

SYLLABUS

Academic year 2024 - 2025

1. Details about the program

1.1. Higher Education Institution	„Lucian Blaga” University of Sibiu
1.2. Faculty	Faculty of Sciences
1.3. Department	Environmental Sciences, Physics, Physical Education and Sports
1.4. Field of study	Biology
1.5. Study cycle ¹	Bachelor
1.6. Specialization	Biology

2. Details about the course

2.1. Course name	PLANT PHYSIOLOGY	Code	FSTI.MFE.BIOEN.L.FO.3.2020.E-5.2
2.2. Course coordinator	Associate professor Alexandra Zamfir Ph.D		
2.3. Practical activity coordinator	Asistant lecturer Mihai Crăciunaș Ph.D		
2.4. Year of study ²	II	2.5. Semester ³	III
2.6. Type of assessment ⁴			E
2.7. Type of discipline ⁵	O	2.8. Formative category of the discipline ⁶	F

3. Estimated total time

3.1. Proportion of the discipline within the curriculum – <i>number of hours / week</i>					
3.1.a.Lecture	3.1.b. Seminar	3.1.c. Laboratory	3.1.d. Project	3.1.e Other	Total
2	-	2	-	-	4
3.2. Proportion of the discipline within the curriculum – <i>number of hours / week</i>					
3.2.a.Lecture	3.2.b. Seminar	3.2.c. Laboratory	3.2.d. Project	3.2.e Other	Total ⁷
28	-	28	-	-	56
Allocation of time budget for individual study⁸					No. hours
Study based on textbook, lecture notes, bibliography and course notes					25
Additional research: library, specialized electronic platforms and field or on-site investigation and documentation					14
Preparing for the seminar / laboratorires, home assignments, reports, portfolios and essays					14
Tutoring ⁹					10
Examinations ¹⁰					6
3.3. Total number of hours for individual study¹¹ (NOSI_{sem})					69
3.4. Total number of hours in the curriculum (NOAD_{sem})					56
3.5. Total number of hours per semester¹² (NOAD_{sem} + NOSI_{sem})					125
3.6. No of hours / ECTS					25
3.7. Number of credits¹³					5

4. Prerequisites (if applicable)

4.1. Prerequisite courses for enrollment to this subject (from the curriculum) ¹⁴	Biochemistry, Plant cytology, anatomy and morphology
4.2. Competencies	-

5. Requirements (wherever applicable)

5.1. Lecture organization and structure ¹⁵	Computer, projector
5.2. Organization and structure of practical activities (lab/sem/pr/other) ¹⁶	Plant physiology laboratory (microscope, chemical reagent, utensils and specific equipment, water sources, gas, current, projector, computer, fresh and preserved biological material, boards)

6. Specific competencies¹⁷

Number of credits assigned to the discipline ¹⁸		5	Distribution of credits according to competencies ¹⁹
6.1. Professional competencies	CP1	Demonstration of the unitary nature of plant organisms.	1
	CP2	Modification of physiological processes in different environmental conditions, regulation and self-regulation mechanisms.	1
	CP3	To use appropriate methods and means to make practical arguments in the observation of plant physiology under optimal physiological and stress conditions.	1.5
6.2. Transversal competencies	CT1	The application of efficient and responsible work strategies, punctuality, seriousness and personal responsibility, based on the principles, norms and values of the code of professional ethics.	0.5
	CT2	The application of efficient work techniques in the multidisciplinary team, on various hierarchical levels.	0.5
	CT3	Documentation for professional and personal development, through continuous training and efficient adaptation to new scientific discoveries. Progress in the field.	0.5

7. Course objectives (reflected by the framework of specific competencies)

7.1. General objective	Understanding the notions related to plant physiology, the physiological processes that take place in plant organisms under optimal and stress conditions. Studying the metabolic mechanisms on the basis of which they tolerate and resist the minimum and maximum variations of environmental factors.
7.2. Specific objectives	<p>Informing students with theoretical and practical notions necessary for biology teachers, biochemists in the laboratory, environmental agents, etc. Through the skills received by students in the physiology laboratory, the foundations are laid for a conscious protection of flora and fauna, but also of the environment on which they depend.</p> <p>Identification of biochemical reactions of photosynthesis, respiration, etc. Knowledge of secondary biochemical products of plant metabolism with a role in the</p>



	<p>geographical spread of plants, as well as their resistance to "stepfather" environmental factors.</p> <p>Formation of positive attitudes towards the most appropriate behavior to respect the norms of vegetation protection, based on the knowledge of its role in ecosystems.</p> <p>Understanding the notion of stress as a deviation from the optimal condition for the plant. The study of plant metabolic mechanisms on the basis of which they tolerate and resist the minimum and maximum variations of environmental factors.</p> <p>Developing the capacity to investigate/research the physiological processes and adaptation of plants to the environment.</p> <p>The formation of observation and experimentation skills through which plants are subjected to normal or harmful factors, resulting from environmental pollution.</p>
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8. Course description

