

DISCIPLINE SYLLABUS

Academic year 2024 - 2025

1. Program Information

1.1. Higher education institution	”Lucian Blaga” University of Sibiu
1.2. Faculty	Faculty of Sciences
1.3. Department	Department of Environmental Science, Physics, Physical Education and Sport
1.4. Field of study	BIOLOGY
1.5. Study cycle ⁱ	Bachelor
1.6. Program Specialization	BIOLOGY

2. Discipline Information

2.1. Discipline Name	Enzymology	Code	FSTI.MFE.BIOEN.L.CA.4.1020.E-5.11
2.2. Course coordinator	Eng. PhD Alexandra Maranciuc		
2.3. Practicals coordinator	Eng. PhD Alexandra Maranciuc		
2.4. Year of study ⁱⁱ	II	2.5. Semester ⁱⁱⁱ	2
2.6. Type of assessment ^{iv}		E	
2.7. Discipline regime ^v	A	2.8. Formative category of the discipline ^{vi}	
		C	

3. Total estimated time

3.1. Extent of the course in the learning plan – number of hours per week				
3.1.a.Course	3.1.b. Seminary	3.1.c. Laboratory	3.1.d. Project	Total
1		2		3
3.2. Extension of the subject in the curriculum – Total hours in the curriculum				
3.2.a.Cours	3.2.b. Seminar	3.2.c. Laboratory	3.2.d. Project	Total ^{vii}
14		28		42
Time Distribution for Individual Study^{viii}				Hours
Individual study based on textbooks, course support notes, bibliography and student notes				32
Additional study in the library, on specialized electronic platforms and through fieldwork				18
Preparation seminary/laboratory, homework, essays and portofolios				20
Tutoring ^{ix}				9
Examination ^x				4
3.3. Total number of hours allocated to individual studies^{xi} (NOSI_{sem})				83
3.4. Total number of hours in the learning plan (NOAD_{sem})				42
3.5. Total number of hours per semester^{xii} (NOAD_{sem} + NOSI_{sem})				125
3.6. Number of hours / ECTS				25

3.7. Number of credits^{xiii}	5
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Prerequisites (if needed)

3.8. Disciplines required to be passed previously (of curriculum) ^{xiv}	
3.9. Of competencies	

4. Conditions (if needed)

4.1. Course development ^{xv}	Blackboard, video projector, specific teaching materials, online platforms, etc.
4.2. For carrying out practical activities (lab/sem/pr/aplic) ^{xvi}	Compliance with labor protection rules and conduct in a chemical laboratory. Use of specific equipment (robe/gloves). Chemical reagents, laboratory, pipetes, tubes, specific apparatus for chemical determinations, kits. Presence is mandatory. Participation in all laboratory work - is a condition for participation in the laboratory exam.

5. Specific competencies acquired^{xvii}

		Number of credits allocated to the disciplin ^{xviii}	Distribution of credits by skills ^{xix}
6.1. Professional competencies	PC1	Knowledge of the theoretical principles and some practical notions of general enzymology and applied enzymology.	1
	PC2	The ability to identify and explain the functioning of a catalytic process in the living cell.	1
	PC3	The ability to recognize an enzyme and to classify it according to its class.	1
	PC3	The ability to apply the laboratory activities in related fields such as biotechnology, biology and medical industries.	1
6.2. Transversal competencies	TC1	The ability to plan an experiment and to understand the workflow of the experiment.	0.5
	TC2	Ability to work in a team.	0.5
	TC3	Involvement in scientific activities related to the discipline. Corroboration of previously acquired information with information acquired within the discipline.	1

6. Objectives of the discipline (based on the grid of the acquired specific competencies)

7.1. Overall objective	Learning the basic concepts related to enzymology, nomenclature, the structure of enzymes, their kinetics, their mechanisms in metabolic processes and in applications for the pharmaceutical, cosmetic, food and biomedical industries.
7.2. Specific objective	O1. To recognize the class to which the studied enzymes belong. O2. To understand the action mechanisms of enzymes and the factors that influence enzyme activity. O3. To correlate laboratory activities with the practical applicability of enzymes in various fields of industrial activity or fundamental research.

