteria for the diagnosis of asthma during an attack and in remission. Criteria for assessing the occupational etiology of asthma. Complications of asthma. Principles and methods of treatment. Pharmacotherapy of asthma. Modern controlling treatment of asthma - place and role of inhaled corticosteroids and combination drugs.	2 h.
5.	Phasic /stepwise/ therapeutic approach in the treatment of chronic asthma. Treatment of acute asthma. Status asthmaticus - etiology, clinical picture. Therapeutic approach in severe attack and asthmatic status. Assessment of the risk for fatal outcome. Criteria for symptom control. Anaphylactic shock - definition, etiology, pathogenesis, clinical forms, diagnosis and differential diagnosis. Principles and methods of treatment. Drugs and principles of treatment in allergology. Antihistamines and glucocorticosteroids - the basis of pharmacotherapy of allergic diseases.	2 h.
6.	Urticaria and angioedema - definition, etiology, forms. Clinical picture. Special forms of urticaria and angioedema. Hereditary angioedema (HAE) - etiology, pathogenesis, forms, features in the clinical manifestation and course, criteria for diagnosis, differential diagnosis, principles of treatment. Prevention. Drug allergy. Food and insect allergy - etiology, pathogenesis, clinical manifestations, diagnostic-therapeutic algorithm.	2 h.

TOTAL: 12 h.

THEMATIC PLAN OF THE LECTURES – EXPANDED OPTION

LECTURE № 1 – 2 academic hours

Introduction to clinical allergology - epidemiology of allergic diseases, social significance, clinical classification. Types of allergic reactions and clinical manifestations. Basic principles in the diagnosis of allergic diseases - features of the allergic history and physical examination of the allergic patient. Paraclinical tests - markers of allergic inflammation. Determination and clinical significance of eosinophilic cationic protein (ECP). Interpretation of eosinophilia and the results of pulmonary function testing. Bronchodilator test. Determination of nonspecific bronchial hyperreactivity /Methacholine test/. Skin allergy tests: types, methods, indications and contraindications, reading and interpretation of results. Allergy-specific in vitro studies - determination and clinical interpretation of total and allergen-specific IgE. Stages of diagnosis of a patient with allergic disease.

LECTURE № 2 – 2 academic hours

Allergic rhinitis - definition, epidemiology, etiology, pathogenesis. Etiological and clinical classification of rhinitis. Modern concept of "one airway - one disease" /ARIA/. Clinical picture of the two main types of AR. Criteria for diagnosis. Complications, differential diagnosis. Principles of treatment of allergic rhinitis. Pharmacotherapy. Criteria for assessing the occupational etiology of rhinitis.

LECTURE № 3 – 2 academic hours

Bronchial asthma - definition, epidemiology, etiological forms. Characteristics of atopic and non-atopic asthma. Factors causing inflammation in the respiratory tract /inducers/ and factors that trigger the onset of an acute attack /triggers/. Pathogenesis of atopic asthma - cells, mediators and effects of early- and late-phase allergic reaction. Diagnostic-therapeutic classification /clinical phenotypes/. Clinical picture of asthma.

LECTURE № 4 – 2 academic hours

Bronchial asthma - acute and chronic. Assessment of the severity of an asthma attack. Forms of chronic asthma according to the severity of the course /GINA, Bulgarian Consensus on Asthma/. Laboratory tests. Criteria for the diagnosis of asthma during an attack and in remission. Criteria for assessing the occupational etiology of asthma. Complications of asthma. Principles and methods of treatment. Pharmacotherapy of asthma. Modern controlling treatment of asthma - place and role of inhaled corticosteroids and combination drugs.

LECTURE № 5 – 2 academic hours

Phasic /stepwise/ therapeutic approach in the treatment of chronic asthma. Treatment of acute asthma. Status asthmaticus - etiology, clinical picture. Therapeutic approach in severe attack and asthmatic status. Assessment of the risk for fatal outcome. Criteria for symptom control. Anaphylactic shock - definition, etiology, pathogenesis, clinical forms, diagnosis and differential diagnosis. Principles and methods of treatment. Drugs and principles of treatment in allergology. Antihistamines and glucocorticosteroids - the basis of pharmacotherapy of allergic diseases.

