COURSE SYLLABUS

Academic year 2025 - 2026

1. Programme Information

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. Level of study [i]	Bachelor
1.6. Programme of study	Biology (in english)

2. Details about the course

2.1. Name of course	Microbiology		Code	FSTI.MFE.BIORO.L.FO.6.2020.E-4.2	
2.2. Course coordinator	Lecturer PhD Horea Olosutean				
2.3. Seminar / laboratory coordinator	Assistant Professor PhD Ion Brînza				
2.4. Year of study[ii]	III	**2.5.** Semester[iii]	6	**2.6.** Evaluation form [iv]	E
2.7. Course type [v]	R	**2.8.** The formative category of the course [vi]			F

3. Estimated total time

3.1. Course Extension within the Curriculum – Number of Hours per Week					
3.1.a.Lecture	3.1.b. Seminar	3.1.c. Laboratory	3.1.d. Project	3.1.e Other	Total
2	0	2	0	0	4
3.2. Course Extension within the Curriculum – Total Number of Hours within the Curriculum					
3.2.a.Lecture	3.2.b. Seminar	3.2.c. Laboratory	3.2.d. Project	3.2.e Other	Total[vii]
24	0	24	0	0	48

Time Distribution for Individual Study [viii]	**Hours**
Learning by using course materials, references and personal notes	9
Additional learning by using library facilities, electronic databases and on-site information	4
Preparing seminars / laboratories, homework, portfolios and essays	2
Tutorial activities [ix]	2
Exams[x]	2

3.3. Total Individual Study Hours [xi] ***(NOSI$_{sem}$)***	**52**
3.4. Total Hours in the Curriculum (*NOAD$_{sem}$*)	**48**
3.5. Total Hours per Semester [xii] **(*NOAD$_{sem}$* + *NOSI$_{sem}$*)**	**100**
3.6. No. of hours / ECTS	**25**
3.7. Number of credits[xiii]	**4**

4. Prerequisites (if needed)

4.1. Courses that must be successfully completed first (from the curriculum) [xiv]	Not applicable.
4.2. Competencies	Ability to work in a team and to comply with hygiene and safety rules in the laboratory.

5. Conditions (wherever applicable)

5.1. For course/lectures [xv]	Lecture room equipped with computer and video projector; access to e-learning platforms (e.g. Google Classroom/Meet, Moodle/Teams).
5.2. For practical activities (lab/sem/pr/other) [xvi]	Microbiology laboratory equipped with: autoclave, incubator, thermostat, microscopes, centrifuge, spectrophotometer, colony counter, laminar flow hood; specific glassware and reagents; access to e-learning platforms.

6. Learning outcomes [xvii]

Number of credits assigned to the discipline: 4				
Learning outcomes				Credit allocation based on learning outcomes
No.	Knowledge	Aptitudes	Responsibility and autonomy	
LO 1	The student/graduate describes, defines and discusses fundamental principles in the field of Biology, as well as interdisciplinary aspects (e.g. Evolution, General Ecology, Plant Physiology, Animal Physiology).	The student/graduate applies working methods using modern instruments/equipment and classical laboratory techniques in order to perform and design experiments, to record and to appropriately analyse the obtained results.	The student/graduate uses their own knowledge and experience for the development of the scientific community and of society in general, by participating in professional and/or community activities.	0.8
LO 2	The student/graduate correctly uses and explains the specific terminology employed in the field of Biology, the main concepts and laws, and the characteristics of biological systems from the perspective of the principles of organisation and functioning of living matter.	The student/graduate defines, describes and discusses/presents the major concepts in the field of Biology.	The student/graduate demonstrates responsibility and autonomy in using scientific knowledge in the field of Biology, by carrying out research, developing or improving concepts, theories, operational methods or biotechnological products, assuming ethical and professional decisions within the scientific process.	0.8
LO 3	The student/graduate defines, explains and exemplifies basic and modern experimental	The student/graduate uses, investigates and critically analyses the principles of operation	The student/graduate applies the knowledge acquired in other courses in order to explain	0.8

