INFORMATION ABOUT THE COURSE

Histology with embryology

1. Basic information

Field of studies field of medical and health sciences, discipline: medical sciences **Unit responsible for the field of studies** Faculty of Medicine Bydgoszcz University of Science and Technology **Level of studies** Uniform master's studies **Profile of studies** General academic **Form of studies** Full-time	**Studies cycle** …….. **Course code** 17-EMS-HWE-SP2 **Language** English **Obligatory** Yes

Prerequisites	None
Introductory courses	None
Coordinator	Patrycja Reszka, PhD

Study period	**Form of assessment** **Form and hours of classes**	**ECTS credits**
Summer semester	Exam Lecture 35h Exercise 45h Seminar 10h	6.0

2. Learning outcomes

Code	**Description of learning outcomes**	**Learning outcomes reference**
Knowledge (student knows and understands):		
K1	The graduate knows and understands the structure of the human body in a topographical and functional approach, including the topographical relationships between individual organs, along with anatomical, histological, and embryological terminology.	A.W1.
K2	The graduate knows the structure and function of a cell.	A.W2.
K3	The student knows the histological structure of tissues and organs and their functions.	A.W3.
K4	Knows and understands the stages of human embryo development, the structure and function of fetal membranes and the placenta, the stages of development of individual organs, and the impact of harmful factors on embryo and fetal development (teratogenic factors).	A.W4.
Abilities (student can do/perform):		

A1	The student is able to list the components of an optical microscope and operate it.	A.U1.
A2	The student is able to assess the histological image of individual organs, tissues, cells, and cellular structures. The student is able to distinguish between structure and function.	A.U2.
A3	The graduate can plan their own educational activities and continuously improve their skills in order to update their knowledge	O.U5.
A4	The graduate is able to communicate within a team and share knowledge	O.U8.
Social skills (the student is ready to):		
S1	The graduate is ready to use objective sources of information.	O.K7.
S2	The graduate is ready to draw conclusions from the observations/analyses carried out.	O.K8.
S3	The graduate is ready to recognize and acknowledge his own limitations, to self-assess his deficits and educational needs.	O.K5.
S4	The graduate is ready to formulate opinions on various aspects of professional activity.	O.K10.
S5	The graduate is prepared to accept responsibility for decisions made in the course of their professional activities, including in terms of their own safety and that of others.	O.K11.

3. Programme contents

No.	Programme contents	Form of studies	Learning outcomes covered by the programme content
1	Histology 1. Epithelial tissue. Definition and classification of epithelia. 2. Connective tissue - general characteristics of connective tissues and their classification. 3. Muscle tissue. Classification and occurrence of muscle tissues. 4. Nervous and glial tissue. 5. Nervous system. Central nervous system: brain and spinal cord. Peripheral nervous system: nerve ganglia, nerves, nerve endings. 6. The vascular system. Morphological and functional characteristics of large blood vessels. Histological structure, types of capillaries and their location. Histological structure of the heart. 7. The lymphatic system. Organization of the lymphoid follicle. Structure and function of the lymph node. Spleen. Thymus. 8. Digestive system – oral cavity, lip, tongue, esophagus, stomach, small intestine, large intestine; major glands of the digestive tract – salivary glands, liver, gallbladder, pancreas.	Lecture	K1, K2, K3

