

SYLLABUS

INTERNATIONAL EUROPEAN
UNIVERSITY



SCHOOL OF
MEDICINE

MEDICAL BIOLOGY

2023



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Discipline			
		Medical Biology	
Teacher(s)			
		Associate Professor of the Department of Fundamental and Medical and Preventive Disciplines Mykhailiuk Mykhailo Mykhailovych; Lecturer Pavlenko R.O.	
Profile of the teacher(s)			
		https://medicine.ieu.edu.ua/pro-yemsh/kafedry/kafedra-fundamentalnykh-dystsyplin	
Consultations			
Face-to-face consultations		Every Thursday from 14:00 to 15:00	
Online consultations		Every Thursday from 14:00 to 15:00	
Contact phone number			
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Discipline page			
		https://student.ieu.edu.ua/school-of-medicine/department-of-medicine-profilact-disciplines/	
Form of final control			
	Test	Differentiated test	Exam
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1 Brief annotation of the discipline

"Medical Biology lays the foundation for the formation of further program learning outcomes in accordance with the Standard of Higher Education of Ukraine for undergraduate training of specialists of the second (master's) level of the specialty "Medicine".

2 Prerequisite for studying the discipline

The discipline is based on such subjects as General Biology, Human Biology, Animal Biology, and Plant Biology previously studied by students in secondary school. "Medical Biology" lays the foundation for further mastery of knowledge and skills in specialized theoretical and clinical professional and practical disciplines (biological and bioorganic chemistry, histology, cytology and embryology, physiology, microbiology, medical genetics, clinical immunology, infectious diseases, epidemiology, pediatrics, etc.)

3 Purpose and objectives of the discipline

The purpose of the discipline "Medical Biology" follows from the goals of the educational and professional program of training graduates of higher education institutions and is determined by the content of the systemic knowledge and skills that a doctor must master. The knowledge that students receive in the discipline is basic for the block of disciplines that provide natural science (block NS) and professional and professional-practical (block PP) training.

Objectives:

- to form in students a holistic view of the general patterns of development of wildlife, the essence of life, its forms, individual and historical development of the organic world and the place of man in it, forms of biotic relationships in nature, life cycles of parasites and human parasitic diseases, the place of man in the biosphere;
- to provide fundamental biological training and acquisition of practical skills for the subsequent professional activity of a general practitioner.

4 Learning Outcomes

PLO 1	Have a thorough knowledge of the structure of professional activity. Be able to carry out professional activities that require updating and integration of knowledge. Be responsible for professional development, the ability to further professional training with a high level of autonomy
PLO 2	Understanding and knowledge of basic and clinical biomedical sciences, at a level sufficient to solve professional problems 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 thinking of problems in the field of medicine and related interdisciplinary issues.
PLO 21	Find necessary information in professional literature and databases of other sources, analyze, evaluate and apply this information.
PLO 23	Evaluate the impact of the environment on human health to assess the state of morbidity of the population.



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ECTS Credits

The discipline takes 150 hours to study (16 hours of lectures, 64 hours of practical classes, 70 hours of SRS), 5 ECTS credits. The discipline is studied in the first semester.

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Structure of the discipline

SECTION I. Molecular and cytological bases of human life

Contents Section 1. Molecular and cellular level of life organization

Topic Name	Number of hours			
	total	Including		
		l.	pr.	ind.
Topic 1: Introduction to the course of medical biology. Optical systems in biological research. Levels of organization of living things	5	1	2	1
Topic 2. Cell morphology. Structural components of the nucleus and cytoplasm	5	1	2	2
Topic 3. Cell membranes. Transport of substances through the plasma membrane	3	-	2	1
Topic 4. The nucleus. Morphology of chromosomes. Human karyotype	4	-	2	2
Topic 5. Molecular basis of heredity. Characterization of nucleic acids.	4	-	2	2
Topic 6. Gene structure of pro- and eukaryotes	5	-	2	3
Topic 7. Organization of information flow in the cell. Regulation of gene expression. Molecular mechanisms of variability Male gender. Exceptions to the genus.	4	-	2	2
Topic 8: Life cycle and cell division. Mitosis. Meiosis Masculine gender. Exceptions to the genus.	5	-	2	3

SECTION II. Organizational level of life organization. Fundamentals of human genetics

Content section 2. Patterns of heredity and variability

Topic 9: Features of human genetics. Mono-, di- and poly-hybrid crossing. Mendelian human traits	4	-	2	2
Topic 10. Interaction of allelic and non-allelic genes. Pleiotropy. Multiple allelism. Genetics of blood groups	5	1	2	2
Topic 11: Chromosomal theory of heredity. The linked inheritance. Genetics of the article.	4	-	2	2



