

EUROPEAN MEDICAL UNIVERSITY

“APPROVED”

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

_____Herman TITOV

«____»_____202__

SYLLABUS OF THE EDUCATIONAL DISCIPLINE "HISTOLOGY, EMBRYOLOGY AND CYTOLOGY"

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 3, St., Dnipro, 49005
Compilers of the syllabus	ScD., prof. Svitlana OSTROVSKA Lecturer Natalia TERESHCHENKO

Dnipro
2024

1. Status and structure of the discipline

Discipline status	Mandatory
Discipline code in EPP/place of discipline in EPP	EC 8, professional training discipline
Course/semester	1 course (1 semester)
Course volume (total number of hours/ number of ECTS credits)	210 hours / 7 ECTS credits
Distribution by types of training and hours of study	Lectures 18 hours Practical classes 76 hours Independent work 116 hours
Number of Chapter :	2
Number of content sections	8
Language of instruction	English
Form of education	Full-time
Type of final control	Exam

2. Prerequisites and Postrequisites of educational discipline

Prerequisites: Histology, Embryology and Cytology as an academic discipline is based on the knowledge acquired by students in such disciplines as human anatomy, medical biology, medical chemistry, and integrated with these disciplines; sets the foundations for students' study of physiology, biochemistry, pathological physiology, pathomorphology, which involves the integration of teaching with these disciplines and the formation of skills to apply knowledge in Histology, Embryology and Cytology in the process of further education and professional activity.

Post-requisites: knowledge, skills and abilities acquired by students after completing the study of the discipline "Histology, Embryology and Cytology" create theoretical foundations for mastering the following clinical and non-clinical disciplines: normal physiology, microbiology, virology and immunology, clinical anatomy and operative surgery, pathological anatomy, pathological physiology, forensic medicine, immunology, ophthalmology, otolaryngology, obstetrics and gynecology, endocrinology, neurology.

3. Characteristic of the educational discipline

Purpose and definition of the educational discipline:

The objectives of teaching the discipline "Histology, Cytology and Embryology" is to form an understanding of general cytology and histology as important components of medicine, which study the structural and functional organization of prokaryotic and eukaryotic cells in general and their structural components in particular, molecular mechanisms of regulation of cellular functions, the nature and transmission of signals that determine cell ontogeny and the formation of intercellular connections, reproduction, differentiation and aging of cells; structure and functions of the main types of animal tissues; features of the interaction of cells and intercellular substance that make up a particular tissue, phylogeny and ontogeny of tissues.

This discipline studies the microscopic and ultramicroscopic structure of the human body, their development and changes in various conditions of life.

"Histology, Cytology and Embryology" is an academic discipline that studies the cellular architecture of tissues and provides a deep understanding of the functioning of the body. It also substantiates the structure of tissues and organs in close connection with their function; helps students to acquire in-depth knowledge of histology and use this knowledge in the process of further education and in professional activities to solve clinical problems, create a theoretical basis for students to master clinical disciplines.

4. Tasks of educational “Histology, cytology and Embryology” discipline

- 1) study of the cellular and tissue levels of the human body organization and prenatal ontogeny;
- 2) study of the morphological and functional organization of major tissues;
- 3) studying the structural organization of vital processes and the possibilities of targeted influence on them;
- 4) study of molecular and structural bases of functioning and recovery of cells and their derivatives;
- 5) study of the basics of adaptation, reactivity and maintenance of homeostasis;
- 6) determination of adaptive and regenerative capabilities of organs, taking into account their tissue composition, peculiarities of regulation and age-related changes;
- 7) interpretation of patterns of human embryonic development, regulation of morphogenesis processes;
- 8) to determine critical periods of embryogenesis, defects and anomalies of human development;
- 9) characterize the microscopic structures of four specialized tissues and be able to identify specific structures in microscopic images;
- 10) demonstrate an understanding of the basic functions and structural relationships with the characteristics of basic and specialized tissues;
- 11) to interpret the structural basis of adaptation, reactivity and maintenance of homeostasis, molecular and structural basis of functioning and repair of cells and their derivatives;
- 12) to interpret the structural basis of human reproduction, to determine the critical periods of embryogenesis, defects and anomalies of human development;
- 13) demonstrate the ability to use a variety of resources to perform laboratory tasks, including answering questions, solving problems and critical thinking to make decisions.