LECTURE № 6 – 2 academic hours

Urticaria and angioedema - definition, etiology, forms. Clinical picture. Special forms of urticaria and angioedema. Hereditary angioedema (HAE) - etiology, pathogenesis, forms, features in the clinical manifestation and course, criteria for diagnosis, differential diagnosis, principles of treatment. Prevention.

Drug allergy. Food and insect allergy - etiology, pathogenesis, clinical manifestations, diagnostic-therapeutic algorithm.

PRACTICES**5th year, 9th semester**

№	THEME	HOURS
1.	Etiology and pathogenesis of allergic diseases. Diagnostic methods in allergology – anamnesis, objective examination of a patient with allergic disease, paraclinical tests – diagnostic significance and interpretation of eosinophilia. Pulmonary function testing – characteristics and interpretation of obstructive ventilatory defect. Bronchodilator test – methodology, interpretation of results, necessary conditions for compliance before conducting the test. Determination of nonspecific bronchial hyperreactivity – Methacholine test. Specific tests on the shock organ: elimination, exposition and provocation tests – inhalatory bronchoprovocation and nasal provocation test. Skin allergy tests: types, methodologies, reading and interpretation of results, indications and contraindications for skin allergy tests. Interpretation of the results from arterial blood gas test. Determination of total serum IgE and allergen-specific IgE – clinical significance, interpretation of results. Stages of diagnosis of an affected person with an allergic disease.	2 h.
2.	Bronchial asthma: definition, socio-economic dimensions of the problem, etiology, etiological forms, clinical phenotypes. Pathogenesis of asthma. Clinical manifestations of the asthma attack. Criteria for assessing the severity of the attack. Chronic asthma – classification by degree and severity. Clinical and functional criteria in determining the degree and severity of chronic asthma. Paraclinical tests in asthmatic patients – blood, pulmonary function, imaging tests, skin allergy tests. Clinical value of specialized allergological tests. Model for interpretation of the obtained results. Criteria for diagnosis of bronchial asthma. Differential diagnosis between atopic and non-atopic asthma. Criteria for differentiating asthma from COPD. Complications of asthma. Status asthmaticus – triggering factors and clinical picture. Demonstration of clinical cases. Solving practical tasks in asthma patients. Treatment of asthma – principles and methods /Seminar training/. Pharmacotherapy of bronchial asthma. Principles of application and dosing of relieving and controlling agents. Modern concepts for therapy and control of chronic asthma - stepwise (phasic) approach. Principles of treatment of acute asthma and asthmatic status. Place of specific immunotherapy in the treatment of asthma. Aspirin-induced (triad) asthma – peculiarities. Determining the therapeutic regimen for the controller treatment of asthma in a specific patient. Prescribing the appropriate medications.	2 h.
3.	Allergic rhinitis – definition, epidemiology, etiology, pathogenetic mechanisms. Basic principles of the concept “one airway-one disease” (ARIA). Etiological and clinical classification of rhinitis. Features in the clinical characteristic of the two main types – with a runny or "dripping" nose, and with a stuffy nose. Diagnosis. Differential diagnosis between allergic and non-allergic rhinitis. Complications. The association between rhinitis and asthma in the context of the concept "Allergic march". Principles of treatment of allergic rhinitis. Pharmacotherapy of	2 h.

	rhinitis.	
4.	<p>Urticaria and angioedema – definition, classifications of different forms of urticaria and angioedema. Pathogenesis. Clinical forms of urticaria and angioedema. Acute urticaria and Quincke's edema – peculiarities in the clinical course, diagnosis and treatment. Forms of chronic urticaria, diagnostic-therapeutic algorithm in patients with chronic urticaria. Presentation and discussion of a clinical case with urticaria and/or angioedema. Hereditary angioedema – definition, etiology, pathogenesis, forms, clinical manifestation, diagnostic criteria, differential diagnosis. Principles in the treatment of hereditary angioedema. Treatment of the edema, prevention of an attack of hereditary angioedema in upcoming risky manipulations and procedures.</p> <p>Drug intolerance and drug allergy. Definition and classification of drug intolerance reactions. Clinical forms of drug eruptions (exanthems). Severe skin reactions of drug intolerance (Stevens-Johnson syndrome, Lyell's syndrome, serum sickness, etc.). Groups of medications that cause drug allergy and types of allergic reactions. Peculiarities of penicillin allergy – types of allergic reactions to penicillin, diagnosis (scratch test). Allergic reactions to anesthetics and neuroleptics used in anesthesiology. Allergic and anaphylactoid reactions to radiopaque substances. Drug reactions by non-immune mechanism (pseudoallergic, anaphylactoid) - pathogenetic mechanisms, peculiarities. Treatment and prevention of drug allergy - primary and secondary. A specific algorithm for the actions of the GP and the allergist in patients with drug allergy. Presentation of a model of specific premedication in a patient with an allergic history, who is about to undergo planned or emergency surgery. Latex allergy.</p>	2 h.