8. Contents

8.1. Course ^{xx}	Teaching methods ^{xxi}	Number of hours
Lecture 1 Introduction to enzymology	Presentation using multimedia means, powerpoint presentations, lecture, debate, exemplification, dialogue	2
Lecture 2 Enzymes: nomenclature, classification, properties, examples	Presentation using multimedia means, powerpoint presentations, lecture, debate, exemplification, dialogue	2
Lecture 3 Enzyme cofactors, classification, examples. Mechanism of action of enzymes.	Presentation using multimedia means, powerpoint presentations, lecture, debate, exemplification	2
Lecture 4 Vitamins. General properties, classification, examples, applications	Presentation using multimedia means, powerpoint presentations, lecture, debate, exemplification, dialogue	2
Lecture 5 Technologies used in enzymology	Presentation using multimedia means, powerpoint presentations, lecture, debate, exemplification, dialogue	2
Lecture 6 Practical use of enzyme in industrial applications (biotechnology/ pharmacology/ chemistry/ textiles)	Interactive presentation of the material according to the analytical program, using multimedia tools, powerpoint presentations, didactic films. Debate. Discussions.	2
Course 7 Practical use of enzymes in the medical and research fields. Therapies used in enzymology	Interactive presentation of the material according to the analytical program, using multimedia tools, powerpoint presentations, didactic films. Debate. Discussions.	2
Total course hours:		14

1.1. Practical activities (8.2.a. Seminar ^{xxii} / 8.2.b. Laboratory ^{xxiii} / 8.2.c. Project ^{xxiv})	Teaching methods	Number of hours
Act.1 Labor protection norms. Equipment and apparatus. Organizing the seminar and assigning the report topics (presentation).	Demonstration, dialogue	2
Act.2 Enzyme kinetics. Determination of K_M	Demonstration, explanation, dialogue, practical work	4
Act.3 The influence of temperature on enzyme catalysis.	Individual study of the related didactic material, individual or demonstrative experiment, dialogue, practical work	4
Act.4 Determination of the influence of temperature on salivary amylase activity	Individual study of the related didactic material, individual or demonstrative experiment, dialogue, practical work	4
Act.5 Determining the specificity of enzymes	Individual study of the related didactic material, individual or demonstrative experiment, dialogue, practical work	4

Act.6 Determination of possible chemical imbalances in a controlled microbiological environment	Individual study of the related didactic material, individual or demonstrative experiment, dialogue, practical work	4
Act.7 Power-point presentation – presentation of a topic of interest within the discipline	Individual study of the related didactic material, individual or demonstrative experiment, dialogue, practical work	4
Act. 8 Laboratory practical examination	Evaluation	2
Total seminar/laboratory hours		28

9. Bibliography

9.1. Recommended Bibliography	Introduction To Enzyme and Coenzyme Chemistry(second edition) -Bugg,T.-Blackwell-2004.
	Enzyme engineering: methods and protocols-Samuelson, J.C.-Humana Press-2013.
	Enzyme and Microbial Biosensors: techniques and protocols-Ed. Mulchandani, A. and Rogers, K.R.-Humana Press-1998
	Gligor F. Notiuni de biochimie structurala, Editura Universitatii „Lucian Blaga” din Sibiu, 2015.
	D.C. Cojocar, Elena Ciornea, Zenovia Olteanu, Lăcrămioara Oprică, Sabina-Ioana Cojocar. Enzimologie Generală, Editura Tehnopress, Iași 2007.
	Gligor F., Totan M., Introducere în analiza biochimică, Editura Universității „Lucian Blaga” din Sibiu, 2015.
9.2. Additional Bibliography	Collection of reports for certain laboratory works. Dumitru I.F si Iordachescu D., Introducere in enzimologie, Editura Medicala, Bucuresti, 1981.

10. Conjunction of the discipline’s content with the expectations of the epistemic community, professional associations and significant employers of the specific study program ^{xxv}

The course has a content based on student preparation being similar to courses in other European universities.
The course is fundamental for the development of work skills in research laboratories and/or in biotechnological systems engineering applications.