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Structure of the discipline

SECTION II. Organizational level of life organization. Fundamentals of human genetics

Content section 2. Patterns of heredity and variability

Topic Name	Number of hours			
	total	Including		
		l.	pr.	ind.
Topic 12: Human variability as a property of life and a genetic phenomenon	5	1	2	2

Content section 3. Methods of studying human heredity. Hereditary diseases

Topic 13: Fundamentals of medical genetics. Methods of studying human heredity. Hereditary diseases of humans	5	1	2	2
Topic 14: Cytogenetic method. Human chromosomal diseases	5	1	2	2
Topic 15: Biochemical method and DNA diagnostics.	4	-	2	2
Topic 16: Population and statistical method. Medical genetic counseling.	4	-	2	2

Content section 4. Biology of individual development

Topic 17: Biological features of human reproduction. Gametogenesis. Fertilization	4	-	2	2
Topic 18: Molecular genetic mechanisms of ontogenesis. Features of the prenatal period of human development. Disorders of ontogeny and their place in human pathology	5	1	2	2
Topic 19: Postnatal period of human ontogeny.	5	-	2	3
Topic 20: Biological mechanisms of maintaining homeostasis in the body. Final lesson on sections 1, 2	6	1	2	3

SECTION II. Organizational level of life organization. Fundamentals of human genetics

Content section 2. Patterns of heredity and variability

Topic 21: Medical and biological bases of parasitism. Medical protozoology. Under the kingdom of Protozoa. Type Sarcodigesta. Class True amoebae. Type Ciliate. Representatives of the class Slit-mouth - human parasites	5	1	2	2
Topic 22. Representatives of the class Animal flagellates - human parasites. Type Apicomplexa. Representatives of the class Sporozoa - human parasites	5	1	2	2



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Structure of the discipline

Content section 6. Medical helminthology

Topic Name	Number of hours			
	total	Including		
		l.	pr.	ind.
Topic 23. Medical helminthology. Medical helminthology. Flat and roundworms - human parasites Type Flatworms. Class Flukes - human pathogens	6	2	2	2
Topic 24. Type Flatworms. Class Tapeworms - pathogens of human diseases (1 part)	4	-	2	2
Topic 25: Type Flatworms. Class Tapeworms - pathogens of human diseases (part 2)	4	-	2	2
Topic 26: Type Roundworms. Class Actually roundworms - pathogens of human diseases (1 part)	4	-	2	2
Topic 27. Type Roundworms. Class Actually roundworms - causative agents of human diseases (2 part). Methods of laboratory diagnosis of helminthiasis	4	-	2	2

Content section 7. Medical arachnoentomology

Topic 28. Medical arachnoentomology. Arthropods - pathogens and vectors of infections and invasions. Type Arthropoda. Class Arachnida. Ticks are pathogens and vectors of human diseases. Poisonous arachnids	6	2	2	2
Topic 29: Class Insects. Cockroaches. Diptera - pathogens and vectors of human diseases	5	-	2	3
Topic 30. Class Insects: lice, fleas, bedbugs - pathogens and vectors of human diseases	5	-	2	3

Content module 8: The relationship between individual and historical development. Biosphere and man

Topic 31. Synthetic theory of evolution. Features of the action of evolutionary factors in human populations. Population structure of mankind. The origin of man.	6	1	2	3
Topic 32. Biosphere as a system of ensuring human existence. Human ecology. The final lesson from section 3 "Population species, biogeocenotic and biosphere levels of life organization"	6	1	2	3
Total hours	150	16	64	70



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List of mandatory tasks

1. Organization of substance and energy flows in the cell
2. Life of cells outside the body. Cloning of cells
3. Genetic maps. Methods of mapping human chromosomes. The current state of human genome research
4. Genetic hazards of environmental pollution. The concept of commutagens and antimutagens
5. Genetic engineering. Biotechnology. The concept of gene therapy
6. Methods of human genetics: dermatoglyphic, immunological, somatic cell hybridization
7. Old age as the final stage of human ontogeny. Theories of aging
8. The concept of biofields, biological rhythms and their medical significance
9. Methods of laboratory diagnosis of diseases caused by parasitic protozoa
10. Flukes - human parasites. Pathogens of metagonimosis and nanofatiacosis
11. Ticks - inhabitants of human dwellings and their medical significance
12. Phylogeny of the main vertebrate systems
13. Population structure of humanity
14. Vernadsky's doctrine of the noosphere
15. Human penetration into biogeocenoses, formation of anthropocenoses

