

EUROPEAN MEDICAL UNIVERSITY

“APPROVED”

Vice-rector of EMU,
MD, PhD, DrMedSc, Professor

_____Herman TITOV

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SYLLABUS OF THE EDUCATIONAL DISCIPLINE " PATHOPHYSIOLOGY "

Cycle of Higher Education:	second cycle of higher education (Master's degree)
Field of Study:	22 «Healthcare»
Specialty	221 Dentistry
Educational qualification	Master of Dentistry
Professional qualification	doctor
Educational program	EPP «Dentistry» 2023
Department	Department of Fundamental Disciplines
Contact information	dp1funddis@dmitnm.edu.ua Akademician H. Dzyaka St. 3,, Dnipro. 49005
Compilers of the syllabus	ScD., prof. Svitlana OSTROVSKA Lecturer Nataliya TERESHCHENKO

1. Status and structure of the discipline

Discipline status	Mandatory
Discipline code in EPP/place of discipline in EPP	EC 16, professional training discipline
Course/semester	2-3 course (4-5 semester)
Course volume (total number of hours/ number of ECTS credits)	180 hours / 6 ECTS credits
Number of Chapter :	1
Number of content sections	8
Distribution by types of training and hours of study	Lectures 16 hours Practical classes 74 hours Independent work 90 hours
Language of instruction	English
Form of education	Full-time
Type of final control	Exam

2. Description of the discipline

Brief course summary, relevance.

Pathophysiology is one of the fundamental disciplines. It forms an idea of the general patterns of the emergence, development and completion of various disorders of the body's vital functions, integrating with other disciplines. Forms an idea of the general patterns of the emergence, development and completion of various disorders of the body's vital functions. Lays the foundations for students to study the features of the etiology, pathogenesis of oral diseases, which involves the formation of skills in the application of knowledge in pathological physiology in the process of further study.

Prerequisites. Pathophysiology as an academic discipline is based on the knowledge acquired by students in the following disciplines: medical biology, anatomy, histology, cytology and embryology, Latin, physiology, ethics, philosophy, ecology, medical and biological physics, medical chemistry, biological, bioorganic and inorganic chemistry, pharmacology and is integrated with these disciplines.

The purpose of the course and its significance for professional activity. The purpose of teaching the academic discipline "Pathophysiology" is to form systemic knowledge about the disease and the general patterns of the occurrence and development of various diseases, to form in students the concept of the complexity and dialectics of the relationship between harmful and protective-adaptive components of pathological processes; to provide a theoretical basis for further study of other medical and biological disciplines.

Postrequisites: knowledge, skills and abilities acquired by students after completing the study of the discipline "Pathophysiology" create theoretical foundations for mastering clinical disciplines (internal medicine, surgery, obstetrics, pharmacology, pediatrics, endocrinology, therapeutic dentistry, surgical dentistry, orthodontics, etc.), which involves both the integration of teaching with the main clinical disciplines and the acquisition of deep knowledge of pathophysiology, the ability to use this knowledge in the process of further education and in the

professional activities of a doctor, forms the methodological foundations of clinical thinking and provides the opportunity to conduct pathophysiological analysis of clinical situations for the purpose of further diagnosis, treatment, and prevention of diseases.

