	SYLLABUS OF THE ACADEMIC DISCIPLINE «Plant Physiology with basics of biochemistry» Degree of higher education - Bachelor Specialization <u>202 Plant protection and quarantine</u> Educational programme «Plant protection and quarantine» Academic year <u>2</u> , semester <u>4</u> Form of higher education: full-time Number of ECTS credits <u>4</u> Language of instruction English
Lecturer of the discipline	Candidate of Biological Sciences, Associate Professor
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educational portal of	
NULES of Ukraine	

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 with basics of biochemistry" 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 with basics of biochemistry " 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.

Competencies of the discipline:

Integral competence (IC): Ability to solve complex specialised tasks and practical problems of professional activity in plant protection and quarantine and apply theoretical knowledge and methods of phytosanitary monitoring, inspection, analysis, examination, characterised by complexity and uncertainty of conditions.

General competencies (GC):

GC3. Knowledge and understanding of the subject area and understanding of professional activities.

GC6. Skills in using information and communication technologies for professional activities.

Program learning outcomes (PLOs):

PLOs4. Know and understand mathematics and natural sciences to the extent necessary for professional activities in plant protection and quarantine.

PLOs6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of agrobiocenoses and maintenance of their stability to preserve natural diversity.

PLOs16. Know the main historical stages of development of the subject area.

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theoryofwell asendosymbiogenesis.ModuleTheconceptofControl incompartmentalization.Themaincompartments of theeLearn) andplantcell.cell.cellmembrane,itsquestioning			organisms and the		work, as	
endosymbiogenesis.ModuleThe concept of compartmentalization.Control in the form of tests (on eLearn) and plant cell.Cell oral/written questioning			theory of		well as	
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plant cell. Cell oral/written questioning			approximate of the		iesis (on	
membrane, its questioning			plant coll Coll		oral/writton	
questioning			membrane ita		questioning	
atructure properties according			structure properties		- according	
and functions to the			and functions		to the	

Topic 3.	1/2	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. Study: The flow of water into	Solve the	gradebook in eLearn Completion
«water exchange of plants».		The now of water into the plant cell. Diffusion. Osmosis. The cell as an osmotic system. Phenomena of plasmolysis and deplasmolysis. Absorption mechanisms, symplastic and apoplastic pathways of water transport. Ways and driving forces of water transport. The mechanism of root pressure. Gutation 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.	probems and design the solution according to the sample given in the e- course.	and submission of laboratory and independent work, as well as Module Control in the form of tests (on eLearn) and oral/written questioning - according to the gradebook in eLearn
Module 2 «Ener	gy processes of	the plant organism and	physiology of nutrit	ion, growth
Tonic 4		Study	» Select nlant	Completion
«Photosynthesis»	1/2	Photosynthesis. History of discovery and study of photosynthesis. The value of photosynthesis in nature, its cosmic role. Characteristics of the main indicators of photosynthesis.	select plant species with different pathways of photosynthesis, establish their biological and ecological properties,	and submission of laboratory and independent work, as well as
		methods and units of	analyze the	Module

		their measurement.	relationship of	Control in
		Leaf structure due to	morphological	the form of
		photosynthesis.	and physiological	tests (on
		Chloroplasts their	characteristics of	eLearn) and
		structure chemical	plants of different	oral/written
		composition and	photosynthetic	questioning
		functions	types with their	- according
		Photosynthetic	physiological	to the
		nigments (chlorophyll	processes Prepare	gradebook
		carotenoids	a report on the	in al earn
		physophiling)	requirements of	III CLCal II
		To determine the	the a course	
		10 determine the	the e-course.	
		condition of plant		
		stomata from different		
		ecological conditions		
		of growth by		
	1/2	Influtation.	C - 1 (1	Completion
10pic 5.	1/2	The concert of right	solve the	completion
«Plant		The concept of plant	problems and	
respiration».		respiration. History of	design the	submission
		study and physiological	solution according	01 Johovotowy
		A such is and an analysis	to the sample	laboratory
		Aerobic and anaerobic	given in the e-	and
		respiration. General	course.	independent
		equation of respiration.		work, as
		The relationship		well as
		between respiration and		Module
		fermentation. Primary		Control in
		stages of respiration.		the form of
		Glycolysis (Embden-		tests (on
		Meyerhof-Parnassus		eLearn) and
		path). The tricarboxylic		oral/written
		acid cycle, or Krebs		questioning
		cycle. Chemistry and		- according
		significance.		to the
		Respiratory electron		gradebook
		transport chain and		ın eLearn
		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.		
Topic 6.	1/2	Study:	Solve the	Completion
«Mineral		Physiological role of	problems and	and
nutrition of		batteries. The concept	design the	submission
plants».		ot organogens.	solution according	of
		Macronutrients. Trace	to the sample	laboratory
		elements.	given in the e-	and

