

National Pirogov Memorial Medical University, Vinnytsya

“APPROVE ”

Vice Rector for Academic Affairs

Prof. Y.I. Guminskiy

“ 28 ” *септ* 20 20 year

“ AGREED ”

Head of medical biology department

Sen.res. V.M. Shkarupa

“ 27 ” *септ* 20 20 year

SYLLABUS

of academic discipline

«MODERN PROBLEMS OF MOLECULAR BIOLOGY»

Specialty	222 Medicine
Educational level	the second (master's) level
Educational programme	EPP Medicine, 2020
Academic year	2020-2021
Department	Medical biology
Lecturer (if lectures are given)	Sen. ass., PhD. Polesya T.L.
Contact information	<i>medbiology@vnmue.edu.ua,</i> <i>str.Stusa 2 ,</i>
Syllabus compiler	Sen.res. PhD. Shkarupa V.M., Sen. ass., PhD. Polesya T.L.

1. Status and structure of the discipline

Discipline status	Elective course
Discipline code in EPP/discipline place in EPP	EC49, discipline of general training
Course / semester	2nd year (IV semesters)
The amount of discipline (the total number of hours / number of credits ECTS)	30 hours / 1 credit ECTS
The structure of the discipline	Lectures - 10 hours Practical classes - 12 hours Independent work - 8 hours In general : Lecture classes – 73%, independent classwork - 27%
Number of content modules	3
Language of study	English
Form of study	Full-time (when implementing quarantine measures - remote <i>full-time by order</i>)

2. Description of the discipline

Short annotation of the course, relevance.

The subject discipline is the biological basis of human activity at the molecular genetic level. The discipline "Modern problems of molecular biology", are basic for a block of disciplines that provide natural, scientific and professional training of graduates of higher medical educational institutions and are determined by the content of those systemic theoretical knowledge, practical skills and skills that a specialist doctor should master.

Prerequisites. The discipline "Medical Biology" is based on the knowledge of students obtained on the basis of the State standard of basic and complete general secondary education in such academic subjects as "General Biology", "Human Biology". The purpose of the course and its significance for professional activities.

The purpose of the course and its significance for professional activities. The purpose of teaching the discipline. is the formation of knowledge and practical skills of molecular biology for further assimilation by students of the block of disciplines that provide natural science and professional training.

Postrequisite. The discipline "Modern problems of molecular biology" lays the foundation for students to further assimilate their knowledge of specialized theoretical and clinical professional and practical disciplines: bioorganic chemistry, pharmacology, physiology, medical genetics, clinical immunology, infectious diseases, pediatrics, etc.

3. The results of training

Integrative final program results of training, the formation of which contributes to the academic discipline:

PRH 1. Be able to analyze information, make informed decisions, be able to acquire modern knowledge. Establish appropriate links to achieve goals. Be responsible for the timely acquisition of modern knowledge.

PRH 2. Have specialized conceptual knowledge acquired in the learning process. Be able to solve complex problems and problems that arise in professional activities. Ability to effectively formulate a communication strategy in professional activities; understandable and unambiguous reporting of their own conclusions, knowledge and explanations that justify them to specialists and non-specialists. Responsible for decision-making in difficult conditions of the

PRH 3. Have a thorough knowledge of the structure of professional activity. Be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability to further vocational training with a high level of autonomy.

4. Content and logistic of the discipline

Content Part 1. Molecular basis of heredity	3 semester 16 hours/ 0,53 credit	Lectures №№ 1-3 Practical classes №№ 1-3 Topic for Independent work № 1
Content Part 2. Molecular basis of heredity diseases	3 semester 6 hours / 0,2 credit	Lecture № 4 Practical classes №4 Topic for Independent work №2
Contents part 3. Modern problems of gene technologies	3 semester 8 hours/ 0,27 credit	Lecture № 5 Practical classes №№ 5-6 Topic for Independent work №3

The discipline program "Modern problems of molecular biology" is structured into three content parts

Content Part 1. Molecular basis of heredity

Theme 1. Subject and tasks of molecular biology. Molecular mechanisms of intracellular and intercellular signaling and transmembrane transport.

Theme 2. Proteins and nucleic acids as objects of study of molecular biology. DNA replication and reparation.

Theme 3. Gene expression and its regulation. Epigenetics.

Content Part 2. Molecular basis of heredity diseases

Theme 4. Problems of mutagenesis and molecular mechanisms of hereditary diseases.

Theme 5. Problems of mutagenesis and molecular mechanisms of hereditary diseases.

