SYLLABUS
Autumn semester 2024-2025 academic years
on the educational program 6B05102 - Biology

ID and name of course	Independent work of the student (IWS)	Number of credits			General number of credits	Independent work of the student under the guidance of a teacher (IWST)
		Lectures (L)	Sem. classes (SC)	Prac. classes (PC)		
100365 Biology of cell and Histology	4	3	0	6	9	6

ACADEMIC INFORMATION ABOUT THE COURSE

Learning Format	Cycle, component	Lecture types	Types of seminar classes	Form and platform final control
Offline	major disciplines (MD). University component (UC)	Information with visualization	Solution of situational problems	Oral offline form

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ACADEMIC COURSE PRESENTATION

Purpose of the course	Expected Learning Outcomes (LO) * As a result of studying the discipline the undergraduate will be able to:	Indicators of LO achievement (ID) The undergraduate:
The aim is to provide students with a comprehensive understanding of the structure, function, and processes of cells and tissues in living organisms; to explore the principles of cellular organization, differentiation, and specialization, equipping them with the foundational knowledge required for further studies in biological sciences and related fields.	1. To be able to form an idea of the discipline, connections with other biological scientific directions	1.1 to define this discipline, show the connection with other sciences and biological directions
		1.2 to know the theoretical, practical and applied significance of the discipline
	2. To be able to apply acquired knowledge in both theoretical contexts and practical situations	2.1 to show the main theoretical aspects of the discipline
		2.2 to use the possibilities of applying this biological discipline in practice
	3. To be able to get an idea of the structure and biology of various types of cells and tissues	3.1 to understand the features of the structure of cells and tissues of various systematic groups of living organisms
		3.2 to work with a microscope, interpret cytological and histological preparations
	4. To be able to implement a systematic approach in searching, critically analyzing and synthesizing information on cells and tissues	4.1 to find and critically analyze information on the methodology of working with histological preparations
		4.2 to earch, analyze and interpret the necessary information using information technology in professional activities
Prerequisites	Biodiversity of plants and animals	
Postrequisites	Microscopic technology and anatomy of humans and animals	

Learning Resources	**Literature:** 1. Dalton L. and Young R. Fundamentals of Cell Biology. Oregon State University. – 2024. – 586 p. ISBN 978-1-955101-38-7. 2. Mescher A.L. Junqueira's Basic Histology: Text and Atlas, 17th Edition. – 2023. – 486p. 3. Sorenson R.L. Atlas of Human Histology. - A Guide to Microscopic Structure of Cells, Tissues and Organs– 2nd Edition, All Rights Reserved. – 2008. – 359 p. 4. Shubnikova E.A. Functional tissue morphology: study. Pos. M., Publishing House of Moscow State University, 1981 5. Gilbert, S.F. & Raunio, A.M., eds. Embryology: Constructing theOrganism. Sunderland, MA: Sinauer Associates. (2012) page 223-260. **Internet resources:** http://elibrary.kaznu.kz/ru/ https://study.com/academy/topic/introduction-to-plant-anatomy.html https://botanydepot.com/2021/01/20/videos-plant-systematics-lectures-by-bruce-kirchoff/
Academic course policy	The academic policy of the course is determined by the Academic Policy and the Policy of Academic Integrity of Al-Farabi Kazakh National University . Documents are available on the main page of IS Univer . **Integration of science and education.** The research work of students, undergraduates and doctoral students is a deepening of the educational process. It is organized directly at the departments, laboratories, scientific and design departments of the university, in student scientific and technical associations. Independent work of students at all levels of education is aimed at developing research skills and competencies based on obtaining new knowledge using modern research and information technologies. A research university teacher integrates the results of scientific activities into the topics of lectures and seminars (practical) classes, laboratory classes and into the tasks of the IWST, IWS, which are reflected in the syllabus and are responsible for the relevance of the topics of training sessions and assignments. **Attendance.** The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course. Failure to meet deadlines results in loss of points. **Academic honesty.** Practical/laboratory classes, IWS develop the student's independence, critical thinking, and creativity. Plagiarism, forgery, the use of cheat sheets, cheating at all stages of completing tasks are unacceptable. Compliance with academic honesty during the period of theoretical training and at exams, in addition to the main policies, is regulated by the "Rules for the final control" , "Instructions for the final control of the autumn / spring semester of the current academic year" , "Regulations on checking students' text documents for borrowings". Documents are available on the main page of IS Univer . **Basic principles of inclusive education.** The educational environment of the university is conceived as a safe place where there is always support and equal attitude from the teacher to all students and students to each other, regardless of gender, race / ethnicity, religious beliefs, socio-economic status, physical health of the student, etc. All people need the support and friendship of peers and fellow students. For all students, progress is more about what they can do than what they can't. Diversity enhances all aspects of life. All students, especially those with disabilities, can receive counseling assistance by phone / e- mail 8 702 46 16 800 / zaparina.elena06@gmail.com MS Teams **ATTENTION!** The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course, as well as in the MOOC. Failure to meet deadlines results in loss of points.