5. Appointment of the discipline

Competencies

General competences (GC): GC 1-3

GC 1	The ability for abstract thinking, analysis and synthesis.
GC 2	Knowledge and understanding of the subject area and understanding of the multi-level nature of professional activity.
GC 3	The ability to apply knowledge in practical activities.

Special (professional) competences (PC): by codes – SC 2, SC 4.

SC 2	Ability to interpret the results of laboratory and instrumental studies
SC 4	The ability to plan and carry out measures to prevent diseases of the organs and tissues of the oral cavity and maxillofacial region.

Program learning outcomes (PLO): 1-4.

PLO 1	To identify and identify the leading clinical symptoms and syndromes (according to list 1); using standard methods, using preliminary data from the patient's history,
-------	--

	patient examination data, knowledge about the person, his organs and systems, to establish a probable nosological or syndromic preliminary clinical diagnosis of a dental disease (according to list 2).
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 studies, evaluate information regarding 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, and differential diagnostics under the supervision of the head physician in a medical institution (according to list 2.1).

5. Content of the discipline

Lectures plan (L)

List of lecture topics by section

№	Topic name	Number of hours
Section 1: "Cytology, General Histology and Embryology"		
1	Introduction. Principles and methods of histological studies Cytology.	2
2	General embryology.	2
3	General concept of tissue. Epithelial tissue. Connective tissue - characteristics, connective tissues themselves, connective tissues with special properties.	3
4	Blood and hematopoiesis.	2
5	Nervous tissue	2
Chapter 2: "Special Histology and Embryology"		
6	General characteristics of the gastrointestinal tract, embryogenesis. Oral cavity, salivary glands. Structure and development of teeth.	3
7	Histological structure of the cardiovascular system	2
8	Histological structure of the genitourinary system	2
Total		18

Topics of seminar classes (not provided). Laboratory topics (not provided)

List of practical/clinical training topics according to sections/topics.

№	Topic name	Number of hours
Section 1: "Cytology, General Histology and Embryology"		
1	Content section 1 Cytology, general histology. Principles and methods of histological studies. Cell structure, cytoplasmic membrane, organelles	4
2	Structure of the nucleus, chromosomes. Chromatin. Life cycle. Division of somatic and germ cells. Final control of the content section 1.	4
3	BContent section 2 General embryology – structure of germ cells, fertilization,	4

	cleavage, implantation. Gastrulation, histogenesis, organogenesis Final control of content section 2	
4	Content section 3. Histology and embryology of general tissues, hematopoiesis and hematopoietic organs. General concept of tissue. Epithelial tissue. Connective tissue - characteristics of connective tissues, connective tissues with special properties	4
5	Blood. Hematopoiesis. Central organs of immune defense. Red bone marrow, thymus.	4
6	Peripheral organs of immune defense. Spleen, lymph nodes. Lymphoid tissue. Final control of the content section 3.	4
7	Content section 4. Histology and embryology of special tissues. Cartilage tissue. Bone tissue.	4
8	Muscle tissue. Nervous tissue Final control of content section 4.	4
Chapter 2: "Special Histology and Embryology"		
9	Content section 5. "Histology and embryology of vessels." Cardiovascular system.	4
10	Content section 6. General characteristics of the gastrointestinal tract, embryogenesis. Oral cavity, salivary glands. Structure and development of teeth.	4
11	Histological structure of the esophagus, stomach, intestine. Digestive glands: liver, pancreas.	4
12	Respiratory system. Skin and its derivatives.	4
13	Final control of content sections 5-6.	4
14	Content section 7. "Histology and embryology of the nervous and endocrine systems." Nervous system.	4
15	Visual analyzer. Organ of hearing and balance.	4
16	Central organs of the endocrine system. Peripheral organs of the endocrine system.	4
17	Content section 8. "Histology and embryology of the organs of the urinary and reproductive systems." Urinary system.	4
18	Male reproductive system. Female reproductive system.	4
19	Human embryogenesis. Control of practical skills.	4
Total		76