TOTAL: 8 hours

MANDATORY BIBLIOGRAPHY

1. BOZHKOV, Bozhko. Allergology: Principles and Practice /Bozhko Bozhkov/ - Sofia: ARSO, 1999 - 410 p.
2. Allergic diseases: Principles, diagnosis and treatment /V. Dimitrov, Bozhko Bozhkov, Maria Svetoslavova Boikikeva, Em. Petranov/ - Sofia: ARSO, 2000 - 271 p.
3. MILEVA, Jeni, etc. Clinical Allergology /Jeni Mileva, Marta Baleva, Daniela Baltadzhieva/ - Sofia: "Knowledge", 2001 - 351 p.
4. DIMITROV V., etc. Clinical Allergology for General Practitioners /V. Dimitrov, St. Hristova, S. Slavov/ - Sofia: ARSO, 2002 - 174 p.
5. DIMITROV V., PETRUNOV B., KISYOVA A. Clinical Allergology, 2009
6. Dermendzhiev, Svetlan. Diagnostic-therapeutic algorithms in acute poisoning and toxoallergic reactions. Ed. Medical University-Plovdiv, Plovdiv, 2018 – 143 p.

RECOMMENDED BIBLIOGRAPHY

1. KRASDEV, Zahariy, etc. Internal medicine /under the editorial of Prof. Zahariy Krastev, PhD, DMSc/ Sofia 2004, 543-561 p.; Sofia: "ELDO", 2004, 54-77 p.
2. DERMENDZHIEV, Svetlan Mihov. "Comparative analysis of allergic diseases of a general and occupational nature for a 10-year period in Plovdiv region". Academic research dissertation for the award of educational and academic degree "Doctor" Svetlan Mihov Dermendzhiev - Plovdiv, MU-Plovdiv, 2011 - 165 p.
3. Occupational diseases /Assoc. prof. V. Kostova and Assoc. prof. V. Petkova/: "Rahl and Kolober", 2007
4. Zlatka Stoyneva, Svetlan Dermendzhiev. Occupational nervous and allergic diseases. Ed. House "Elestra", Sofia, 2015
5. Svetlan Dermendzhiev. Diagnostic-therapeutic algorithms in bronchial asthma. Ed."Elestra" Ltd., Sofia, 2017
6. Svetlan Dermendzhiev. Angioneurotic edema. Ed. "Studio Griff" Ltd., Plovdiv, 2018
7. PATTERSON, Roy et al. Allergic Diseases: Diagnosis and Treatment /Roy Patterson, L. K. Gremmer, Paul A. Greenberger/ - Moscow: GEOTAR-MED, 2000 - 768 p.
8. ATLAS of allergies /Ed. Philip Fireman, Raymond G. Slavin. - 2nd ed. - St. Louis: Mosby-Wolfe, 1996 – 301 p.
9. ALLERGY: Principles & practice: In 2 v. / Ed. Elliott Middleton, Charles E. Reed et al. - 5th ed.- St. Louis: Mosby, 1998
10. Modern treatment of allergic diseases, under the editorial of J. Mileva, Ed. "Knowledge", 1997 and second edition 1999

