

EUROPEAN MEDICAL UNIVERSITY

SYLLABUS OF THE EDUCATIONAL DISCIPLINE "MEDICAL BIOLOGY"

Specialty	222 Medicine
Educational level	Mater
Educational program of OPP	OPP «Medicine»
Academic year	2023-2024
Department	Department of Fundamental Disciplines
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Compilers of the syllabus	ScD., prof. Svitlana Ostrovska PhD., prof. associate Natalia Markhon

1. Status and structure of the discipline

Discipline status	Mandatory
Discipline code in OPP/place of discipline in OPP	OK 4, professional training discipline
Course/semester	1 course (1 semester)
Course volume (total number of hours/ number of ECTS credits)	150 hours / 5 ECTS credits
Structure of the discipline	Lectures 18 hours Practical classes 76 hours Independent work 56 hours
Language of instruction	English
Form of education	Full-time
Type of final control	Exam

2. Description of the discipline

Short abstract of the course, relevance: The discipline is based on subjects previously studied by students in secondary comprehensive school, such as "General Biology", "Human Biology", "Animal Biology", "Plant Biology". The program of the educational discipline includes sections: "Cellular and organismal levels of life organization. Basics of human genetics", "Population-species, biogeocenotic and biosphere levels of life organization. Medico-biological foundations of parasitism", which ensures a high level of general biological preparation. The teaching of the discipline involves lectures, practical classes, independent work of students and ends with an exam. The program is designed in such a way that during the academic year current and final control of knowledge is carried out. The program contains the required amount of knowledge, abilities and skills, taking into account international requirements for the credit transfer system, international normative documents and standards regulating professional activity and training of masters of medicine. "Medical Biology" lays the foundation for further acquisition of knowledge and skills by students in specialized theoretical and clinical professional-practical disciplines (biological and bioorganic chemistry, histology, cytology and embryology, physiology, medical genetics, clinical immunology, infectious diseases, epidemiology, pediatrics, etc.) .

Prerequisites: Medical biology as an educational discipline is based on acquired knowledge of the following disciplines: Histology, cytology and embryology. Biological and bioorganic chemistry.

The purpose of the course and its significance for professional activity: The purpose of teaching the educational discipline "Medical Biology" is to study and form knowledge and practical skills in human biology for further assimilation by students of the block of disciplines that provide natural-scientific and professional-practical training.

Post-requisites: "Medical Biology" lays the foundation for further assimilation by students of knowledge and skills from specialized theoretical and clinical professional practical disciplines (microbiology, virology and immunology, hygiene and ecology, as well as biological and bioorganic chemistry, histology, cytology and embryology, physiology, clinical genetics, clinical immunology, infectious diseases with epidemiology, pediatrics, etc.).

3. **General competences (GC): GC 2-4, GC 6, GC 10-12.**

Code	Characteristics of general competence
GC 2	Ability to learn and master modern knowledge
GC 3	Ability to apply knowledge in practical situations
GC 4	Knowledge and understanding of the subject area and understanding of professional activity
GC 6	Ability to make informed decisions
GC 10	Ability to use information and communication technologies
GC 11	Ability to search, process and analyze information from various sources
GC 12	Determination and persistence in relation to assigned tasks and assumed responsibilities

4. **Special (professional) competences (PC): by codes – PC 2, PC 17, PC 23, PC 25.**

Code	Characteristic of special competence
PC 2	Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results.
PC 17	Ability to assess the impact of the environment, socio-economic and biological determinants on the state of health of an individual, family, population.
PC 23	Ability to develop and implement scientific and applied projects in the field of health care.
PC 25	Observance of professional and academic integrity, bear responsibility for the reliability of the obtained scientific results

5. **Learning outcomes.**

Program learning outcomes (PLO) correspond to the codes PLO 2, PLO 3, PLO 21, PLO 23..

Code	Integrative learning outcomes
PLO 2	Understanding and knowledge of fundamental and clinical biomedical sciences at a level sufficient for solving professional tasks in the field of health care.
PLO 3	Specialized conceptual knowledge, which includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems.
PLO 21	Finding the necessary information in the professional literature and databases of other sources, analysis, evaluation and application of this information
PLO 23	Determining the impact of the environment on the state of human health to assess the state of morbidity of the population.