INFORMATION ABOUT TEACHING, LEARNING AND ASSESSMENT

Score-rating letter system of assessment of accounting for educational achievements

Grade	Digital equivalent points	points, % content	Assessment according to the traditional system
A	4.0 _	95-100	Great
A-	3.67	90-94	
B+	3.33	85-89	Fine
B	3.0	80-84	

Assessment Methods

Criteria-based assessment is the process of correlating actual learning outcomes with expected learning outcomes based on clearly defined criteria. Based on formative and summative assessment.

Formative assessment is a type of assessment that is carried out in the course of daily learning activities. It is the current measure of progress. Provides an operational relationship between the student and the teacher. It allows you to determine the capabilities of the student, identify difficulties, help achieve the best results, timely correct the educational process for the teacher. The performance of tasks, the activity of work in the classroom during lectures, seminars, practical exercises (discussions, quizzes, debates, round tables, laboratory work, etc.) are evaluated. Acquired knowledge and competencies are assessed.

Summative assessment - type of assessment, which is carried out upon completion of the study of the section in accordance with the program of the course. Conducted 3-4 times per semester when performing IWS. This is the assessment of mastering the expected learning outcomes in relation to the descriptors. Allows you to determine and fix the level of mastering the course for a certain period. Learning outcomes are evaluated.

Formative and summative assessment	Points % content

B-	2.67	75-79		Activity at lectures	3
C+	2.33	70-74		Work in seminar classes	20
C	2.0	65-69	Satisfactorily	Independent work	25
C-	1.67	60-64		Design and creative activity	10
D+	1.33	55-59	Unsatisfactory	Final control (exam)	40
D	1.0	50-54		TOTAL	100

Calendar (schedule) for the implementation of the content of the course. Methods of teaching and learning.