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Selective tasks

1. Create multimedia presentations on the topics of practical classes
2. Creating biological crosswords on the topics of practical classes
3. Making tables
4. Participation in the work of the student scientific club
5. Participation in the student olympiad in the discipline
6. Participation in student scientific and practical conferences
7. Organization and visiting of thematic museums
8. Publication of abstracts of scientific conference reports in co-authorship with a teacher

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Signs of discipline

Term of Teaching	Semester	International disciplinary integration	Course (year of study)	Cycles: general training/ vocational training/ free choice
1 semester	I	Yes	1st	General training

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Grading System and Requirements

The current performance of students is assessed on a 4-point scale (2; 3; 4; 5) at each practical lesson, taking into account the approved evaluation criteria for the relevant discipline.

The student must receive a grade for each topic for further conversion of grades into points on a multi-point (200-point) scale. Criteria for assessing current academic performance:

Excellent ("5") - the student answered 90-100% of the questions correctly. Solves situational problems of increased complexity, is able to summarize the material.

Good ("4") - the student answered 70-89% of the questions correctly. Possesses the necessary practical skills and techniques for their implementation in excess of the required minimum.

Satisfactory ("3") - the student answered 50-69% of the questions correctly. Has only the required minimum of research methods.

Unsatisfactory ("2") - the student answered 50% of the questions correctly. When answering and demonstrating practical skills, he/she makes significant, gross mistakes.

Evaluation of students' independent work in preparation for classroom practical classes is carried out during the current control of the topic at the relevant classroom.

The final control of knowledge in the discipline "Medical Biology" is carried out in the form of an exam.



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The exam in the discipline is conducted in the form of an oral survey according to questions compiled in accordance with the material covered.

QR Code: <https://ieu.edu.ua/docs/rate-of-study.pdf>

11 Conditions of admission to the final control

Students who have completed all types of work, tasks provided for in the curriculum for the semester in accordance with the discipline, attended all classes provided for in the curriculum, written and submitted a medical history and have an average score for current academic activities of at least "3" (72 points on a 120-point scale) are allowed to take part in the semester final control.

<https://ieu.edu.ua/docs/rate-of-study.pdf>

12 Discipline Policy

Basic principles of the classes:

- openness to new and extraordinary ideas, tolerance, friendly partnership atmosphere of mutual understanding and creative development;
- all tasks provided by the program must be completed on time;
- to achieve the learning objectives and successful completion of the course, it is necessary to actively engage in work from the first day, systematically attend lectures and practical classes, prepare and learn protocols for practical classes;
- not to be late for classes, to come to classes dressed in a medical gown, to be in the classroom without outerwear and headgear (if necessary, it is allowed to wear a medical hat to cover your head);
- it is forbidden to come to class with a strong tobacco odor. If a student smokes, the smell must be eliminated and a protective medical mask must be worn throughout the class.

13 Policy for missing classes and completing assignments after the deadline

The student must complete all the necessary tasks in the classroom and work daily on self-improvement, be able to work in a team in a mini-group, ask for help and get it when you need it. Different models of work in the classroom, including work on solving problems, allow you to unleash your own potential, learn to trust your partners, and develop intellectual teamwork skills. The course involves the intensive use of mobile learning technologies and information exchange in joint groups of mobile messengers, which allows students and the teacher to communicate with each other at any time convenient for them, and for students who are absent from classes to receive the necessary educational information and present completed assignments.

On the other hand, students should exclude the possibility of using a mobile phone during tests and homework checks, a tablet or other mobile devices, not to resort to cheating and plagiarism, to observe the cooperation and solidarity of the teacher and students, to ask the teacher for help in organizing and consulting on scientific, search and research work, and to participate in scientific circles;

Throughout the course, students' autonomous skills are actively developed, as they can prepare additional information on a topic that is not included in the list of topics for practical classes of content modules and make an additional presentation or information.

The teacher, in turn, must ensure the full implementation of the curriculum, not be late for lectures and practical classes, and objectively assess students' knowledge and practical skills. It is important to prevent any manifestations of corruption, to pay special attention to students in practical classes when working with equipment.