3. Objectives of the discipline:

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- 1) to study the basic concepts of general nosology: health, disease, pathological process, typical pathological process, pathological reaction, pathological condition, etiology, pathogenesis;
 - 2) to explain the basic concepts of etiology: causal factors, risk factors, conditions of occurrence and development of the disease;
 - 3) to analyze various options for the development of cause and effect relationships in pathogenesis;
 - 4) evaluate the importance of modern research methods (experimental and clinical) for pathophysiology;
 - 5) analyze the role of environmental factors in the occurrence of diseases;
 - 6) explain the mechanisms of pathogenic action of physical, chemical and biological environmental factors;
 - 7) to substantiate the cause and effect relationships, while separating local and general changes, pathological and adaptive-compensatory in the pathogenesis of manifestations of environmental factors (overheating, cooling, burns, frostbite, radiation sickness, decompression and compression diseases);
 - 8) to define the concept and analyze typical disorders of immunological reactivity: immunodeficiency states, allergies, autoimmune reactions (diseases);
 - 9) apply various principles to classify disorders of the immune system;
 - 10) characterize the causative factors, risk factors and conditions of occurrence, mechanisms of development of typical disorders of the immune system;
 - 11) analyze the causes, mechanisms of development and manifestations of infectious diseases;
 - 12) analyze the mechanisms of cell damage in the pathogenesis of allergic and autoimmune reactions;
 - 13) be able to analyze the cause and effect relationships in the pathogenesis of major disorders of the immune system.

4. Competencies and Program learning outcomes.

General competencies (GC): GC 1, GC 2, GC 3, GC 7

GC 1	Ability to think abstractly, analyze and synthesize. Ability to learn and develop.
GC 2	Knowledge and understanding of the subject area and understanding of the multi-level nature of professional activity.
GC 3	Ability to apply professional knowledge and practical skills in medical practice.
GC 7	Ability to search, process and analyze scientific information from various sources.

Special (professional, subject) competencies (SC): SC 2, SC 5

SC 2	Ability to interpret the results of laboratory and instrumental studies.
SC 5	Ability to design the process of providing medical care: determine approaches, plans, types and principles of treatment of diseases of organs and tissues of the oral cavity and maxillofacial region.

Program learning outcomes (PLO): PLO 2, PLO 3, PLO 4, PLO 15

PLO 2	Collect information about the patient's general condition and the condition of the maxillofacial organs, assess the patient's psychomotor and physical development. Based on the comprehensive diagnosis and the results of additional laboratory and instrumental examinations, evaluate information on the diagnosis (according to list 5).
PLO 3	Assign and analyze the results of additional (mandatory and optional) examination methods (laboratory and instrumental) (according to list 5) of patients with diseases of the organs and tissues of the oral cavity and maxillofacial region for differential diagnosis of diseases (according to list 2).
PLO 4	Determine the final clinical diagnosis in compliance with relevant ethical and legal norms, by making a reasoned decision and logical analysis of the obtained subjective and objective data of clinical, additional examination, differential diagnosis under the supervision of the head physician in the conditions of a medical institution (according to list 2.1).
PLO 15	Assess the impact of the environment on the health of the population in the conditions of a medical institution using standard methods.

5. Content of the discipline

Topics of lectures (L)

No	Subject name	Number of hours
Chapter 1: "Pathophysiology"		
1	Subject and tasks of Pathological Physiology. Methods of pathophysiological research. Historical stages of the formation of Pathological Physiology. The doctrine of disease.	2
2	The role of reactivity in pathology. Violations of immune reactivity. Allergy.	2
3	Inflammation. Fever. Hypoxia.	2
4	Pathophysiology of tissue growth. Tumors	2
5	Pathophysiology of the blood and circulatory system. Heart failure. Pathophysiology of vessels.	2
6	Pathophysiology of the digestive system and external respiration	2
7	Pathology of metabolism	2
8	Pathophysiology of the excretory system. Violations of water and electrolyte balance	2
Total		16