Theme 6. Regulation of the cell cycle. Apoptosis. Basics of oncogenetics

Contents part 3. Modern problems of gene technologies

Theme 7. Methods of genetic engineering. Investigation of nucleic acids.

Theme 8. Transgenic organisms. Gene therapy. Cloning organisms.

Topics of the lecture course reveal the problematic questions of the relevant sections of molecular biology.

Practical classes provide for theoretical justification of the main questions of the topic and the assimilation of practical skills.

Independent work of the student involves preparation for practical classes and the development of practical skills, the study of topics for independent non-classroom work. Control over the assimilation of topics of independent non-classroom work is carried out at current classes and final control in the discipline.

Thematic plans of lectures, calendar plans of practical classes, thematic plan of independent non-classroom work are published on the website of the department

Route of obtaining materials: Department of Medical Biology / Student / Full-time form of study / Medicine / 2 course / Teaching materials / or by the link <https://www.vnmu.edu.ua/> Department of Medical Biology. Access to the materials is carried out from the student's corporate account s000XXX@vnmu.edu.ua.

5. Forms and methods of monitoring academic performance.

Current control in practical studies	Methods: oral or written survey, testing, electronic survey, solving situational problems, conducting laboratory studies, interpreting them and evaluating their results (drawing up a protocol in a workbook)
Control of mastering the thematic section of the discipline at intermediate control classes	According to the regulations on the organization of the educational process VNMU by Pirogov (link https://www.vnmu.edu.ua/ General information/General documents)
Learning success diagnostic tools	Theoretical questions, tests, clinically-oriented situational tasks, practical tasks, practical skills demonstration

6. Assessment criteria

Knowledge assessment is carried out in accordance with the Regulations of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link <https://www.vnmu.edu.ua/> General information)

Continuous assessment	On a four point system of traditional assessments: 5 «excellent», 4 «good», 3 «satisfactory», 2 «unsatisfactory»
Pass-fail exam (credit)	On a 200-point scale (the arithmetic average grade for the semester is converted into points) Credited: 120 to 200 points Not credited: less than 120 points (See Grading Scale)

Discipline Score Scale: National and ECTS

The sum of grades for all types of educational activities	Score ECTS	Score on a national scale	
		For exam, course project (work), practice	for credit test
180-200	A	excellent	credited
170-179,9	B	good	
160-169,9	C		
141-159,9	D	satisfactory	
122-140,99	E	satisfactory	-
120-140,99	E	-	credited
119-61	FX	unsatisfactory with the possibility of reassembly	is not credited with the possibility of reassembling
1-60	F	unsatisfactory with a mandatory reexamination of discipline	is not credited with mandatory reexamination of discipline

Criteria for student knowledge assessment

Assessment of oral / written response during the current assessment

The grade "excellent" is given to a student who has deeply and comprehensively mastered the theoretical material, competently and logically teaches it. He is fluent in Latin terminology, clearly answers non-standard questions on the topic of the lesson, is able to link the material of the topic with previously studied sections, which indicates knowledge of the recommended literature and the ability

to analyze the material studied, and clearly demonstrates the importance of theoretical knowledge for practical medicine.

The grade "good" is given to a student who knows and has a good theoretical material, teaches it correctly, does not allow inaccuracies in the answer, is able to reveal the topic from the standpoint of its medical significance and practical application, but the answers do not go beyond the textbook, methodical recommendations.

The grade of "satisfactory" is given to a student who knows the basic concepts and definitions of the studied topic, but admits inaccuracies in the formulation of biological patterns, does not know how to transform general biological principles on the human body, does not understand the medical aspects of the theme-task.

The grade "unsatisfactory" is given to a student who does not know the theoretical foundations of the theme, practical work, makes gross mistakes in answering, does not master the medical aspects of the theme, has difficulty performing biological experiments, can not explain the importance of theoretical material for practical medicine.

Assessment of practical skills during the current assessment

The grade "excellent" is given to a student who knows the course and sequence of independent scientific-research to perform practical tasks, independently conducts experimental research, identifies elements of creative thinking, seeks the best options for setting up a biological experiment, learns the necessary practical skills correctly, draws up a protocol with clear formulations of generalizations and conclusions.

The grade of "good" is given to a student who admits inaccuracies in the performance of biological research, but is able to identify errors and can demonstrate the implementation of practical skills in general, carefully draws up research results in the protocol of the practical lesson.

The grade of "satisfactory" is given to a student who knows the basics of the practical task, but has difficulty at performing biological research, can not demonstrate the correct sequence of practical skills, can not fully interpret the results of research, sloppy protocol.