	9. Respiratory system. Airways: nasal cavity. Respiratory epithelium – cell types. Larynx, trachea, bronchial tree. Respiratory epithelium: types of pneumocytes and their functions. Blood supply to the lungs. 10. Excretory system. Kidney – cortical and medullary parts. Blood supply to the kidney. Structure and function of the renal calyces and pelvis, ureter, and urinary bladder. 11. Male reproductive system. Structure and function of the male gonads. Seminal tubules, spermatogenic epithelium, structure of sperm, interstitial testicular gland. Semen ducts, accessory sex glands. Copulatory organ – penis. Female reproductive system (ovary, ovarian follicles, corpus luteum, fallopian tube, uterus, vagina – histological structure). Ovarian and menstrual cycle. 12. Endocrine system – pituitary gland, thyroid gland, parathyroid glands, pineal gland, adrenal glands. Hormones of the digestive tract. 13. The integumentary system. Skin and skin appendages. Structure of the epidermis, dermis, and subcutaneous tissue. Sebaceous, sweat, and mammary glands. Structure of the hair at the root.		
2	Histology 1. Histological preparation – histological techniques in imaging the morphology of tissues and organs. 2. Epithelial tissue – classification, structure, examples (single- and multi-layered epithelia; squamous, cuboidal, and columnar epithelia). 3. Embryonic connective tissue, proper connective tissue, supporting connective tissue: cartilage and bone, connective tissue: blood. 4. Muscle tissue – classification and structure. Contraction mechanism. 5. Nervous tissue – structure and functions. Classification of nerve and glial cells. 6. Circulatory system (general structure of blood and lymphatic vessels and their types, differences in the structure of arteries and veins, histological structure of the heart, cardiac conduction system). 7. Lymphatic and immune system (histological structure and functions of lymphatic organs: spleen, tonsils, lymph nodes, thymus). 8. Digestive system - oral cavity, tongue, taste buds, teeth, esophagus, stomach, general histological structure of the intestines, including differences, appendix; large glands of the digestive tract - salivary glands, liver, gallbladder, pancreas. 9. Respiratory system (airways: nasal cavity, larynx, trachea, bronchi – histological structure, respiratory part: respiratory bronchioles, alveoli). 10. Urinary system (kidney, glomerular apparatus, urinary tract – ureter, urinary bladder, urethra). 11. Male reproductive system (testicle, epididymis, vas deferens, prostate gland – histological structure). Female reproductive system (ovary – general histological structure, ovarian follicles,	Exercise	A1, A2, A3, A4

	corpus luteum, fallopian tube, uterus – mucous and muscular membrane, vagina – histological structure). 12. Endocrine glands (pituitary gland, pineal gland, thyroid gland, parathyroid glands, adrenal glands – histological structure). 13. Skin and its appendages (hairy and hairless, hair structure, glands – sebaceous, sweat, mammary).		
3	Embriology 1. Introduction to embryology. Basic concepts and terminology. 2. Gametogenesis: a/ oogenesis; b/ spermatogenesis; sexual cycle: a/ ovarian; b/ menstrual; hormonal regulation of the sexual cycle 3. Fertilization. Cleavage. Implantation. 4. Weeks II–IV of development. 5. Fetal period: from 9 weeks of fetal life to birth. 6. Structure and function of the placenta. Fetal membranes 7. Differentiation of the mesoderm. Development of the muscular and skeletal systems. Differentiation of the ectoderm. Derivatives of the neural crest. 8. Differentiation of the endoderm. Development of the pharyngeal arches. Development of the digestive and respiratory systems 9. Development of the urogenital system. Development of the heart and blood vessels 10. Development of the central and peripheral nervous systems. Sense organs. Structure and function of the eye and ear.	Lecture	K4
4	Embriology Oogenesis, spermatogenesis. Meiosis. Fertilization. Blastulation. Implantation. Gastrulation. Germ layers: ectoderm, endoderm, mesoderm. Differentiation of germ layers. Temporary membranes. Fetal membranes. Placenta.	Seminar	K4, A3, A4, S1, S3, S4

4. Methods of verifying and assessing the learning outcomes achieved by the student

Winter semester

Form of studies		
Lecture	**Methods of studies form:**	
	Lecture	
	Methods of verification:	**Involvement:**
	Written exam	100%
	Conditions for passing the course:	
	The condition for admission to the exam is passing the exercises. Passing the exam means obtaining at least 60% of the points confirming the achievement of each of the learning outcomes; if less than 60% of the total points are obtained, the student has one chance to retake the exam. Grading scale depending on the degree of achievement of learning outcomes (given in percentages): a) from 95% very good (5.0);	

