



СИЛАБУС ДИСЦИПЛІНИ
«Фізіологія рослин з основами біохімії»

Ступінь вищої освіти - Бакалавр
 Спеціальність **202 Захист та карантин рослин**
 Освітня програма «Захист та карантин рослин»
 Рік навчання 2021-2022
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 Форма навчання денна
 Кількість кредитів ЄКТС 1
 Мова викладання англійська

Лектор курсу
 Контактна інформація
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 Сторінка курсу в eLearn

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DESCRIPTION OF THE DISCIPLINE

(up to 1000 characters)

The mechanisms of the main life processes in plants are described, the structural and functional organization of plant systems of different levels of organization is revealed, and the ways of plant organism management for optimization of crop cultivation, plant protection and protection of natural phytocenoses are substantiated.

The purpose of teaching the discipline "Plant Physiology" is to learn the laws of vital functions of plants, the disclosure of their mechanisms, the formation of ideas about the structural and functional organization of plant systems at different levels and the development of ways to control the plant organism.

The main tasks of the discipline "Plant Physiology" are the study by students of the laws of vital functions, the disclosure of their mechanisms, the formation of ideas about the structural and functional organization of plant systems at different levels; obtaining and generalizing new knowledge about the physiological functions of the plant organism and the ability to control the production process of phytocenoses to create a theoretical basis for the rational use and protection of flora, the acquisition of practical skills in the laboratory of plant physiology.

СТРУКТУРА КУРСУ

Topic	Hours (lec./lab., ind., sem.)	Learning outcomes	Tasks	Evaluation
4 semester				
Module 1. «Plant cell physiology and patterns of water exchange»				
Topic 1. «Introduction. Subject, purpose and tasks, directions and methods of modern plant physiology. History of the formation of plant physiology as a science»	Lectures – 2 hours Laboratory – 2 hours Individual work – 2 hours	Master the subject, purpose and direction of plant physiology. History of formation of plant physiology and contribution of domestic scientists to its development; methods and directions of research in plant physiology; connection of plant physiology with other sciences;	Choose one of the personalities listed in the e-course according to your serial number in the journal and prepare an essay on the life and scientific achievements of the scientist.	Maximum score for laboratory work – 5; Maximum score for individual work – 10.

		<p>main directions of development of modern plant physiology; the role of plant physiology in plant productivity programming, forecasting the state of ecological systems and nature protection; the role of discipline in the formation of agrobiologists.</p> <p>Get acquainted with the rules of work in the laboratory of plant physiology and the structure of the light microscope.</p>		
<p>Topic 2. «Plant cell physiology».</p>	<p>Lectures – 3 hours Laboratory – 4 hours Individual work – 2 hours</p>	<p>Study: General ideas about the plant cell. Structural and functional organization of a plant cell. Modern ideas about the eukaryotic cell of plant organisms and the theory of endosymbiogenesis. The concept of compartmentalization. The main compartments of the plant cell. Cell membrane, its structure, properties and functions. Protoplast or cytoplasm as the living contents of a plant cell. Cytoplasmic conditions and its main components. Biological membranes, their structure and functions. Determine the permeability of the protoplast of beetroot cells under the action of temperature and chemicals.</p>	<p>Solve the problems and design the solution according to the sample given in the e-course.</p>	<p>Maximum score for laboratory work – 10; Maximum score for individual work – 15.</p>
<p>Topic 3. «Water exchange of plants».</p>	<p>Lectures – 2 hours Laboratory – 6 hours</p>	<p>Study: The flow of water into the plant cell. Diffusion. Osmosis. The cell as an osmotic system. Phenomena of</p>	<p>Solve the problems and design the solution according to the sample given in the e-course.</p>	<p>Maximum score for laboratory work – 15; Maximum score for</p>

