СИЛАБУС ДИСЦИПЛІНИ
«Cell biology»

Ступінь вищої освіти - Бакалавр
Спеціальність 162 «Біотехнології та біоінженерія»
Освітня програма «_____»
Рік навчання 2021-2022, семестр 4
Форма навчання денна
Кількість кредитів ЄКТС 4
Мова викладання англійська

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ОПИС ДИСЦИПЛІНИ
(до 1000 друкованих знаків)

Issues on cell evolution, cell structure and physiology of various organisms, processes of cell regulation, exchange of genetic information, methods of studying cells, basics of molecular biology are covered.

To increase the quantity and quality of biotechnological products and their environmental safety, it is necessary to significantly increase the scientific level of specialists in this field, able to put into practice the latest advances in science, to master the latest advances in molecular biology and cell biology. In this case, a significant role is given to disciplines that provide fundamental knowledge of plant cell biology.

Tasks set before the discipline: study of the physiology of the plant cell - the chemical and molecular composition of the cell, its structural components; study of cell life processes - photosynthesis, respiration, synthesis processes and the influence of biotic and abiotic factors on them; elucidation of features of intracellular regulation; study of the processes of genetic information exchange.

As a result of studying the discipline the student must:

know: the structure of different cells and their differences, have a modern understanding of bioenergetic and metabolic processes in the cell. Know the concepts of cell cycles and their regulation.

be able to: apply the acquired knowledge of plant cell biology in solving practical problems, develop and conduct research in biotechnology, plant physiology, understand the physiological processes of the organism at the cell level and have a scientific, professional approach to biotechnological methods.

СТРУКТУРА КУРСУ

Тема	**Години** (лекції/ лабораторні, практичні, семінарські)	**Результати навчання**	**Завдання**	**Оцінювання**
4семестр				
Module 1. The cell as the basic structural and functional unit of living nature				
Topic 1. "Modern ideas about cell evolution"	2/4	Get acquainted with modern ideas of cell evolution: -from the molecule to the first cell; - the formation of the outer membrane as	Write an essay on "Cell Evolution"	The maximum score is 10.

		a key moment in cell evolution; -from prokaryotic cells to eukaryotes; -general principles of compartmentalization eukaryotic cells; -evolutionary origin of membrane organelles;		
Topic 2. "Methods of studying cells"	6/4/4	Master the methods of cell research: - light (optical) microscopy - fluorescence microscopy - electron microscopy (scanning electron microscopy (SEM) -transmission electron microscopy (TEM) (its density. - centrifugation - method of labeled atoms (autoradiography) - methods of cell engineering - cell culture methods. Master the method of manufacturing permanent and temporary drugs.	Make a presentation on one of the methods of studying the cell	The maximum score is -20.
Topic 3. "Structure and functions of biological membranes"	4/4/4	Master the material: Biological membranes, their structure and functions. Modern ideas about the structure of the plasma membrane and their formation. Chemical composition of membranes. Membrane lipids. Lipid bilayer. Fluidity of lipid bilayer. Asymmetry of lipid bilayer. Glycolipids, their function. Protein composition of membranes and their functions. Transport of substances across membranes. Ion channels. Transfer of small molecules across the membrane. Active transport, (Na + - K +) - plasma membrane pump,	Perform tasks on the elearn platform for laboratory work №1	The maximum score is -10.

		(Na + - K +) ATPase. Some Ca2 + pumps. Membrane potential.		
Topic 4. "Cytosol. Cytoskeleton »	2/2/4	Master the material: Cytosol. Chemical composition and functioning processes. Cytoskeleton and its structure. Functions and chemical composition of microtubules and microfilaments.	Perform tasks on the elearn platform for laboratory work №2	The maximum score is -10
Topic 5. "Single-membrane and non-membrane organelles"	4/4/6	Master the material: The composition of the vacuolar system. Synthesis, restructuring and export of biopolymers, membrane synthesis. Scheme of operation. Endoplasmic reticulum. Types, structure and functions. Cotranslational transport of soluble proteins. Lipid metabolism in the smooth endoplasmic reticulum. Golgi apparatus. Structure and functions.	Perform tasks on the elearn platform for laboratory work №3	The maximum score is -10
Topic 6. "Double-membrane organelles"	4/2/6	Master the material: Components of the nucleus structure. The nucleolus and its functions. Nuclear organizers. Chromosomes and chromatin. Number and shape of chromosomes. Heterochromatin. The structure of DNA and genes. Mitochondria. Plastids. Structure and functions.	Perform tasks on the elearn platform for laboratory work №4,5	The maximum score is -10
Навчальна робота				**70**
Модульна робота 1.				**30**
Module 2. The cell as a whole system				
Topic 7. "Cell reproduction. Cell cycle »	4/2/4	Master the material: Cell cycle. Mitotic index. The duration of the cell cycle. Regulation of the cell cycle. The concept of mitosis and characteristics of its stages. Meiosis. The	Model the process of photosynthesis and protein biosynthesis	The maximum score is -20