6. Discipline content

Names of content sections	Number of hours			
	everything	including		
		lectures	practical classes	IWA
CHAPTER 1: "Cellular and organismal levels of life organization. Basics of human genetics"				
Content section 1. Molecular-cellular level of life organization.. General cytology and molecular bases of heredity	24	4	12	8
Content section 2. Biology of individual development. Biological features of human reproduction. Gametogenesis, fertilization.	16	2	8	6
Content section 3. Medical and biological foundations of human genetics. Patterns of heredity and variability.	20	4	8	8
Content section 4 Methods of studying human heredity. Hereditary diseases	20	2	12	6
CHAPTER 2: "Population-species, biogeocenotic and biosphere level of life organization. Medical and biological basis of parasitism"				
Content section 5. Medico-biological bases of parasitism. Medical protoparasitology	18	2	8	8
Content section 6. Medical helminthology	22	2	12	8
Content section 7. Medical arachnoentomology	16	2	8	6
Content section 8. Relationship between individual and historical development. Biosphere and man.	14		8	6
Total hours:	150	18	76	56

Note: * distribution according to the curriculum according to the educational program of the specialty

Lectures plan (L)

№	Topic	Hours
1.	Introduction to Medical Biology Course. Structural and functional organization of a cell	2
2.	Molecular basis of heredity. Realization of hereditary information.	2
3.	Reproduction at the cellular level. Molecular and genetic mechanisms of ontogenesis. Breaks of the ontogeny and their place in human pathology.	2
4.	Organismic level of the genetic information organization.	2
5.	Interaction of genes. Genetics of sex.	2
6.	Methods of human genetics. Hereditary diseases.	2
7.	The medical and biological basis of parasitism. Protozoa are human parasites.	2
8.	Medical Helminthology. Flat and Round worms are human parasites.	2
9.	Medical Arachnoentomology. Arthropods as the carriers of human infections and invasions.	2
Total		18

Practical lessons plan (PL)

№	Topic	Hours
CHAPTER 1. "Cellular and organismal levels of life organization. Basics of human genetics"		
	Content section 1. Molecular-cellular level of life organization.. General cytology and molecular bases of heredity	
1	Levels of living organization. Optical systems in biological research. Types of cellular organization. Cellular theories. Cell morphology. Structural components of cytoplasm and nucleus.	4
2	Cell membranes. Transport of substances through the plasma membrane. Characteristics of nucleic acids. Solving problems.	4
3	Structure of genes of pro- and eukaryotes. Genes are structural, regulatory. Gene expression in a trait. Regulation of gene activity. Morphology of chromosomes. Human karyotype. Life cycle of a cell. Cell division..	4
	Content section 2. Biology of individual development. Biological features of human reproduction. Gametogenesis, fertilization	
4	Biological features of human reproduction. Gametogenesis. Meiosis. Fertilization. Peculiarities of the prenatal period of human development.	4

5	Prerequisites of congenital malformations. Postnatal period of ontogenesis. Final lesson on cytology and biology of individual development	4
	Content section 3. Medical and biological foundations of human genetics. Patterns of heredity and variability.	
6	Peculiarities of human genetics. Manifestations of the main laws of inheritance on the example of Mendelian traits of a person (mono-, di- and polyhybrid crossing) Linked inheritance. Gender genetics	4
7	Interaction of allelic and non-allelic genes. Multiple allelism. Genetics of blood groups. Variability, its forms and manifestations	4
	Content section 4 Methods of studying human heredity. Hereditary diseases	
8	Cytogenetic and twin methods of human genetics. Hereditary diseases. Genealogical method of genetics	4
9	Population-statistical method of genetics. Medical genetic counseling. Biochemical method of genetics. DNA diagnostics. Genetic diseases.	4
10	Practical skills in genetics, problem solving. Final control of cytology, biology of individual development and genetics..	4
CHAPTER 2: "Population-species, biogeocenotic and biosphere level of life organization. Medical and biological basis of parasitism"		
	Content section 5. Medico-biological bases of parasitism. Medical protoparasitology	
11	Sarcoflagellate type. Class True amoebae. Dysentery and other types of amoeba. Ciliated type. Balantidius. Class Animal flagellates. Leishmania, trypanosomes, giardia, trichomonads.	4
12	Type Apicomplexna. Class Sporovyka. Malarial plasmodia. Toxoplasma. Final lesson on protozoology.	4
	Content section 6. Medical helminthology	
13	Medical helminthology. Type Flatworms. Sisuna class. Hepatic, cat, lanceolate, Chinese, lung sisuna, metagonim and schistosomes.	4
14	Class Tapeworms. Beef, pork shank, broad shank. Class Tapeworms. Dwarf hookworm, echinococcus, alveococcus. 4	4
15	Type Roundworms. Class Properly round worms. Ascaris, pinworm, hairy head. Type Round worms. Hookworm, ringworm, trichinella and filaria. Methods of laboratory diagnosis of helminthiasis. Practical skills and abilities: identification of parasite preparations. 4	4
	Content section 7. Medical arachnoentomology	