A week	Topic name	Number of hours	Max. ball
	MODULE 1 Cell organization		
1	**Lecture 1.** Introduction. Cytology-as a scientific direction. Levels of organization of the living organisms. The structure of the cel and general information. Cell structure of prokaryotes and eukaryotes.	2	
	Laboratory class 1. Similarity and difference in the cell structure of prokaryotes and eukaryotes. Cell structure of bacteria, fungi, plants and animals.	4	10
2	**L2.** Cell organelles. Cell wall: structure, purpose, biology. Membrane: structure, purpose, biology, biochemical aspects. Membrane bound and Non-membrane-bound organelles	2	
	LC 2. To investigate the structure, biology, biochemical aspects, functions of the Membrane.	4	10
	IWST 1. Consultation on the implementation of IWS 1		
3	**L3.** Cell organelles. The structure of the Membrane bound organelles and their functions.	2	
	LC 3. To investigate the structure, biology, biochemical aspects, functions of the Membrane bound organelles: Endoplasmic reticulum, Golgi apparatus, Vacuoles, Peroxisomes and Lysosomes	4	10
	IWS 1. History of cytology. Works by Robert Hooke, Antoni van Leeuwenhoek and others. Methods of light and electron microscopy		15
4	**L 4.** Cell organelles. The structure of the non - membrane bound organelles and their functions.	2	
	LC 4. To investigate the structure, biology, biochemical aspects, functions of the Non - Membrane bound organelles: Ribosomes, Cell center, Cytoskeleton	4	10
	IWST 2. Consultation on the implementation of IWS 1		
5	**L 5.** Cell organelles. The structure of the two - Membrane bound organelles and their functions.	2	
	LC 5. To investigate the structure, biology, biochemical aspects, functions of the two - membrane bound organelles: Mitochondria, Nucleus, Plastids.	4	10
	IWST 3. Consultation on the implementation of IWS 2		
6	**L 6.** Non-cellular life forms and cell division. The role of viruses in cell biology and in the evolution of the organic world. Cellular inclusions. Methods of cell research. Applied aspects of cell biology.	2	
	LC 6. To investigate the structure, biology, biochemical aspects, functions of the Viruses. To know the main functions of the Cellular inclusions.	4.	10
	IWS 2 Structure and function of the cell nucleus. Cell cycle. Regulation of the cell cycle. Cell division (mitosis and meiosis). Cell death. Necrosis and apoptosis.		15
7	**L 7.** Cell cycle. Regulation of the cell cycle. Cell division (mitosis and meiosis). Different types of eukaryotic mitosis (pleuromitosis, orthomitosis). Meiosis. Spore and gamete type of meiosis. Stages of meiotic division.	2	
	LC 7. Mitosis of plant and animal cells. Meiosis. Structure of meiotic chromosomes	4	10
	IWST 4. Consultation on the implementation of IWS 2		
Midterm control 1			**100**
	MODULE 2 Histology		
8	**L 8.** Histology-as a scientific direction. The relationship of histology with other disciplines. Epithelial tissues.	2	
	LC 8. To investigate the structure and functions of the Epithelial tissues (Simple and Multilayer). Classification.	4	10
9	**L 9.** Glandular epithelia. Types of secretion.	2	
	LC 9. To investigate the structure of various epithelial glands and determination of the type of secretion	4	10
	IWST 5. Consultation on the implementation of IWS 3		
10	**L. 10.** Blood. Lymph. Hematopoiesis. Embryonic hematopoiesis. Postembryonic hematopoiesis.	2	
	LC 10. The structure of the blood of amphibians and humans, hematopoietic organs, lymphoid tissue	4	10
11	**L 11.** Connective tissues, their classification and functions	2	
	LC 11. To investigate the structure of fibrous connective tissues	4	10

12	**L 12** The structure of reticular, adipose, mucous, and cartilaginous tissues	2	
	LC 12. To investigate the structure of reticular, adipose, mucous, and cartilaginous tissues	4	10
	IWS 3. Structure, function and classification of epithelial tissues and glandular epithelia		10
13	**L 13.** Bone tissues. Osteohistogenesis. Histological structure of tubular bone	2	
	LC 13. To investigate the structure of bone tissue	4	10
	IWST 6. Consultation on the implementation of IWS 3		
14	**L 14.** Muscle tissue, morphofunctional characteristics, classification	2	
	LC 14. To investigate the Striated and smooth muscle tissues	4	10
	IWS 4. The bone, muscle and nervous tissues.		10
15, 16	**L 15 -16 .** Nervous tissue. Structure of a neuron. Neuroglia. Nerve fibers.	2	
	LC 15 -16. To investigate the structure of neurons and neuroglia.	4	10
Midterm control 2			**100**
Final control (exam)			**100**
TOTAL for course			**100**

Dean _____ **Kurmanbayeva M.S.**

Chair of the Academic Committee
on the Quality of Teaching and Learning _____ **Baktybayeva L.K.**