8.1. Lecture ²⁰	Teaching methods ²¹	No. of hours
Lecture 1 Introduction to plant ecophysiology. Notions of cell physiology: Plant cell metabolism; The physiology of cellular organelles;	Interactive lecture, explanation, conversation, problem solving	2
Lecture 2 The role of mineral elements in cell metabolism.	Interactive lecture, explanation, conversation, problem solving	2
Lecture 3 The role of some ecological factors in the life of plants The role of water in plant life plant - water: - the absorption - the transport - the elimination - stress resistance	Interactive lecture, explanation, conversation, problem solving	2
Lecture 4 The role of environmental factors	Interactive lecture, explanation, conversation, problem solving	2
Lecture 5 The role of mineral salts in plant life - the mineral nutrition	Interactive lecture, explanation, conversation, problem solving	2
Lecture 6 The role of mineral salts in plant life - the elimination - the accumulation - the ecophysiological adaptations	Interactive lecture, explanation, conversation, problem solving	2
Lecture 7 The role of light in plant life - photosynthesis/generalities	Interactive lecture, explanation, conversation, problem solving	2
Lecture 8 The stages of photosynthesis	Interactive lecture, explanation, conversation, problem solving	2
Lecture 9 The ecological factors of photosynthesis	Interactive lecture, explanation, conversation, problem solving	2
Lecture 10 Energy generation - the role of respiration in energy production	Interactive lecture, explanation, conversation, problem solving	2
Lecture 11 The respiratory quotient	Interactive lecture, explanation, conversation, problem solving	2



Lecture 12 The ecological factors of breathing The adaptations of respiration to anaerobic conditions	Interactive lecture, explanation, conversation, problem solving	2
Lecture 13 The movement of plants	Interactive lecture, explanation, conversation, problem solving	2
Lecture 14 Allelopathic interrelations between plants	Interactive lecture, explanation, conversation, problem solving	2
Total number of lecture hours:		28

8.2. Practical activities (8.2.a. Seminar ²² / 8.2.b. Laboratory ²³ / 8.2.c. Project ²⁴ / 8.2.d. Other practical activities ²⁵)	Teaching methods	No. of hours
Act.1 The plant cell as an osmotic system - osmosis - plasmolysis, turgescence - the suction force of the cell	Practical demonstration, exercise, experiment	2
Act.2-3 Water absorption - the role of the root in absorption - the role of other plant organs in absorption	Practical demonstration, exercise, experiment	4
Act.4 The transpiration of plants and ecological factors	Practical demonstration, exercise, experiment	2
Act.5-6 Mineral nutrition of plants - the mineral content of plant tissues - artificial nutrient media	Practical demonstration, exercise, experiment	4
Act.7-9 Photosynthesis - the extraction of pigments - the synthesis of starch and other organic substances - emphasizing photosynthesis - ecological factors of photosynthesis	Practical demonstration, exercise, experiment	6
Act.10-12 Plant respiration and the influence of ecological factors	Practical demonstration, exercise, experiment	6
Act.13 Germination, growth and development of plants - ecological factors of germination and growth - highlighting the role of growth hormones	Practical demonstration, exercise, experiment	2
Act.14 The resistance of plants to polluting and stress factors	Practical demonstration, exercise, experiment	2
Total number of hours: seminar/laboratory		28

9. Bibliography

9.1. Recommended references	1. Trifu, M., Bărbat, I., 1997, <i>Fiziologia plantelor</i> , Ed. Viitorul Românesc
	2. Zamfir Alexandra, 2000, <i>Noțiuni de fiziologie și ecofiziologie vegetală</i> , Ed. Alma Mater Sibiu
	3. Zamfir Alexandra, 1993, <i>Ecofiziologia plantelor</i> , Îndrumător de lucrări practice, Ed. Univ. "Lucian Blaga" Sibiu
9.2. Additional references	1. Atanasiu, L., 1984, <i>Ecofiziologia plantelor</i> , Ed. Șt. și Encicl., București

10. Correlating the course description with the expectations and requirements of representatives of the epistemic community, professional associations and significant employers and stakeholders related to the study program and the specific area²⁶

It is carried out through periodic contacts with them in order to analyze the problem.

The choice of principles and the establishment of appropriate scientific and experimental methods for solving problems related to Biology

Choosing appropriate notions and tools from related disciplines to support the appropriate resolution of a given situation for Biology
 Realization of working methodologies that allow to go through all the stages necessary for a complete investigation process (realization of measurements/calculations, data processing, interpretation).
 Critical and constructive evaluation of the research approach specific to the Biology study program.