		Ultramicroelements.	course.	independent
		Ways of absorption of		work, as
		mineral elements by a		well as
		plant. Nitrogen		Module
		metabolism.		Control in
		Compare the activity of		the form of
		dehydrogenase,		tests (on
		polyphenol oxidase,		eLearn) and
		peroxidase and catalase		oral/written
		in different plant		questioning
		species.		- according
		1		to the
				gradebook
				in eLearn
Topic 7.	1/2	Study:	Solve the	Completion
«Plant growth		The concept of plant	problems and	and
and		development. The	design the	submission
development.		relationship between	solution according	of
adaptation of		growth and	to the sample	laboratory
plants to		development.	given in the e-	and
environmental		Physiology of plant	course	independent
conditions»		aging Aging and	course.	work as
conditions".		rejuvenation of plants		well as
		and organs in		Module
		ontogenesis		Control in
		Photoperiodism		the form of
		Hormonal theory		tests (on
		M Kh Chailakhian		el earn) and
		Thermoneriodism and		oral/written
		vernalization The		questioning
		theory of cyclic aging		- according
		and rejuvenation DM		to the
		Kranka The concent of		gradabook
		ontogenesis and its		in el earn
		stages Cytogenesis		III eLeai II
		Call differentiation and		
		histogenesis Plant		
		growth and dormanov		
		Investigate the		
		dynamics of growth of		
		shoots of woody plants		
		on the example of		
		hibiscus		
Total for 4 th some	ster	11015005.		70
Exam	5UU1			30
Total for the cour	se			100
				100

ASSESSMENT POLICY

Policy regarding	Assignments submitted after the deadline without valid reasons		
deadlines and resits:	will be graded lower. Resitting of modules will be allowed with the		
	permission from the lecturer and in the presence of valid reasons		
	(e.g. medical reasons).		
Academic honesty	Cheating during tests and exams is strictly prohibited (including		
policy:	the use of mobile devices). Coursework and research papers must		
	contain correct citations for all sources used.		

Attendance policy:	Class attendance is mandatory. In case of objective reasons (such		
	as illness or international internships), individual learning may be		
	allowed (in online format by the approval of the dean of the		
	faculty).		

SCALE OF ASSESSMENT OF STUDENT KNOWLEDGE

Student rating,	National grade based on exam results		
points	exams	credits	
90-100	excellent	passed	
74-89	good		
60-73	satisfactory		
0-59	unsatisfactory	not passed	

Recommended sources of information Main literature

- 1. Plant physiology: a textbook / S.V. Prylutska, A.I. Babytskyi, N.H. Nesterova, T.A. Tkachenko, P.Y. Drozd Kyiv: NUBiP of Ukraine, 2023. 224 p.
- Musienko M.M. Plant Physiology: Textbook (for students of higher educational institutions) -K.: Lybid, 2005. - 808 p.
- 3. Musienko M.M. Plant Physiology: Textbook K.: Phytosociocenter, 2001. 392 p.
- 4. Makrushyn M.M., Makrushyna E.M., Peterson N.V. et al. Physiology of agricultural plants with the basics of biochemistry K.: Urozhay, 1995. 352 p.
- 5. Makrushyn M.M., Makrushyna E.M., Petersen N.V., Menshikov M.M. Plant Physiology Vinnytsia: "New Book", 2006. 416 p.
- 6. Samoilenko T.G., Samoilenko M.O., Rozhok O.F. Workshop on plant physiology: Study guide. Mykolaiv: MNAU, 2013. 431 p.
- 7. Romaniuk N.D., Tsvilynyuk O.M., Mykievych I.M., Terek O.I. Plant Physiology: A textbook for students of biological faculties of higher educational institutions: Pyramid, 2005. 160 p.
- 8. Nikolaychuk V.I., Belchgazi V.Y. Physiology and biochemistry of plants: Study guide for students of biological specialties of higher educational institutions Uzhhorod: UzhNU, 192 p.
- 9. Bryon O.V., Chykalenko V.G., Slavnyi P.S., Merezhynskyi Y.Y., Bilanovskyi M.F. Plant Physiology: Workshop. K.: Higher School, 1995. 191 p.
- 10. Kozhukalo V.E., Marchenko O.M., Suray O.O. Methodical instructions for laboratory and practical classes for students of agrobiological faculties. K.: NAU Publishing Center, 2006. 46 p.
- 11. Methodical recommendations for laboratory classes in the discipline "Plant Physiology" for students of agrarian universities of agronomic specialties. K.: Phytosociocenter, 2000. 64 p.
- 12. Kazakov E.O. Methodological bases of setting up an experiment in plant physiology. Kyiv: Phytosociocenter, 2000. 272 p.
- 13. Musienko M.M. Photosynthesis. K.: Higher School, 1995. 247 p.

Supporting literature

1. Hrytsayenko Z.M., Hrytsayenko O.A., Karpenko V.P. Methods of biological and agrochemical research of plants and soils. - K.: CJSC "Nichlava", 2003. - 320 p.

2. Kostylov O.V., Romanenko O.V. Biology and ecology of autotrophic organisms. - K.: Phytosociocenter, 1999. - 192 p.

3. Musienko M.M., Parshikova T.V., Slavnyi P.S. Spectrophotometric methods in the practice of physiology, biochemistry and plant ecology. - Kyiv: Phytosociocenter, 2001. - 200 p.

4. Rudyshyn S.D. Fundamentals of plant biotechnology. Textbook for higher agricultural institutions. - Vinnytsia, 1998. - 234 p.