	Individual work – 2 hours	plasmolysis and deplasmolysis. Absorption mechanisms, symplastic and apoplastic pathways of water transport. Ways and driving forces of water transport. The mechanism of root pressure. Guttation and "crying" of plants. Adhesion and cohesion. Transpiration. Features of the water regime of plants of different ecological groups. Determine the suction force, osmotic pressure and degree of turgor of plant tissue cells of potatoes and table beets.		individual work – 15.
Educational work				70
Modular test				30
Module 2 «Energy processes of the plant organism and physiology of nutrition, growth and development of plants»				
Topic 4. «Photosynthesis»	Lectures – 2 hours Laboratory – 8 hours Individual work – 2 hours	Study: Photosynthesis. History of discovery and study of photosynthesis. The value of photosynthesis in nature, its cosmic role. Characteristics of the main indicators of photosynthesis, methods and units of their measurement. Leaf structure due to photosynthesis. Chloroplasts, their structure, chemical composition and functions. Photosynthetic pigments (chlorophyll, carotenoids, phycobilins). To determine the condition of plant stomata from different ecological conditions of growth by infiltration.	Select plant species with different pathways of photosynthesis, establish their biological and ecological properties, analyze the relationship of morphological and physiological characteristics of plants of different photosynthetic types with their physiological processes. Prepare a report on the requirements of the e-course.	Maximum score for laboratory work – 20; Maximum score for individual work – 9.
Topic 5. «Plant respiration».	Lectures – 2 hours	Study: The concept of plant respiration. History of	Solve the problems and design the solution	Maximum score for

	Laboratory – 4 hours Individual work – 2 hours	study and physiological role of respiration. Aerobic and anaerobic respiration. General equation of respiration. The relationship between respiration and fermentation. Primary stages of respiration. Glycolysis (Embden-Meyerhof-Parnassus path). The tricarboxylic acid cycle, or Krebs cycle. Chemistry and significance. Respiratory electron transport chain and oxidative phosphorylation. Respiratory energy. Master the method of one-dimensional paper ascending chromatography and use it to separate a mixture of photosynthetic pigments from the leaves of tradescantia.	according to the sample given in the e-course.	laboratory work – 10; Maximum score for individual work – 8.
Topic 6. «Mineral nutrition of plants».	Lectures – 2 hours Laboratory – 2 hours Individual work – 2 hours	Study: Physiological role of batteries. The concept of organogens. Macronutrients. Trace elements. Ultramicroelements. Ways of absorption of mineral elements by a plant. Nitrogen metabolism. Compare the activity of dehydrogenase, polyphenol oxidase, peroxidase and catalase in different plant species.	Solve the problems and design the solution according to the sample given in the e-course.	Maximum score for laboratory work – 5; Maximum score for individual work – 8.
Topic 7. «Plant growth and development, adaptation of plants to environmental conditions».	Lectures – 2 hours Laboratory – 4 hours	Study: The concept of plant development. The relationship between growth and development. Physiology of plant aging. Aging and rejuvenation of plants	Solve the problems and design the solution according to the sample given in the e-course.	Maximum score for laboratory work – 10.

	and organs in ontogenesis. Photoperiodism. Hormonal theory M.Kh. Chailakhian. Thermoperiodism and vernalization. The theory of cyclic aging and rejuvenation PM Krenke. The concept of ontogenesis and its stages. Cytogenesis. Cell differentiation and histogenesis. Plant growth and dormancy. Investigate the dynamics of growth of shoots of woody plants on the example of hibiscus.	
Educational work		70
Modular test		30
Total for 4th semester		70
Exam		30
Total for the course		100

EVALUATION POLICY

<i>Deadline and rearrangement policy:</i>	Works that are submitted in violation of deadlines without good reason are evaluated at a lower grade. Rearrangement of modules takes place with the permission of the lecturer if there are good reasons (for example, hospital).
<i>Academic Integrity Policy:</i>	Write-offs during tests and exams are prohibited (including the use of mobile devices). Independent works, abstracts must have correct text references to the used literature and / or electronic sources.
<i>Attendance policy:</i>	Attendance is mandatory. For objective reasons (for example, illness, international internship) training can take place individually (in online form in consultation with the dean of the faculty).

STUDENT EVALUATION SCALE

Student rating, points	The assessment is national for the results of passing	
	exams	credits
90-100	Excellent	Credited
74-89	Good	
60-73	Satisfactorily	
0-59	Non-Satisfactorily	Non-Credited