11. Evaluate

Type of activity	11.1 Assessment criteria	11.2 Assessment methods		11.3 Percentage of the final grade	Notes. ²⁷
11.4a Exam / Colloquium	<ul style="list-style-type: none"> Theoretical and practical knowledge (quantity, correctness, accuracy) 	Midterm / ongoing assignments²⁸:	25%	75 %	
		Home assignments:	%		
		Other activities ²⁹ :	%		
		Final assessment:	50%		
11.4b Seminar	<ul style="list-style-type: none"> Frequency/relevance of contributions or answers 	Proof of contributions, portfolio (scientific papers, syntheses)		%	
11.4c Laboratory	<ul style="list-style-type: none"> Knowledge of equipment, methods of using specific instruments and tools; assessment of tools or achievements, processing and interpretation of results 	<ul style="list-style-type: none"> Written questionnaire Oral examination Laboratory notebook, experimental work, scientific papers, etc. Practical demonstrations 		25 %	
11.4d Project	<ul style="list-style-type: none"> Quality of achieved project, accuracy of project documentation, rationale and evidence of selected solutions 	<ul style="list-style-type: none"> Self-assessment, project submission and/or defense Critical assessment of a project 		%	
11.5 Minimum performance standard ³⁰ Promotion of the laboratory colloquium Fulfilling the requirements for grade 5					

The course description includes components adapted to SEN (Special Educational Needs) persons, according to their type and degree, at all curricular elements and dimensions (competencies, objectives, course description, teaching methods, alternative assessment), in view of providing and ensuring equitable and fair opportunities to academic education for all students, with special attention to special educational needs.

Date of submission: 07 / 09 / 2024

Date of approval in the Department: 17 / 09 / 2024

	Degree, title, first name, surname	Signature
Course coordinator	Associate professor. Alexandra Zamfir Ph.D Asistant lecturer. Mihai Crăciunaș Ph.D	
Study program coordinator	Assoc. Prof. Ana-Maria Benedek-Sîrbu, PhD	
Director Department	Lecturer Ioan Tăușan, PhD	

¹ Licență / Master

² 1-4 pentru licență, 1-2 pentru master

³ 1-8 pentru licență, 1-3 pentru master

⁴ Examen, colocviu sau VP A/R – din planul de învățământ

⁵ Regim disciplină: O=Disciplină obligatorie; A=Disciplină opțională; U=Facultativă

⁶ Categoria formativă: S=Specialitate; F=Fundamentală; C=Complementară; I=Asistată integral; P=Asistată parțial; N=Neasistată

⁷ Este egal cu 14 săptămâni x numărul de ore de la punctul 3.1 (similar pentru 3.2.a.b.c.d.e.)

⁸ Liniile de mai jos se referă la studiul individual; totalul se completează la punctul 3.37.

⁹ Între 7 și 14 ore

¹⁰ Între 2 și 6 ore

¹¹ Suma valorilor de pe liniile anterioare, care se referă la studiul individual.

¹² Suma (3.5.) dintre numărul de ore de activitate didactică directă (NOAD) și numărul de ore de studiu individual (NOSI) trebuie să fie egală cu numărul de credite alocate disciplinei (punctul 3.7) x nr. ore pe credit (3.6.)

¹³ Numărul de credit se calculează după formula următoare și se rotunjește la valori vecine întregi (fie prin micșorare fie prin majorare)

$$\text{Nr. credite} = \frac{\text{NOCpSpD} \times C_C + \text{NOApSpD} \times C_A}{\text{TOCpSdP} \times C_C + \text{TOApSdP} \times C_A} \times 30 \text{ credite}$$

Unde:

- NOCpSpD = Număr ore curs/săptămână/disciplina pentru care se calculează creditele
- NOApSpD = Număr ore aplicații (sem./lab./pro.)/săptămână/disciplina pentru care se calculează creditele
- TOCpSdP = Număr total ore curs/săptămână din plan
- TOApSdP = Număr total ore aplicații (sem./lab./pro.)/săptămână din plan
- C_C/C_A = Coeficienți curs/aplicații calculate conform tabelului

Coeficienți	Curs	Aplicații (S/L/P)
Licență	2	1
Master	2,5	1,5
Licență lb. străină	2,5	1,25

¹⁴ Se menționează disciplinele obligatoriu a fi promovate anterior sau echivalente

¹⁵ Tablă, videoprojector, flipchart, materiale didactice specifice, platforme on-line etc.

¹⁶ Tehnică de calcul, pachete software, standuri experimentale, platforme on-line etc.

¹⁷ Competențele din Grilele aferente descrierii programului de studii, adaptate la specificul disciplinei

¹⁸ Din planul de învățământ

¹⁹ Creditele alocate disciplinei se distribuie pe competențe profesionale și transversale în funcție de specificul disciplinei

²⁰ Titluri de capitole și paragrafe

²¹ Expunere, prelegere, prezentare la tablă a problematicii studiate, utilizare videoprojector, discuții cu studenții (pentru fiecare capitol, dacă este cazul)

²² Discuții, dezbateri, prezentare și/sau analiză de lucrări, rezolvare de exerciții și probleme etc.

²³ Demonstrație practică, exercițiu, experiment etc.

²⁴ Studiu de caz, demonstrație, exercițiu, analiza erorilor etc.

²⁵ Alte tipuri de activități practice specifice

²⁶ Legătura cu alte discipline, utilitatea disciplinei pe piața muncii

²⁷ CPE – condiționează participarea la examen; nCPE – nu condiționează participarea la examen; CEF - condiționează evaluarea finală; N/A – nu se aplică

²⁸ Se va preciza numărul de teste și săptămânile în care vor fi susținute.

²⁹ Cercuri științifice, concursuri profesionale etc.

³⁰ Se particularizează la specificul disciplinei standardul minim de performanță din grila de competențe a programului de studii, dacă este cazul.