	techniques for the analysis and characterisation of biological systems, records and presents experimental results, and explains the principles of scientific methods.	and use of equipment/instruments and working techniques/methods for investigating the functioning of biological systems.	interactions between organisms and the environment.	
LO 4	The student/graduate operates scientific means of documentation and literature search, critically evaluates scientific literature, builds arguments supported by scientific evidence and clearly communicates such information in a variety of formats (models, tables, graphs, mathematical equations etc., as appropriate).	–	–	0.8
LO 5	The student/graduate demonstrates the ability to work with appropriate methods of information, documentation and knowledge, and to instruct pupils, colleagues, students and other persons in a scientific manner.	–	–	0.8

7. Course objectives (resulted from developed competencies)

7.1. Main course objective	To build a solid theoretical and practical foundation regarding the diversity and roles of prokaryotic microorganisms, as well as safe and efficient working skills in the microbiology laboratory.
7.2. Specific course objectives	• explain the architecture and functioning of the bacterial cell; • distinguish the main groups of microorganisms and their specific features; • justify the importance of prokaryotes in natural processes and applications; • handle microbial cultures under biosafety conditions;

	• use microbiology-specific scientific terminology and argumentation.

8. Course description

8.1. Lecture[xviii]		**Teaching methods** [xix]	**Hours**
Lecture 1	History of microbiology and current directions.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 2	Phylogenetic positioning and diversity of microbial communities.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 3	Bacterial morphology: forms, size, organisation.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 4	Bacterial ultrastructure I. Essential components: cell wall, membranes, cytoplasm.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google	2

		Classroom, Google Meet, Zoom, etc.).	
Lecture 5	Bacterial ultrastructure II. Facultative structures: capsule, pili/flagella, endospores.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 6	Chemical composition and nutrition. Macro-/micronutrients, assimilation mechanisms.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 7	Trophic strategies in prokaryotes. Auto-/heterotrophy, photo-/chemo-, aerobic/anaerobic lifestyles.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 8	Dynamics of bacterial populations. Growth curves, multiplication, control.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2

Lecture 9	Environment and microorganisms. Limiting factors, tolerance ranges, extremophiles.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 10	Microbial interactions. Competition, cooperation, biofilms.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 11	Plant–microorganism interactions in the rhizosphere. Symbiosis/antagonism, ecological effects.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
Lecture 12	Natural habitats. Soil, water, air – micro-niches and resources.	Lecture assisted by video projector; systematic exposition; didactic demonstration, debate and problem-based discussion; interactive dialogue with students; activities carried out on e-learning platforms (Google Classroom, Google Meet, Zoom, etc.).	2
		Total lecture hours:	**24**

9. Bibliography

9.1. Recommended references	Baron S (Ed.). *Medical Microbiology*. 4th ed. Galveston (TX): University of Texas Medical Branch at Galveston; 1996. (NCBI Bookshelf).
	Parker N, Schneegurt M, Tu A.-H.T., Lister P, Forster B.M. *Microbiology*. Houston (TX): OpenStax; 2016.
	Willey J.M., Sandman K.M., Wood D. *Prescott's Microbiology*. 11th ed. New York (NY): McGraw-Hill Education; 2019.
	Gupte S. *The Short Textbook of Medical Microbiology (Including Parasitology)*. 10th ed. New Delhi: Jaypee Brothers Medical Publishers; 2010.
	Parija S.C. *Textbook of Microbiology & Immunology*. 2nd ed. New Delhi: Elsevier; 2014.
9.2. Additional references	Dunca S, Ailiesei O, Nimițan E, Ștefan M. *Elemente de microbiologie*. Iași: Junimea; 2005.
	Mihășan M, Ștefan M, Olteanu Z. *Biologie moleculară – metode experimentale*. Iași: "Alexandru Ioan Cuza" University Press; 201
	Ștefan M. *Biologia microorganismelor rizosferice – aplicații biotehnologice*. Iași: Tehnopress; 2008.

10. Conjunction of the discipline's content with the expectations of the epistemic community, professional associations and significant employers of the specific study program [xx]

The course contents are updated periodically through consultations with the academic environment, laboratories (clinical/environmental/biotech) and employers.