11. Evaluation

Activity Type	11.1 Evaluation criteria	11.2 Evaluation methods		11.3 Percentage in the Final Grade	Obs. ^{xxvi}
11.4a Exam	<ul style="list-style-type: none"> Theoretical and practical knowledge acquired (quantity, correctness, accuracy) 	Tests during the semester ^{xxvii} :	%	70 % (minimum 5)	CPE
		Homework:	%		
		Other activities ^{xxviii} :	%		
		Final evaluation: Exam with grid and essay type questions.	70 % (min. 5)		
11.4c Laboratory	<ul style="list-style-type: none"> Knowledge of the equipment, how to use specific tools; evaluation of tools, processing and interpretation of results 	Test Laboratory notebook, experimental works, reports, etc. Practical demonstration		30% (minimum 5)	CEF
11.5 Minimum performance standard ^{xxix} Achieving 50% of the total constituent weights of the final grade, provided that each test/exam is completed in proportion to 50% (Minimum Grade 5).					

The Discipline Syllabus includes components adapted to people with CES (people with disabilities and people with high potential), depending on their type and degree, at the level of all curricular elements (skills, objectives, contents, teaching methods, alternative assessment), to ensure equal opportunities in the academic preparation of all students, paying greater attention to individual learning needs.

Filling Date: 16 / 09 / 2024

Department Acceptance Date: 17 / 09 / 2024

	Academic Rank, Title, First Name, Last Name	Signature
Discipline holder	Eng. PhD Alexandra Maranciuc	
Study Program Coordinator	Assoc. Prof. PhD Ana-Maria Benedek-Sîrbu	
Head of Department	Lect. PhD Ionuț Tăușan	

ⁱ Bachelor / Master

ⁱⁱ 1-4 for bachelor, 1-2 for master

ⁱⁱⁱ 1-8 for bachelor, 1-3 for master

^{iv} Exam/interview or VP A/R – in the learning plan

^v Discipline regime: O=Compulsory discipline; A=Optional discipline; U= Elective course

^{vi} Formative category: S = Specialty; F = Fundamental; C = Complementary; I= Fully assisted; P= Partially assisted; N= Unassisted

^{vii} Equal to 14 weeks x number of hours from point 3.1 (similar to 3.2.a.b.c.)

^{viii} The following lines refer to individual study; the total is completed at point 3.37.

^{ix} Between 7 and 14 hours

^x Between 2 and 6 hours

^{xi} The sum of the values from the previous lines, which refer to individual study.

^{xii} The sum (3.5.) between the number of hours of direct teaching activity (NOAD) and the number of hours of individual study (NOSI) must be equal to the number of credits assigned to the discipline (point 3.7) x no. hours per credit (3.6.)

^{xiii} The credit number is computed according to the following formula, being rounded to whole neighbouring values (either by subtraction or addition

^{xiv} Mention the subjects that must be passed previously or equivalent.

^{xv} Blackboard, video projector, flipchart, specific teaching materials, online platforms, etc.

^{xvi} Computing technique, software packages, experimental stands, online platforms, etc.

^{xvii} Competences from the Grids related to the opening of the study program, adapted to the specifics of the discipline.

^{xviii} From the education plan.

^{xix} The credits allocated to the discipline are distributed on professional and transversal skills according to the specifics of the discipline.

^{xx} Chapter and paragraph titles

^{xxi} Exposition, lecture, board presentation of the studied topic, use of video projector, discussions with students (for each chapter, if applicable)

^{xxii} Discussions, debates, presentations and/or analyses of papers, solving exercises and problems

^{xxiii} Practical demonstration, exercise, experiment

^{xxiv} Case study, demonstration, exercise, error analysis, etc.

^{xxv} The relationship with other disciplines, the usefulness of the discipline on the labour market



^{xxvi} *CPE – Conditions Exam Participation; nCPE – Does Not Condition Exam Participation; CEF - Conditions Final Evaluation; N/A – not applicable*

^{xxvii} *The number of tests and the weeks in which they will be taken will be specified.*

^{xxviii} *Scientific circles, professional competitions, etc.*

^{xxix} *The minimum performance standard from the skills grid of the study program is customized to the specifics of the discipline, if applicable.*