List of topics for independent study

№	Topic name	Number of hours
1.	Fundamentals of the cell theory. Research methods in histology.	4
2.	Structural components of the cell. Cytolemma (plasmolemma).	4
3.	Cytoplasm.	4
4.	Nucleus, cell reproduction. Cell aging and death. 4ь клітини.	4
5.	Fundamentals of embryology. Progenesis and initial stages of embryogenesis.	4
6.	Fundamentals of Embryology. Gastrulation and Histogenesis	4
7.	General principles of tissue organization. Epithelial tissues	4
8.	Tissues of the internal environment. Blood and lymph	4
9.	Connective tissue itself	4
10.	Skeletal connective tissues	4
11.	Tissues of the internal environment. Hematopoiesis.	4
12.	Central organs of hematopoiesis and immune defense.	4
13.	Peripheral organs of hematopoiesis and immune defense.	4

14.	Muscle tissues.	4
15.	Nervous tissue 1.	4
16.	Нервова система 2.	4
17.	Sensory systems: visual, olfactory, gustatory analyzer nervous tissue.	4
18.	Sensory systems: auditory and gravitational analyzers.	4
19.	Cardiovascular system. Vessels and microcirculation.	4
20.	Cardiovascular system. Heart.	4
21.	Central endocrine organs.	4
22.	Peripheral endocrine organs.	4
23.	General skin. Skin derivatives.	3
24.	Digestive system. Oral cavity organs. Salivary glands. Esophagus.	3
25.	Digestive system. Stomach, large and small intestines, rectum.	3
26.	Digestive system. Pancreas. Liver.	3
27.	Respiratory system.	3
28.	Urinary system.	3
29.	Male reproductive system.	3
30.	Female reproductive system. Ovary.	3
31.	Female reproductive system. Uterus, fallopian tubes. Ovarian-menstrual cycle. Placenta.	4
Total		116

6. List of practical skills:

1. Identify and describe cytology micrographs. Analyze standard electron micrographs in the normal.
2. Identify and describe micrographs from embryology. Analyze standard electron micrographs in the norm.
3. Identify and describe micrographs of epithelial, connective tissues, blood and lymph. Analyze standard electron micrographs in the normal.
4. Identify and describe micrographs of cartilage, bone, muscle and nervous tissue. Analyze standard electron micrographs in the norm.
5. Identify and describe microdissections of the nervous system and sensory organs, analyze standard electron micrographs in the norm.
6. Identify and describe microdissections of the cardiovascular, immune and endocrine systems, analysis of standard electron micrographs in the normal state.
7. Identify and describe microsections of the oral cavity. Analyze standard electron micrographs in the norm.
8. Identify and describe microdissections of the digestive system, analyze standard electron micrographs in the normal.
9. Identify and describe micrographs of the skin, respiratory and genitourinary systems, analyze standard electron micrographs in the normal state.

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 a course in traditional and non-traditional medicine/ Educational and methodological support of the Department/ Pediatrics / or follow the Department of Fundamental Disciplines with a course in traditional and non-traditional medicine, discipline "Histology, Cytology and Embryology". Materials are accessed from the student's Office 365-based corporate account.

7. 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"
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](#)).

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](#)) 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](#)).

8. Recommended literature

1. Eroschenko, V.P. Atlas of Histologi with Functional Correlations / V. P. Eroschenko. — thirteenth edition. — Philadelphia : Wolters Kluwer, 2017. 617 p.
2. Kierszenbaum A.L., Tres L.L. Histology and Cell Biology. – Elsevier, Philadelphia, 2012. – 701p.
3. Melnyk, N.O. Histology, cytology and embryology : підручник / N. O. Melnyk. — K. : Book-plus, 2017. — 416 p.
4. Melnyk, N.O. Histology, cytology and embryology (short course) / N. O. Melnyk. — K. : Book-plus, 2018. — 312 c.
5. Ross, M.H. Histology : a Text and Atlas with Correlated Cell and Molecular Biology / M. H. Ross, W. Pawlina. — 7-th ed. — Philadelphia : Wolters Kluwer, 2016. — 984 p.

Information resources:

<http://histologyatlas.wisc.edu>
<http://www.meddean.luc.edu>
<http://www.morphology.dp.ua>
<http://histologyatlas.wisc.edu/>
<http://www.histologyguide.com/>
<https://www.cytoindia.com>

Responsible for the course _____
Lecturer

Natalia TERESHCHENKO

Head of the department _____
ScD, Professor

Svitlana OSTROVSKA