The grade "unsatisfactory" is given to a student who cannot demonstrate the performance of practical skills, experiences significant difficulties in performing biological research, violates the procedure for performing practical work, does not register the progress of work in the protocol.

Evaluation of testing during the current assessment

The grade "excellent" is given to the student who at carrying out test control is allowed no more than 5% of incorrect answers (volume of correct answers 95-100%). Provides correct answers to all test questions when solving situational problems.

A grade of "good" is given to a student who makes no more than 20% of mistakes during the test. (volume of correct answers 80-94%). Provides correct answers to 80% of problems when solving situational problems.

The grade "satisfactory" is given to a student who makes mistakes in no more than 35% of test tasks (the amount of correct answers is 65-79%). Solves 60% of situational problems.

A grade of "unsatisfactory" is given to a student who correctly solves less than 65% of the test tasks in a test survey. Solves less than 60% of practical situational problems.

Assessment of intermediate control (credit)

Intermediate control is credited if the student has mastered a first module of the discipline in full, as evidenced by the current assessment of each practical lesson, and attended a lecture course. To assess the intermediate control, the calculation of the arithmetic average mark of the traditional assessment for the semester is performed.

Assessment of independent work of student

The student's independent work is assessed during the current control of the topic in the relevant practical lesson or during the final lessons of mastering the modules of the discipline by oral questioning or solving test tasks on topics that are not included in the plan. Assessment of prepared messages, presentations on the selected topic is carried out by traditional evaluation.

The grade "**excellent**" is given to a student who has deeply and comprehensively revealed the problem, logically set out the main questions, gave examples from modern medical information sources. He is able to connect the material of this theme with previously studied sections, which indicates the ability to analyze the studied material, as well as clearly demonstrates the importance of the acquired theoretical knowledge for practical medicine.

The grade of "**good**" is given to a student who knows and commands well of theoretical material, competently reveals the main questions of the theme and its medical significance, but does not go beyond the textbook, methodical recommendations.

The grade of "**satisfactory**" is given to a student who revealed the basic concepts and definitions of the recommended theme, but did not fully disclose it, does not understand the medical aspects of the theme, can not relate theoretical material to practice.

Evaluation of the final control (test)

The final control is taken if the student has learned the content sections of the discipline in full, as evidenced by the current assessment of each practical training, and attended a lecture course. To evaluate the final control, the average arithmetic traditional assessment for the semester is calculated.

7. Policy of discipline / course

The student has the right to receive high-quality educational services, access to contemporary scientific and educational information, qualified tutoring during the study of discipline and mastering practical skills. The policy of the department during the providing of educational services is a student-centered, based on normative documents of the Ministry of Education and the Ministry of Health of Ukraine, the Statute of the University and the Procedure for the Providing of Educational Services regulated by the main principles of the organization of the educational process in National Pirogov Memorial Medical University, Vinnytsya and the principles of academic integrity (link https://www.vnmu.edu.ua/General_information).

Adherence to the rules of VNMU, safety techniques in practical classes.

Instruction on safety is conducted at the first practical lesson by the teacher. A student who has not been instructed is not allowed to perform practical work.

Requirements for preparation for practical classes.

The student should be prepared for a practical lesson, test tasks for the current topic should be solved in a workbook, diagrams and tables are filled. A student should come to class on time, without delay. A student who is more than 10 minutes late is not allowed to the practical class and must work it in the prescribed manner. In practical classes, the student must be dressed in a work uniform (medical gown, hat). Students who do not have a work uniform are not allowed to practice. The student must follow the rules of safety in practical rooms and at the department. When discussing theoretical questions, students should demonstrate tolerance, courtesy and respect for their colleagues and the teacher; when performing practical tasks, the workplace should be kept in order and be cleaned after performing practical work.

Use of mobile phones and other electronic devices. The use of mobile phones and other electronic devices in the classroom is allowed only during electronic testing or surveys.

Academic integrity. When studying the discipline, the student must be guided by the Code of Academic Integrity and Corporate Ethics of National Pirogov Memorial Medical University, Vinnytsya (link: https://www.vnmu.edu.ua/General_information) / Code of Academic Integrity). In case of violation of the norms of academic integrity during the current and final controls student receives a grade of "2" and must rework it to his teacher in the prescribed manner within two weeks after receiving an unsatisfactory assessment).