CONSPECTUS FOR SEMESTER EXAM ON CLINICAL ALLERGOLOGY

1. Allergy and allergens – definition. Classification of allergic diseases. The essence of atopy. Classical atopic diseases. Pseudoallergy.
2. Etiology of allergic diseases. Types of allergens - house dust and mites, pollen allergens, animal (epidermal) allergens, mold allergens, food and food impurities, other household allergens - characteristics, sources, sensitizing potential. Allergic reactions and diseases caused by different types of allergens.
3. Pathogenesis of allergic diseases - types of allergic reactions and clinical manifestations. Genetic factors for atopy and IgE production. Mosmann's concept of the Th2-immune response and Okudaira's hypothesis of alterations in immunity under the influence of environmental factors.
4. Mediators of allergic reactions – preformed and newly synthesized. Adhesion molecules, cytokines, interleukins. The role of histamine and its induced effects in the pathogenesis of allergic reactions. Lipid mediators – derivatives of arachidonic acid and cyclooxygenase products. Effects of prostaglandins, thromboxanes, leukotrienes, PAF, lipoxins.
5. Diagnosis of allergic diseases – peculiarities of the allergological anamnesis and physical examination of the allergic patient.
6. Eosinophilia – interpretation, clinical assessment.
7. Pulmonary function testing – the most important indicators of pulmonary ventilation for the functional pulmonary diagnostics. Types of ventilatory defect (VD). Characteristics of obstructive VD. Bronchodilator test (BDT) - nature, methodology, interpretation of results, significance
8. Nonspecific bronchial hyperreactivity - essence, assessment of nonspecific bronchial hyperreactivity. Inhalatory bronchoprovocation tests with Methacholine - interpretation of the Methacholine test results.
9. Skin allergy tests - indications and contraindications for skin allergy tests, direct and indirect skin allergy tests, methods, scales for reading the results, interpretation of the results, significance for the diagnosis of allergic diseases.

10. Specific tests on the shock organ - types, indications, diagnostic value.
11. Determination of total and specific IgE - methodologies, indications, interpretation of results, clinical significance, Advantages of RAST.
12. Bronchial asthma – definition, epidemiology, forms, etiological factors (inducers and inciters), pathogenesis – specific cells and mediators of early- and late-phase allergic reaction.
13. Clinical picture of bronchial asthma – characteristics of asthma attack, cardinal symptoms (markers) of asthma. Assessment of the severity of the asthma attack (according to the criteria of British Thoracic Society).
14. "Acute severe asthma" (Asthmatic status) - definition, occurrence factors, peculiarities in clinical manifestation.
15. Forms of chronic asthma according to the severity of the course (Bulgarian consensus on asthma, 1999). Characteristics of the forms/stages of chronic asthma.
16. Criteria for diagnosis of asthma during an attack and in a period of remission. Diagnosis of initial asthma.
17. Complications and differential diagnosis of bronchial asthma. Criteria for differentiation of non-atopic bronchial asthma from COPD.
18. Special forms of bronchial asthma – exercise-induced asthma, aspirin-induced (triad) asthma, syndromic asthma. Occupational bronchial asthma. Features in the etiology, pathogenesis, clinical manifestation. Types and forms of occupational bronchial asthma. Criteria for diagnosis and assessment of the occupational etiology of asthma. Occupational expert assessment.
19. Basic principles of treatment of BA. Etiological treatment. Specific hyposensitization (allergen immunotherapy) - essence of the method, goals and tasks, pathophysiological mechanisms, indications and contraindications, modifications, risks and complications. Modern methods of specific immunotherapy.
20. Asthma pharmacotherapy. Anti-inflammatory treatment – main groups of anti-inflammatory (controlling) medications – cromons, inhaled steroids, oral steroids, antileukotrienes – mechanisms of anti-inflammatory action, method of administration, dosing, principles of combination therapy, therapeutic and adverse (side) effects, control of therapy.
21. Principles, mechanisms and most commonly used in practice medications for bronchodesobstructive treatment. Pharmacological characteristics of relievers – inhaled short acting beta2-agonists, long-acting beta2-agonists, methylxanthines, anticholinergics – mechanism of action, indications, dosing of the most commonly used medications in practice.
22. Stepwise (phasic) therapeutic approach in the treatment of chronic asthma. Modern principles and approaches in the treatment of asthma, based on the Global (GINA) and National Consensus.
23. Treatment of acute asthma - an algorithm for behavior in mild, moderate and severe asthma attacks. Stationary treatment of severe attack and asthmatic status in hospitals. Actions of general practitioners and allergists in bronchial asthma (Expert group at the NHIF, 2001).
24. Hypersensitivity pneumonitis (Exogenous allergic alveolitis) - definition, etiology, pathogenetic mechanisms, clinical picture of acute, subacute and chronic form, immunological tests, diagnosis, treatment. Differential diagnosis between exogenous bronchial asthma and allergic alveolitis. Criteria for diagnosis and assessment of the occupational etiology of hypersensitivity pneumonitis.
25. Drug allergy - definition, etiology, pathogenetic mechanisms. Medications causing drug allergy by a non-immune mechanism.
26. Clinical forms of drug allergy – generalized reactions and organ manifestations. Features of drug allergy caused by beta-lactam antibiotics and anesthetics.
27. Features of drug allergy to iodine-containing radiopaque substances and algorithm in upcoming tests with these substances. Primary and secondary prevention (prophylaxis). Diagnostic-therapeutic algorithm in patients with drug allergy. Behavior of general practitioners and allergists in drug allergy.
28. Allergic rhinitis – definition, epidemiology, etiology, pathogenesis. The essence of the concept “one airway-one disease” /ARIA/. Classification of allergic rhinitis.