Head of Department _____ **Kegenova G.B.**

Lector _____ **Zaparina Ye.G.**

RUBRICATOR OF THE SUMMATIVE ASSESSMENT

CRITERIA EVALUATION OF LEARNING OUTCOMES

SIW 1: A group presentation «History of cytology. Works by Robert Hooke, Antoni van Leeuwenhoek and others. Methods of light and electron microscopy» (15% of 100% MC)

Criterion	"Excellent" 10-15 %	"Good" 8-10 %	"Satisfactory" 5-8 %	"Unsatisfactory" 0-15 %
Understanding theories and basic principles of botany relating to the anatomy and morphology of plants, knowledge of professional terms and definitions.	Deep understanding the theories and basic principles of cytology and histology, the main discoveries related to the cell as the smallest functional unit, knowledge of professional terms and definitions. Relevant and relevant links (citations) to key sources are provided.	Understanding the theories and basic principles of cytology and histology, the main discoveries related to the cell as the smallest functional unit, knowledge of professional terms and definitions. Links (citations) to key sources are provided.	Limited understanding the theories and basic principles of cytology and histology, the main discoveries related to the cell as the smallest functional unit, knowledge of professional terms and definitions. Limited references (citations) to key sources are provided.	Superficial understanding / lack of understanding of theories, basic principles of cytology and histology, the main discoveries related to the cell as the smallest functional unit, knowledge of professional terms and definitions. Relevant references (citations) to key sources are not provided.
Understanding the types of methods of light and electron microscopy (bright and dark field, phase contrast, polarization, interference, fluorescence microscopy, transmission and scanning electron microscopy).	Deep understanding of the of the main tissues, can clearly distinguish the following types: assimilation, storage, aerenchyma, aquiferous parenchyma. He knows very well the structure of various types of cells, their functions, as well as their placement in the plant. Without difficulty he can explain the significance of the main tissues in a plant. Excellently substantiates his answers, justifying them with examples.	Partially understanding the types of methods of light and electron microscopy (bright and dark field, phase contrast, polarization, interference, fluorescence microscopy, transmission and scanning electron microscopy). Substantiates his answers, sometimes justifying them with examples. .	Limited understanding the types of methods of light and electron microscopy (bright and dark field, phase contrast, polarization, interference, fluorescence microscopy, transmission and scanning electron microscopy). Limited use of evidence from empirical research.	Not understanding of methods of light and electron microscopy There is no logical connection in the answers, which are not supported by arguments and are not supported by examples.
Consideration of the main provisions, giving comparative aspects and examples, putting forward statements and conclusions.	The answer is clear, deep logically structured and directly connected with question. Maintains consistent, clearly formulated answers to the questions posed, is	The answer is structured, there are some inaccuracies (insignificant errors) in the presentation of theoretical and practical material; the answer is	The answer is not structured; answers to questions are presented in a chaotic order, without any logical relationship. There are no results or conclusions.	There is absolutely no logical connection in the answer.

	able to connect theory with practice, illustrate with examples, facts, and scientific research data; makes interdisciplinary connections, proposals, conclusions.	less thorough, deep, valid and complete. The results and conclusions are partially summarized.		
Presentation, Teamwork	Excellent, attractive presentation, excellent quality of visuals, slides, materials, excellent teamwork.	Good engagement, good quality of visuals, slides or other materials, good level of teamwork.	Satisfactory level of involvement, satisfactory quality of materials, satisfactory level of teamwork.	Low level of involvement, low quality of materials, poor level of teamwork.