Missed classes. Missed classes are working out in the manner prescribed by Regulations of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link https://www.vnmu.edu.ua/General_information) at the time of work out schedule (published on the

website of the department <https://www.vnmu.edu.ua/ Department of Medical biology>) to the teacher on duty. To work out missed lesson student must provide a completed workbook protocol on the relevant theme, take a test and answer questions in writing or orally to the theme of the lesson. The reworking of missed lectures is carried out after providing a thesis of lecture material, or writing an abstract, or preparing own presentation on the theme of missed lecture.

The procedure for admission to the discipline final control is given in the Regulation of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link <https://www.vnmu.edu.ua/General information>). Students who do not have missed practical classes and lectures and received an average traditional grade of at least "3" are allowed to final control.

Additional points. Individual points in the discipline that student can receive for individual work, is determined by the results of his individual work according to Regulation of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link <https://www.vnmu.edu.ua/General information>) and policy of the course.

Conflict resolution. In case of misunderstandings and complaints to the teacher because of the quality of educational services, knowledge assessment and other conflict situations, student should submit his / her claims to the teacher. If the issue is not resolved, the student has a right to apply to the head of the department according to Complaints Consideration Procedure (<https://www.vnmu.edu.ua/ General information / Basic documents>).

Politics in terms of remote learning. Distance learning regulated by the Regulations of the elements of remote learning in National Pirogov Memorial Medical University, Vinnytsya (<https://www.vnmu.edu.ua/ General information>). The main training platforms for studying are Microsoft Team and Google Meets. Practical classes and lectures, exercises and consultations during distance learning is published on the website of the department (<https://www.vnmu.edu.ua/ Department of Microbiology / Student> or <https://www.vnmu.edu.ua/ Department of Microbiology / News>).

Feedback from teachers is via messengers (Viber, Telegram, WhatsApp) or e-mail (at the teacher's choice) during working hours.

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8. Educational resources Educational-methodological support of the discipline is published on the website of the department. Route of receiving materials <https://www.vnmu.edu.ua/ Department of Medical Biology / Student>.

Educational resources:

1. Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Scott, M. P., Bretscher, A., ... & Matsudaira, P. (2016). Molecular cell biology.
2. Molecular biology / David P. Clark, Nanette J. Pazdernik, Michelle R. McGehee Series: Academic Cell Publisher: Academic Press, Year: 2019
3. Medical Biology / Ed. V.P. Pishak, Yu.I. Bazhora. Textbook / 3rd Edition, revised and supplemented. - Vinnytsia: New book, 2017. - 608p.

Recommended reading:

1. Chandar, N., & Viselli, S. (2018). Cell and molecular biology. Lippincott Williams & Wilkins.
2. Epstein R.J. Human Molecular Biology: An Introduction to the Molecular Basis of Health and Disease. Cambridge University Press. 2002.
3. Mitchell M.G. Molecular Pathology and the Dynamics of Disease Publisher: Academic Press, Year: 2018
4. Fior R, Zilhão R. Molecular and Cell Biology of Cancer. Springer International Publishing, Year: 2019.
5. Schulz, W. (2005). Molecular biology of human cancers: an advanced student's textbook. Springer Science & Business Media.
6. Collection of tasks for preparation for the license test exam in natural sciences "Krok-1. General medical training" / Col. avt .; For the general ed. prof. V.F. Moskalenko, prof. O.P. Volosovets, prof.

I.E. Bulakh, prof. O.P. Yavorsky, prof. O.V. Romanenko, Assoc. L.I. Ostapyuk. - К.: Медицина, 2004. - 368 p.; Pp. 9-41.

Electronic resources:

1. University website - www.vnmua.edu.ua
2. Library website - library.vsmu.edu.ua
3. Test Center - base license tests "Krok- 1» <http://testcentr.org.ua/>
4. OMIM (Online Mendelian Inheritance in Man) - An Online Catalog of Human Genes and Genetic Disorders <http://omim.org/>
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4) Presentations of lectures, Methodical recommendations before practical ones to take the IWS, Consultations (two times a week, the graph of consultations).

4. **The timetable and distribution of groups with assigned teachers** are published on the web page of the department (<https://www.vnmua.edu.ua> / Department of Medical biology / To students).

5. **Questions to the intermediate and final semester control (credit)** of the discipline are published on the web page of the department (<https://www.vnmua.edu.ua>/ Department of Medical biology / To students).

The syllabus of the elective discipline "Modern problems of molecular biology" was discussed and approved at the meeting of the department Medical Biology (record № 1, dated "27" 08 2020)

Responsible for the academic
discipline "Medical biology"

Head of the Medical Biology department



Shkarupa V.M.