16	Type Arthropoda. Class Arachnida. Pincers. Class of Insects. Lice, Fleas, Bedbugs, Cockroaches.	4
17	Class of Insects. Diptera: flies, mosquitoes, mosquitoes Final lesson from the section: "Medical Parasitology". Test control.	4
	Content section 8. Relationship between individual and historical development. Biosphere and man.	
18	Phylogeny of organ systems.	4
19	Final control of knowledge of the discipline.	4
Total		76

Independent work topics (IW)

№	Topic	Hours
1.	Organization for matter and energy flow in the cell.	4
2.	Molecular basics of heredity. Gene structure of eukaryotes	4
3.	The life of cells outside the organism. Cell cloning.	4
4.	Aging as the final stage of ontogenesis. The concept of biofields, biological rhythms and their medical significance.	2
5.	Mendelian features of a person	4
6.	Genetics of blood groups	4
7.	Genetic maps. Methods of human chromosome mapping.	4
8.	Methods of human genetics: dermatoglyphics, immunologic, somatic cells hybridization.	4
9.	Preparation for test control in cytology and biology of individual development	4
10.	Methods of laboratory diagnosis of diseases caused by protozoa parasites.	4
11.	Blood flukes – the causative agents of parasitic diseases of human. Agents of metagonimosis and nanophoetosis.	2
12.	Laboratory diagnosis of invasive diseases caused by parasitic worms.	4
13.	Ticks and mites of human home or apartment and their medical importance.	4
14.	Midges and it components: characteristic, importance as the intermediate hosts of helminthes and vectors of human infections.	2
15.	Synthetic theory of evolution. The population structure of mankind. Human ecology	4
16.	Preparation for test control from the section "Population-species, biogeocenotic and biospheric levels of life organization"	2

	Total 56
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The topics of the lecture course in the 1st year reveal the problematic issues of the relevant sections of "MEDICAL BIOLOGY".

Laboratory classes: not provided

The applicant's independent work involves preparation for practical classes and final class, mastering topics for independent work, preparation of abstract reports, presentations, tables. Control of mastering the topics of practical classes and independent work is carried out in practical classes and the final class and exam in the discipline.

Individual work includes researching scientific literature, preparing reviews on the given topics for presentation, performing scientific and practical research, participation in specialized Olympiads, scientific and practical conferences, competitions, scientific works.

Methodical recommendations for practical classes, independent work, lecture materials are available on the website of the department.

The way to get materials: EMU site/Student/Department of fundamental disciplines/Educational and methodological support of the department/"MEDICAL BIOLOGY"/ or follow the link Department of fundamental disciplines/Discipline "MEDICAL BIOLOGY". Materials are accessed from the student's Office 365-based corporate account.