SIW 2: A group presentation «Structure and function of the cell nucleus. Cell cycle. Regulation of the cell cycle. Cell division (mitosis and meiosis). Cell death. Necrosis and apoptosis» (15% of 100% MC)

Criterion	"Excellent" 10-15 %	"Good" 8-10 %	"Satisfactory" 5-8 %	"Unsatisfactory" 0-15 %
Understanding the basic characteristics. structural organization and function of the cell nucleus. Cell cycle and its regulation.	Deep understanding the basic characteristics. structural organization and function of the cell nucleus. Cell cycle and its regulation. Relevant and relevant links (citations) to key sources are provided.	Understanding the basic characteristics. structural organization and function of the cell nucleus. Cell cycle and its regulation. Links (citations) to key sources are provided.	Limited understanding of the basic characteristics. structural organization and function of the cell nucleus. Cell cycle and its regulation. Limited references (citations) to key sources are provided.	Superficial understanding / lack of the basic characteristics. structural organization and function of the cell nucleus. Cell cycle and its regulation. Relevant references (citations) to key sources are not provided.
Understanding the process of cell division, the features of mitosis and meiosis, their stages and significance. Cell death. The significance of the processes in the cell cycle: Necrosis and apoptosis.	Deep knowledge of the process of cell division, the features of mitosis and meiosis, their stages and significance. Cell death. The significance of the processes in the cell cycle: Necrosis and apoptosis. Excellent justifies its answers with examples.	Partially knows information about the process of cell division, the features of mitosis and meiosis, their stages and significance. Cell death. The significance of the processes in the cell cycle: Necrosis and apoptosis. Substantiates his answers, sometimes justifying them with examples.	Limited understanding of the process of cell division, the features of mitosis and meiosis, their stages and significance. Cell death. The significance of the processes in the cell cycle: Necrosis and apoptosis. Limited number of reasoned examples for answers.	Not understanding of the process of cell division, the features of mitosis and meiosis, their stages and significance. Cell death. The significance of the processes in the cell cycle: Necrosis and apoptosis. There is no logical connection in the answers, which are not supported by arguments and are not supported by examples.
Consideration of the main provisions, giving comparative aspects and examples, putting	The answer is clear, deep logically structured and directly connected with question. Maintains	The answer is structured, there are some inaccuracies (insignificant errors) in the	The answer is not structured; answers to questions are presented in a chaotic order,	There is absolutely no logical connection in the answer.

forward statements and conclusions.	consistent, clearly formulated answers to the questions posed, is able to connect theory with practice, illustrate with examples, facts, and scientific research data; makes interdisciplinary connections, proposals, conclusions.	presentation of theoretical and practical material; the answer is less thorough, deep, valid and complete. The results and conclusions are partially summarized.	without any logical relationship. There are no results or conclusions.	
Presentation, Teamwork	Excellent, attractive presentation, excellent quality of visuals, slides, materials, excellent teamwork.	Good engagement, good quality of visuals, slides or other materials, good level of teamwork.	Satisfactory level of involvement, satisfactory quality of materials, satisfactory level of teamwork.	Low level of involvement, low quality of materials, poor level of teamwork.

SIW 3: A group presentation «Structure, function and classification of epithelial tissues and glandular epithelia» (15% of 100% MC)

Criterion	"Excellent" 10-15 %	"Good" 8-10 %	"Satisfactory" 5-8 %	"Unsatisfactory" 0-15 %
Understanding of theories and basic principles of classifications of tissues, their structures, functions, knowledge of professional terms and definitions.	Deep understanding of theories and basic principles of classifications of tissues, their structures, functions, knowledge of professional terms and definitions. Relevant and relevant links (citations) to key sources are provided.	Understanding of theories and basic principles of classifications of tissues, their structures, functions, knowledge of professional terms and definitions. Links (citations) to key sources are provided.	Limited understanding of theories and basic principles of classifications of tissues, their structures, functions, knowledge of professional terms and definitions. Limited references (citations) to key sources are provided.	Superficial understanding / lack of understanding of theories and basic principles of classifications of tissues, their structures, functions, knowledge of professional terms and definitions. Relevant references (citations) to key sources are not provided.
Understanding the structure, functions of epithelial and glandular tissues, their role in the body, as well as the performance of their biological role	Well understanding the structure, functions of epithelial and glandular tissues, their role in the body, as well as the performance of their biological role. Excellently substantiates his answers, justifying them with examples.	Partially informing about the structure, functions of epithelial and glandular tissues, their role in the body, as well as the performance of their biological role. Substantiates his answers, sometimes justifying them with examples.	Limited understanding the structure, functions of epithelial and glandular tissues, their role in the body, as well as the performance of their biological role. Limited number of reasoned examples for answers.	No understanding the structure, functions of epithelial and glandular tissues, their role in the body, as well as the performance of their biological role
Consideration of the main provisions, giving comparative aspects and examples, putting	The answer is clear, deep logically structured and directly connected with question. Maintains consistent, clearly formulated	The answer is structured, there are some inaccuracies (insignificant errors) in the presentation of theoretical and	The answer is not structured; answers to questions are presented in a chaotic order, without any logical relationship. There are no results or conclusions.	There is absolutely no logical connection in the answer.