29. Allergic rhinitis – clinical picture, laboratory tests, diagnosis criteria, differential diagnosis of rhinitis.
30. Principles of treatment of allergic rhinitis. Pharmacotherapy – groups, most commonly used in practice drugs, indications, therapeutic schemes. Indications for allergen immunotherapy in allergic rhinitis.
31. Insect allergy – definition, etiology, pathogenesis. Clinic of normal and allergic reaction. Features of the generalized reaction after an insect sting. Unusual reactions.
32. Insect allergy – diagnosis and treatment. Procedures of an emergency order performed by the stung patient. Allergen immunotherapy – principles, indications, scheme of conduct, side effects, alterations occurring during and after completion of allergen immunotherapy.
33. Food allergy – definition, etiology, pathogenesis, classification, clinical manifestations. Criteria for diagnosis of food allergy, diagnostic allergen elimination diets. Oral food challenge. Treatment of food allergy, prophylactic and therapeutic diets.
34. Urticaria and angioedema – definitions, etiology, clinico-pathogenetic classification of the different forms of urticaria and/or angioedema. Clinical forms of urticaria and angioedema.
35. Diagnostic-therapeutic algorithm in urticaria and angioedema. Stages (degrees) in the diagnosis of chronic urticaria. Principles of treatment.
36. Hereditary angioedema - definition, etiology, pathogenesis, forms, clinical picture, criteria for diagnosis. Principles of treatment. Treatment of the edema. Prophylactic treatment between attacks. Prevention of hereditary angioedema in diagnostic-therapeutic procedures with increased risk.
37. Anaphylactic shock – definition, etiology, pathogenetic mechanisms. Medications that most commonly cause anaphylactic shock. Special forms of anaphylaxis (exercise-induced anaphylaxis, idiopathic, immunocomplex, anaphylaxis from ionic compounds, drug-induced anaphylactoid reactions).
38. Clinical forms of anaphylactic shock. Features of idiopathic anaphylaxis. Complications, diagnosis and differential diagnosis of anaphylactic shock.
39. Treatment of anaphylactic shock - goals, algorithm for behavior. Features in the treatment of biphasic, idiopathic and exercise-induced anaphylaxis. Prevention of anaphylactic shock - general measures, specific measures, premedication, precautionary measures, injection of medication by the patient at the occurrence of the first symptoms (autoinjectors).
40. Serum sickness – definition, etiology, pathogenesis, major clinical symptoms, diagnosis and differential diagnosis, treatment.
41. Allergy to latex.
42. Allergic contact dermatitis – definition, classification, etiology, pathogenesis. Clinical picture of contact dermatitis. Morphology of alterations in acute, subacute and chronic phase. Criteria for diagnosis. Significance of epicutaneous (patch) test in the diagnosis of the disease. Differential diagnosis of contact dermatitis. Principles of treatment and dosage forms applied in contact dermatitis.
43. Atopic dermatitis – definition, genetic and immune factors in the etiology of the disease, pathogenesis. Factors that trigger the disease. Clinical picture – dynamics in terms of morphology and localization of the rash depending on age. Clinical characteristics of the separate stages and other characteristic symptoms. Immunological disorders in atopic dermatitis. Basic (mandatory) diagnostic criteria. Differential diagnosis and complications of atopic dermatitis. Basic principles in therapy and treatment regimens.

AUTHOR OF THE PROGRAM:

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