5. Forms and methods of monitoring learning success

Current control in practical classes	Methods: individual oral survey, structured written works, test tasks with the choice of correct answers.
Control of mastering the thematic section of the discipline in intermediate control classes	Methods: oral or written survey, electronic testing, <i>methods of self-control and self-assessment</i> .
Final semester control	According to the regulation on control measures in EMU (<u>regulation of EMU</u>)
Final control of the discipline - <i>exam</i>	Methods: by exam cards in the form of an oral exam, monitoring of acquiring of practical skills (According to the Regulation on control measures in EMU (<u>Regulation of EMU</u>)).
Tools for diagnosing learning success	Theoretical questions, tests, clinically oriented situational tasks, practical tasks, demonstration of practical skills.

6. Evaluation criteria

Knowledge assessment is carried out according to regulation on control measures in EMU (regulation of EMU).

Current control	According to the four-point system of traditional grades: 5 "Excellent", 4 "Good", 3 "Satisfactory", 2 "Unsatisfactory"
Control of practical skills	According to the four-point system of traditional grades

Exam	Based on a 200-point scale (the sum of points for the current academic activity of the student, the result of passing the exam and for successful completion of an individual task, if any) Credited: 120 to 200 points Not credited: less than 120 points (see Rating scale)
Final control for the discipline	The final control of students' academic performance is carried out after completing the study of the discipline and is implemented in the form of an exam.
Discipline assessment:	The score on the discipline is determined based on the results of assessment of current activities and is expressed using a four point scale : ("Excellent", "Good", "Satisfactory", "Unsatisfactory"), multi-point scale and ECTS. The assessment in the discipline consists of an assessment of the current academic performance and the result of passing the exam (in points), which is set when evaluating theoretical knowledge and practical skills in accordance with the list defined by the discipline program. The number of points that the applicant scored for current academic performance in the discipline is defined as the arithmetic mean of the number of points that the applicant received during the study of the discipline (practical, seminar, laboratory classes, etc.). The resulting value of the average traditional rating is converted to points according to the scale of conversion of traditional ratings to rating points. The maximum number of points is 200.

Matching grades on a 200-point scale, a 4-point (traditional) scale, and ECTS scale

By 200-point scale	Rating on a 4-point scale	By 200-point scale	ECTS evaluation
180–200	«5» Excellent	192–200	A
140–179	«4» Good	172–191	B
120–139	«3» Satisfactory	148–171	C
0–119	«2» Unsatisfactory	128–147	D
		120–127	E
		0–119	F

Discipline/course policy

The student has the right to receive high-quality educational services, access to up-to-date scientific and educational information, qualified advice during the study of the discipline and mastering practical skills. The policy of the department in the provision of Educational Services is student-centered, based on the regulatory documents of the Ministry of Education and the Ministry of Health of Ukraine, the Charter of the EMU and the procedure for providing educational services regulated by the regulation on the organization of the educational process in the EMU and the principles of academic integrity.

Compliance with the EMU schedule, safety precautions in the classroom.

Requirements for preparing for practical classes.

Students should arrive at classes on time, without being late. A student who is more than 10 minutes late for classes is not allowed in and must work it out in accordance with the established procedure. During practical classes, the student must wear a work uniform (medical gown, cap). Students who do not have a work uniform are not allowed to attend classes. The student must follow the safety rules during practical classes and while staying in the Department's premises. When discussing theoretical issues, students should demonstrate tolerance, politeness and respect for their colleagues and the teacher; when performing practical tasks, the workplace should be kept in order and cleaned after completing practical work.

Use of mobile phones and other electronic devices. The use of mobile phones and other electronic devices in the classroom is not allowed, only during Distance Learning, provided that it is technically necessary.

Academic integrity. When studying the discipline, the student should be guided by the following regulations: on academic integrity of EMU (regulation of EMU). In case of violation of the regulations of academic integrity during the current and final controls, the student receives a grade of "2" and must work it out to the teacher in accordance with the established procedure.

Regulation on control measures in EMU (Regulation of EMU).

Skippping classes. Missed classes should be worked out in accordance with the procedure established in the regulations on control measures in the EMU (regulation of EMU) during the time determined by the work schedule (Department of fundamental disciplines) to the teacher on duty. To work out a missed lesson the student must pass a test and answer in writing or verbally the question on the topic of the lesson.