forward statements and conclusions.	answers to the questions posed, is able to connect theory with practice, illustrate with examples, facts, and scientific research data; makes interdisciplinary connections, proposals, conclusions.	practical material; the answer is less thorough, deep, valid and complete. The results and conclusions are partially summarized.		
Presentation, Teamwork	Excellent, attractive presentation, excellent quality of visuals, slides, materials, excellent teamwork.	Good engagement, good quality of visuals, slides or other materials, good level of teamwork.	Satisfactory level of involvement, satisfactory quality of materials, satisfactory level of teamwork.	Low level of involvement, low quality of materials, poor level of teamwork.

SIW 4: A group presentation « The bone, muscle and nervous tissues » (15% of 100% MC)

Criterion	"Excellent" 10-15 %	"Good" 8-10 %	"Satisfactory" 5-8 %	"Unsatisfactory" 0-15 %
Understanding the theories and basic principles of the relationship of tissues in the body, knowledge of professional terms and definitions.	Deep the theories and basic principles of the relationship of tissues in the body, knowledge of professional terms and definitions. Relevant and relevant links (citations) to key sources are provided.	Understanding of the theories and basic principles of the relationship of tissues in the body, knowledge of professional terms and definitions. Links (citations) to key sources are provided.	Limited understanding of the theories and basic principles of the relationship of tissues in the body, knowledge of professional terms and definitions. Limited references (citations) to key sources are provided.	Superficial understanding / lack of understanding of the theories and basic principles of the relationship of tissues in the body, knowledge of professional terms and definitions. Relevant references (citations) to key sources are not provided.
Understanding the structural organization and functions of the bone, muscle and nervous tissues.	Well Understanding the structural organization and functions of the bone, muscle and nervous tissues. Excellently substantiates his answers, justifying them with examples.	Partially understanding the structural organization and functions of the bone, muscle and nervous tissues. Substantiates his answers, sometimes justifying them with examples.	Limited understands Understanding the structural organization and functions of the bone, muscle and nervous tissues. Limited number of reasoned examples for answers.	No understanding the structural organization and functions of the bone, muscle and nervous tissues. There is no logical connection in the answers, which are not supported by arguments and are not supported by examples.
Consideration of the main provisions, giving comparative aspects and examples, putting forward statements and conclusions.	The answer is clear, deep logically structured and directly connected with question. Maintains consistent, clearly formulated answers to the questions posed, is able to connect theory with practice, illustrate with examples,	The answer is structured, there are some inaccuracies (insignificant errors) in the presentation of theoretical and practical material; the answer is less thorough, deep, valid and complete. The results and	The answer is not structured; answers to questions are presented in a chaotic order, without any logical relationship. There are no results or conclusions.	There is absolutely no logical connection in the answer.

	facts, and scientific research data; makes interdisciplinary connections, proposals, conclusions.	conclusions are partially summarized.		
Presentation, Teamwork	Excellent, attractive presentation, excellent quality of visuals, slides, materials, excellent teamwork.	Good engagement, good quality of visuals, slides or other materials, good level of teamwork.	Satisfactory level of involvement, satisfactory quality of materials, satisfactory level of teamwork.	Low level of involvement, low quality of materials, poor level of teamwork.