14 Academic Integrity Policy

Participants in the educational process are guided by the principles of academic integrity



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<https://ieu.edu.ua/docs/011.pdf>

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Recommended sources of information

Main literature:

1. Medical Biology: Textbook / Edited by V.P. Pishak, Y.I. Bazhora. Textbook / Edition 4, revised and supplemented. - Vinnytsia: New Book, 2021. 608 pp.
2. Medical biology: a textbook for students of medical institutions of higher and professional higher education / R.O. Sabadyshyn, S.E. Bukhalska. 3rd edition, amended and supplemented - Vinnytsia: New Book, 2020. -344 p.: ill.

Additional literature:

1. Medical Biology, Bazhora Yu. I., Bulyk R. Ye., chesnokova M. M., Shevelenkova A. V., Smetyuk O. O., Lomakina Yu: Nova Knyha, - 2019.
2. Pishak V.P., Zakharchuk O.I. Medical biology, parasitology and genetics. Workshop. 2nd ed. -Chernivtsi:, 2012. - 632 p.; ill.
3. Medical biology. Pishaka VP, Bazhora YI, Vinnytsia: Nova Knyha, - 2017.
4. Medical parasitology. Atlas / Edited by Y. I. Bazhora - Odesa: OGMU, 2001. - 110 p.
5. Bochkov N.V., Puzyrev V.P., Smirnikhina S.A. Clinical genetics / Textbook edited by academician N.P. Bochkov.-4th ed. - Moscow: GEOTAR-Media, 2011. - 592 p.
6. Collection of tasks for preparation for the licensing test exam in natural sciences "Step 1. General medical training" / Collective of authors; Edited by Prof. V. F. Moskalenko, Prof. O. P. Volosovets, Prof. I. E. Bulakh, Prof. O. P. Yavorsky, Prof. O. V. Romanenko, Associate Professor L. I. Ostapiuk - K.: Medicine, 2004. 368 p.; P. 9-41.
7. Kovalchuk LE, Teliuk PM, Shutak VI Human parasitology: Study guide. - Ivano-Frankivsk: Lileia, 2004. 26
8. Medical biology: Manual for practical training / O.V. Romanenko, M.G. Kravchuk et al. Edited by O.V. Romanenko - K.: Zdorovyie, 2005. 372 p. Illus.
9. Pavlichenko V.I., Pishak V.P., Bulyk R.E. Fundamentals of molecular biology: Study guide. - Chernivtsi: Medical University, 2012. 388 p.; illus.
10. Pishak VP, Zakharchuk OI Medical biology, parasitology and genetics. Workshop. Edition 2 - Chernivtsi:, 2012. - 632 p.; ill.
11. Saliak N.O. Workshop on medical biology: a textbook - 3rd edition, revised and supplemented - K.: VSV "Medicine", 2017. 296 p.
12. Slyusarev A.O. Biology / A.O. Slyusarev, S.V. Zhukova - K.: Vysha Shkola, 1992. - 461 p.
13. Taylor D., Green N., Stout W. Biology. In 3 volumes. - M.: Mir, 2002. - 1340 p.
14. Scientific Bulletin of the Institute of Molecular Biology and Genetics: <https://www.imbg.org.ua/uk/journals/>.
15. Scientific Bulletin of the Ukrainian Society of Geneticists and Breeders: <http://utgis.org.ua/index.php/ua/publ-ua/visnyk-ua>

Additional information resources:

1. Ministry of Education and Science of Ukraine <http://www.mon.gov.ua/>
2. Ministry of Ecology and Natural Resources of Ukraine <http://www.menr.gov.ua/>
3. State Emergency Service of Ukraine <http://www.dsns.gov.ua/>
4. Testing Center - database of license test tasks "Krok" - 1 <http://testcentr.org.ua/>
5. Testing Center at the Ministry of Health of Ukraine <https://www.testcentr.org.ua/uk/> Genetic Disorders <http://omim.org/>

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Tips for successful studying on the course

If you want to be successful in this discipline, you need to:

1. Be active, persistent, inquisitive, consistent



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2. Be neat and polite
 2. Systematically prepare for practical classes
 3. Attend lectures and take notes
 4. Perform tasks for independent work and defend them in class.
 5. Handle the equipment of the department, including microscopes, with care.
 6. To be present in the classroom in a medical coat.
 7. To solve tests and tasks independently, to work actively in class.
 8. Keep a sketchbook and sketch macro- and microdrugs.
 9. Visit the Krok Center website and focus on medical biology questions.
 10. Prepare presentations and crossword puzzles in the discipline.
 11. Participate in student scientific conferences.
 12. Engage in research work in research circles of the department.