		value of crossover.		
Topic 8. "Cell differentiation "	2/2/4	Master the issues of cell differentiation; The concept of totipotency; Localization of growth zones in plants	Perform tasks on the elearn platform for laboratory work №6	The maximum score is -20
Topic 9. "General principles of intercellular interactions"	4/2/4	Master the material: General structural and functional characteristics of the extracellular matrix. Recognition and adhesion of cells. Intercellular contacts	Perform tasks on the elearn platform for laboratory work №7	The maximum score is -20
Topic 10. "Information intercellular interactions"	2/2/4	Master the material: Types of signal molecules entering cells. Cellular receptors and their participation in intercellular signaling processes. Trace the movement of the cytoplasm in the cells of Elodea and Valisneria	Perform tasks on the elearn platform for laboratory work №8	The maximum score is -10
Навчальна робота				70
Модульна робота №2				30
Module 3. Unicellular organisms				
Topic 11. "Classification of unicellular organisms"	4/4/4	Master the material: unicellular microorganisms Escherichiacoli, Saccharomycescerevisiae their structure. Fundamental processes in the cell, which are studied by these objects. Intermediate organism between unicellular and multicellular organisms Dictyosteliumdiscoideum . The structure of mucous fungi and their use in genetic and cytological studies. Nematode Caenorhabditiselegans. The structure of her body and its advantages as a model object in cytological studies. Drosophilamelanogaster - fruit fly. Conditions of cultivation and use in genetic research programs. Vertebrates	Make an abstract and presentation on the selected unicellular organism. Biological features and significance in biotechnology .	The maximum score is -30

		Xenopuslaevis and Brachydaniorerio. Structure and use in biological research. Arabidopsisthaliana - the most common plant object in biotechnology and genetics of flowering plants.		
Topic 12. "Nuclear-free organisms"	4/2/4	Master the material: Features of the structure of prokaryotes. Morphological types of bacterial cells. Gram-positive and gram-negative bacteria. The structure of the bacterial cell. Features of the organization of the nuclear apparatus of bacteria. Organs of movement.	Perform tasks on the elearn platform for laboratory work №9	The maximum score is -20
Topic 13. Eukaryotes	4/2/4	Master the material: Features of the structure of eukaryotes. Differences between prokaryotes and eukaryotes. Differences in the structure of animal and plant cells. Haploid and diploid cells. Features of the structure of viruses. Origin, structure, chemical composition, reproduction. Phages.	Perform tasks on the elearn platform for laboratory work №10	The maximum score is -20
Навчальна робота				**70**
Модульний тест №3				**30**
Всього за 4 семестр				**70**
Екзамен				**30**
Всього за курс				**100**

ПОЛІТИКА ОЦІНЮВАННЯ

Політика щодо дедлайнів та перескладання:	Роботи, які здаються із порушенням термінів без поважних причин, оцінюються на нижчу оцінку. Перескладання модулів відбувається із дозволу лектора за наявності поважних причин (наприклад, лікарняний).
Політика щодо академічної доброчесності:	Списування під час контрольних робіт та екзаменів заборонені (в т.ч. із використанням мобільних девайсів). Самостійні роботи, реферати повинні мати коректні текстові посилання на використану літературу та/або електронні джерела.
Політика щодо відвідування:	Відвідування занять є обов'язковим. За об'єктивних причин (наприклад, хвороба, міжнародне стажування) навчання може

	відбуватись індивідуально (в он-лайн формі за погодженням із деканом факультету).

ШКАЛА ОЦІНЮВАННЯ СТУДЕНТІВ

Рейтинг здобувача вищої освіти, бали	**Оцінка національна за результати складання екзаменів заліків**	
	екзаменів	**заліків**
90-100	відмінно	зараховано
74-89	добре	
60-73	задовільно	
0-59	незадовільно	незараховано