Topics of practical classes

No	Subject name	Number of hours
CHAPTER 1: "Pathophysiology";		
Content section 1 "General nosology"»		
1.	The doctrine of disease. General doctrine of etiology and pathogenesis.	2
2.	The role of heredity and constitution in pathology. The role of age factors in pathology.	2
3.	The role of reactivity in pathology. Disorders of immune reactivity. Allergy.	2
4.	Pathogenic effect of physical factors.	2
5.	Cell damage.	2
6	Final control of the content section 1	2
Content section 2 «Типові патологічні процеси»;		
7	Local circulatory disorders.	2
8	Inflammation.	2
9	Fever.	2
10	Hypoxia.	2
11	Pathology of tissue growth. Tumors.	2
12	Fasting.	2
13	Final control for section 2	2
Content section 3 "Typical metabolic disorders"		
14	Carbohydrate metabolism disorders.	2
15	Water and electrolyte metabolism disorders.	2
16	Acid-base balance disorders.	2
17	Final control for section 3	2
Content section 4 "Pathophysiology of the blood system"		
18	Pathophysiology of the blood system. Qualitative and quantitative changes in erythrocytes. Posthemorrhagic anemias.	2
19	Etiology and pathogenesis of hemolytic anemias and anemias with impaired erythropoiesis.	2
20	Leukocytosis. Leukopenia. Leukosis	2
21	Disorders of the physicochemical properties of blood and the hemostasis system.	2
22	Final control of chapter 4	2
Content section 5 "Pathophysiology of systemic circulation and external respiration"		
23	Circulatory failure. Heart failure.	2
24	Coronary insufficiency. Arrhythmias.	2

25	Pathophysiology of blood vessels.	2
26	Pathophysiology of external respiration.	2
27	Final control of chapter	2
Content section 6 "Pathophysiology of digestion, liver, kidneys"		
28	Pathophysiology of the digestive system.	3
29	Pathophysiology of the liver.	2
30	Pathophysiology of the kidneys.	2
31	Final control of chapter 6	3
Content section 7 "Pathophysiology of the endocrine system";		
32	Pathophysiology of the endocrine system. General mechanisms.	2
33	Dysfunction of the thyroid, parathyroid, adrenal and gonadal glands.	2
Content section 8 "Pathophysiology of the nervous system and extreme conditions"		
34	Pathophysiology of the nervous system.	2
35	.Pathophysiology of extreme conditions.	2
36	Final control of chapters 7, 8	2
Total		74

Topics for independent work

No	Subject name	Number of hours
1	Disease as a result of the action of etiological factors	2
2.	Pathogenic effect of physical factors.	4
3.	The role of reactivity in pathology. Changes in immune reactivity	4
4	The role of heredity in pathology.	4
5	Peripheral circulation and microcirculation disorders	4
6	Tumors, pathology of cell reproduction	4
7	Pathophysiology of inflammatory processes	4
8	Pathophysiology of hypoxic conditions in humans	4
9	Disorders of carbohydrate metabolism.	4
10	Pathophysiology of the heart and circulatory system.	4
11	Posthemorrhagic and hemolytic anemias	4
12	Disorders of the hemostasis system.	4
13	Pathophysiology of white blood. Leukemias	4
14	Pathophysiology of blood vessels	4

15	Starvation	4
16	Pathophysiology of the maxillofacial region and digestive disorders	4
17	Pathophysiology of extreme conditions.	4
18	Pathophysiology of the endocrine system	4
19	Pathophysiology of external respiration	4
20	Pathophysiology of the nervous system	4
21	Pathophysiology of the liver	2
22	Pathophysiology of the liver	4
23	Pathophysiology of the blood system.	4
24	Pathophysiology of aging	2
Total		90

Topics of the lecture course: reveal problematic issues in the relevant sections “Pathophysiology”.

Practical classes provide theoretical justification of the main issues of the topic and acquiring **the following practical skills:**

List of practical skills:

1. Conduct pathophysiological analysis of clinical, laboratory, experimental and other data and formulate on their basis a conclusion about the possible causes and mechanisms of development of pathological processes (diseases).
2. To plan and conduct (in compliance with the relevant rules) experiments on animals, to process and analyze the results of experiments, to correctly understand the significance of the experiment for the study of clinical forms of pathology (model of inflammation in the maxillofacial area, hypoxia, fever, etc.)
3. Using Starr's formula, calculate the stroke and minute volumes of the heart by the value of blood pressure (SBP, MBP, DBP) and heart rate. Assess the state of myocardial contractility by the value of these two indicators.
4. According to the finished electrocardiogram to be able to:
 - determine the type of cardiac arrhythmia: a) arrhythmias due to impaired automaticity (sinus tachycardia, sinus bradycardia); b) arrhythmias due to impaired excitability (extrasystole, paroxysmal tachycardia, ventricular fibrillation); c) arrhythmias due to conduction disorders (complete and incomplete atrioventricular heart block);
 - what changes in the ECG indicate these types of cardiac arrhythmias;
 - name possible mechanisms of these types of cardiac arrhythmias.