<table>
<tr><td></td><td colspan="2">b) from 88% good plus (4.5);
c) from 80% good (4.0);
d) from 71% satisfactory plus (3.5);
e) from 60% satisfactory (3.0);
f) below 60% unsatisfactory (2.0).</td></tr>
<tr><td rowspan="8">Exercise</td><td colspan="2">Methods of studies form:</td></tr>
<tr><td colspan="2">Laboratory exercise, Group work</td></tr>
<tr><td>Methods of verification:</td><td>Involvement:</td></tr>
<tr><td>Colloquium</td><td>80%</td></tr>
<tr><td>Worksheet</td><td>10%</td></tr>
<tr><td>Work report</td><td>10%</td></tr>
<tr><td colspan="2">Conditions for passing the course:</td></tr>
<tr><td colspan="2">Components of the final grade for laboratory exercises:
- grades from three tests,
- grade from worksheets - being the arithmetic mean of all completed and submitted during participation in classes,
- grade for reports - being the arithmetic mean of all reports prepared and submitted during participation in classes.

The arithmetic mean is calculated from the grades obtained. When issuing an average grade based on several partial grades, the following rule applies:
a) from 4.76 very good (5.0);
b) from 4.26 good plus (4.5);
c) from 3.76 good (4.0);
d) from 3.26 satisfactory plus (3.5);
e) from 3.00 satisfactory (3.0);
f) below 3.00 unsatisfactory (2.0).
Test: obtaining at least 51% of the points confirming the achievement of each of the learning outcomes; if less than 60% of the total points are obtained, the student has two attempts to improve their grade.

Grading scale depending on the degree of achievement of learning outcomes (given in percentages):
a) from 95% very good (5.0);
b) from 88% good plus (4.5);
c) from 80% good (4.0);
d) from 71% sufficient plus (3.5);
e) from 60% satisfactory (3.0);
f) below 60% unsatisfactory (2.0).
Worksheets/report: (assessment criteria) obtaining at least 60% of the points confirming the achievement of each of the learning outcomes,

Grading scale depending on the degree of achievement of learning outcomes (given in percentages):
a) from 95% very good (5.0);
b) from 88% good plus (4.5);
c) from 80% good (4.0);
d) from 71% satisfactory plus (3.5);
e) from 60% satisfactory (3.0);
f) below 60% unsatisfactory (2.0).</td></tr>
<tr><td rowspan="4">Seminar</td><td colspan="2">Methods of studies form:</td></tr>
<tr><td colspan="2">Discussion, Group work</td></tr>
<tr><td>Methods of verification:</td><td>Involvement:</td></tr>
<tr><td>Presentation</td><td>100%</td></tr>
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	Conditions for passing the course:
	The prerequisite for passing the course is passing the presentation, which is a summary of the seminar classes. Presentation topics for individual groups of students will be assigned during classes.

Learning outcomes	**Methods of verification**				
	Written exam	Colloquium	Worksheet	Work report	Presentation
K1	X	X			
K2	X	X			
K3	X	X			
K4	X	X			
A1			X	X	
A2			X	X	
A3			X	X	
A4			X	X	
S1			X	X	x
S2			X	X	x
S3			X	X	x
S4			X	X	X
S5			x	x	X

5. Student workload – balance of hours and ECTS credits

Students activity		**Student workload Number of hours**
Classes conducted with the direct participation of an academic teacher or other persons conducting classes	Lecture	35
	Exercise	45
	Seminar	10
Student's own work	Preparing for classes	5
	Studying literature	15
	Preparing for a test	10
	Preparing a presentation	5
	Preparing for an exam	25
Total student workload		150
ECTS		6

One (teaching) hour is 45 minutes.

6. Literature

The list of required and recommended literature will be provided by the lecturer at the first meeting.