Procedure for admission to the final control in the discipline is given in the regulations on control measures and regulations on the organization of the educational process in the EMU (regulation of EMU) and regulations on control measures in the TNM DMI (regulation of EMU). Students who do not have missed not worked out practical classes and lectures and have received an average traditional grade of at least "3" are allowed to participate in the final control.

Additional individual points. Points are awarded subject to the mandatory participation of the head, head teacher and teacher. These points are encouraging and are added once to the total score of the current academic performance and the result of passing the comprehensive exam. Their total number for one student should not exceed 10, and the final amount of points for an academic discipline should not exceed 200 points.

Individual tasks include:

- 1) writing essays and creating multimedia presentations with reports at meetings of the student scientific group of the department – 3 points;
- 2) participation in the creation of tables, graphological structure, posters on the topics of practical classes – 2 points;
- 3) participation in the student competition in the discipline at the First Stage – 1 point;
- 4) participation/prize-winner of the All-Ukrainian student competition in the discipline - 7/10 points;
- 5) author or co-author of abstracts/article – 2/5 points;
- 6) author or co-author of an oral/information stand report at a scientific conference – 6/3 points;
- 7) author of a student scientific paper accepted for participation or awarded by a diploma of I-III degree in the All – Ukrainian competition of student scientific papers at Stage II - 8 (participation) or 10 (diploma) points.

Resolving conflict issues. If there are misunderstandings and complaints against the teacher due to quality of educational services provided, knowledge assessment, and other conflict situations, the student must first report his/her claims to the teacher. If the conflict issue is not resolved, the student has the right to submit an appeal to the head of the department in accordance with the regulations on consideration of applications from applicants for higher education in EMU (regulation of EMU), Regulations on consideration of applications, complaints, and proposals of students in EMU (regulation of EMU), Regulations on meeting the requirements of the organization of the educational process (regulation of EMU), Regulation on the appeal of the results of the final control of knowledge of applicants for higher education in EMU (regulation of EMU), Regulations on safe educational environment in EMU (regulation of EMU).

Policy in the context of distance learning. The procedure for distance learning is regulated by regulation of EMU. The main training platforms for conducting training sessions are Microsoft Teams, Zoom. The procedure for conducting practical classes and lectures, working out and consultations during Distance Learning is published on the Department's Web page Department of fundamental disciplines .

Feedback from the teacher is provided directly during the lesson and/or consultation, and is also possible via email (in case of force majeure) during working hours.

Training resources

Educational and methodological support of the discipline is published on the website of the Department (Department of fundamental disciplines). Consultations are held according to the consultation schedule.

1. **Schedule and distribution of groups by teacher** are published on the Department's Web page (Department of fundamental disciplines).
2. **Questions for intermediate and final control of the discipline** are published on the Department's Web page (Department of fundamental disciplines).

Literature

Basic

1. Medical Biology:textbook / T.V.Bihunyak. – Ternopil:TSMU, 2018.-214p.
2. Medical biology. Book-protocols for practical lessons // V.I. Garets, N.O.Markhon, V.F.Shatorna. – Dnepropetrovsk, Litograf – 2018, 126 p.
3. Medical Biology / Bazhora Yu.I., Bulyk R.Ye., Chesnokova M.M. et al. Medical Biology: textbook. Vinnytsia: Nova Knyha, 2018. 448 p.
4. Test Items for Licensing Examination: “Krok-1 General Medical Training: Medical Biology” (for medical students) / Compiler O. Yu. Smirnov. – Sumy: Electronic Edition, 2012.

Additional Literature

- Biology / Raven Johnson, 2003.
- The acts On File Dictionary of Biology / edited by Robert Hine, 2005
- Cell Biology / Thomas D. Pollard, William C. Earnshaw, Jennifer Lippincott-Schwartz, Graham T.Johnson, 2017.
- Medical Genetics / Lynn B. Jorde, John C. Carey, Michael J. Bamshad, 2016.
- Atlas of Medical Helminthology and Protozoology / Peter L. Chiodnin, Anthony H. Moody, David W. Manser. 2001.
- Color Atlas of Parasitology.
- Paniker’s Textbook of Medical Parasitology / CK Jayaram Paniker, Sougata Ghosh, 2018.