Independent work of a student provides for preparation for practical classes and final control, studying topics for independent out-of-class work, preparing abstract reports, presentations, tables.

Control of learning results of topics of independent out-of-class work is carried out during the class and during final control in the discipline.

Individual work includes the study of scientific literature, preparation of reviews on the submitted topics for presentation, implementation of scientific and practical research, participation in specialized competitions, scientific and practical conferences, competitions of student scientific papers.

Calendar plans of practical classes, thematic plan of independent extracurricular work, scope and directions of individual work are published on the website of the Department.

Route for receiving materials: Website of EMU/Student/ Department of Fundamental Disciplines with the course of traditional and alternative medicine/ Educational and methodological support of the Department/ Pediatrics / or follow the link Department of Fundamental Disciplines with a course in traditional and alternative medicine discipline "Pathophysiology". Materials are accessed from the student's Office 365-based corporate account.

6. 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 (regulation of EMU)
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 (Regulation of EMU).
Tools for diagnosing learning success	Theoretical questions, tests, clinically oriented situational tasks, practical tasks, demonstration of practical skills.

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"
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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 fourpoint 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

On a 200-point scale	Rating on a 4-point scale
180–200	Excellent
140–179	Good
120–139	Satisfactory
0–119	Unsatisfactory

On a 200-point scale	ECTS evaluation
192–200	A
172–191	B
148–171	C
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).

Skipping 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)). 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.

Schedule and distribution of groups by teacher are published on the Department's Web page (Department of Fundamental Disciplines).

Questions for intermediate and final control of the discipline are published on the Department's Web page (Department of Fundamental Disciplines).

7. Recommended literature

1. Basic and Pathophysiology: textbook. for students. higher honey. textbook lock / Yu. V. Byts, GM Butenko [etc.]; edited by: MN Zaika, Yu. V. Bytsya, MV Kryshchal. - 6th ed., Reworked. and add. - Kyiv: Medicine, 2017. - 737 p.
2. Essentials of Pathophysiology: Concepts of Altered Health States. - [4th ed.] Porth, K.J. Gaspard. - Philadelphia: Wolters Kluwer, 2015. - 1222 p.
3. Kubyshkin A.V. / General and Clinical Pathophysiology. - 4th ed. Textbook. - 2020. - 696 p.
4. Molecular biology of the cell / Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter - Sixth edition, 2015.
5. Oral Pathology: Clinical Pathologic Correlations / J.A. Regezi, J.J. Sciubba, R.C.K. Jordan - Elsevier Health Sciences, 2016. - 496 p.
6. Robbins and Cotran Pathologic Basis of Disease [9th ed.] V. Kumar, A.K. Abbas, J.C. Aster. - Philadelphia: Elsevier/Saunders, 2015. - 1408 p.
7. Rogers L. Julia Pathophysiology. Elsevier. 2023.

Information resources:

<https://nmapo.edu.ua>
<http://www.medbioworld.com>
<http://roar.eprints.org/>
<http://www.sciencekomm.at/>
<http://testcentr.org.ua/>

www.ExamConsult.co.uk
www.medicalstudent.com

[www. puthguy.com](http://www.puthguy.com)
[www.bloodline.net.](http://www.bloodline.net)
www.tdmu.edu.ua
<http://www.librare.gov.ua>
<http://nbuv.gov.ua>

Responsible for the course
Lecturer

Nataliya TERESHCHENKO

Head of the department
ScD, Professor

Svitlana OSTROVSKA