- Alignment with good practice in EHS/BSL-2, QA/QC, data traceability, ethics and with recommendations of professional societies (e.g. FEMS/ASM) and standards (ISO 15189/ISO 17025).
- The topics and practical activities reflect labour market requirements: microbiological quality of water/air, microbiota, biofilms, extremophiles, biogeochemical cycles.
- Assessment (exam, portfolio, practical test) explicitly verifies the learning outcomes required by the professional community.
- Feedback mechanisms: annual meetings with partners, questionnaires for employers/graduates (tracer studies), practice reports and internal quality checks.

11. Evaluation

Activity Type	11.1 Evaluation Criteria	11.2 Evaluation Methods		11.3 Percentage in the Final Grade	Notes. [xxi]
11.4a Exam / Coloquium	• Theoretical and practical knowledge acquired (quantity, correctness, accuracy)	Tests during the semester [xxii]:	%	70% (minimum 5)	
		Homework:	%		
		Other activities[xxiii]:	%		
		Final evaluation:	% (min. 5)		

11.4b Seminar	• Frequency/relevance of participation or responses	Evidence of participation, portfolio of papers (reports, scientific summaries)	% (minimum 5)	
11.4c Laboratory	• Knowledge of the equipment, how to use specific tools; evaluation of tools, processing and interpretation of results	• Oral response • Written questionnaire • Laboratory notebook, experimental works, reports, etc. • Practical demonstration	30% (minimum 5)	
11.4d Project	• The quality of the project, the correctness of the project documentation, the appropriate justification of the chosen solutions	• Self-evaluation, project presentation • Critical evaluation of a project	% (minimum 5)	
11.5 Minimum performance standard[xxiv] For the grade 5, the student demonstrates a basic understanding of the architecture and functioning of the bacterial cell, correctly classifies the major groups of microorganisms, and explains, with examples, the roles of prokaryotes in natural processes and applications. The course description includes components adapted to students with special educational needs (students with disabilities and students with high potential), depending on the type and degree of these needs, at the level of all curricular elements (competences, objectives, contents, teaching methods, alternative assessment), in order to ensure equitable opportunities in the academic training of all students, with particular attention paid to individual learning needs				

The Course Syllabus will encompass components adapted to persons with special educational needs (SEN – 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), in order to ensure fair opportunities in the academic training of all students, paying close attention to individual learning needs.

Filling Date: |_07_| / |_09_| / |_2025_|

Department Acceptance Date: |_17_| / |_09_| / |_2025_|

	Academic Rank, Title, First Name, Last Name	**Signature**
Course Teacher	Lecturer PhD Horea Olosutean	
Study Program Coordinator	Assoc. Prof. Ana-Maria Benedek-Sîrbu, PhD	
Head of Department	Lecturer Ioan Tăușan, PhD	

[i] *Bachelor / Master*

[ii] *1-4 for bachelor, 1-2 for master*

[iii] *1-8 for bachelor, 1-4 for master*

[iv] *Exam, colloquium or VP A/R - from the curriculum*

[v] *Course type: R = Compulsory course; E = Elective course; O = Optional 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 3.7.*

[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*

$$\text{No.credits} = \text{NOCpSpD} \times \text{CC} + \text{NOApSpD} \times \text{CATOCpSdP} \times \text{CC} + \text{TOApSdP} \times \text{CA} \times 30 \text{ credits}$$

Where:

- NOCpSpD = Number of lecture hours / week / discipline for which the credits are calculated
- NOApSpD = Number of application hours (sem./lab./pro.) / week / discipline for which the credits are calculated
- TOCpSdP = Total number of course hours / week in the Curriculum
- TOApSdP = Total number of application hours (sem./lab./pro.) / week in the Curriculum
- C_C/C_A = Course coefficients / applications calculated according to the table

Coefficients	**Course**	**Applications (S/L/P)**
Bachelor	2	1
Master	2,5	1,5
Bachelor - foreign language	2,5	1,25

[xiv] *The courses that should have been previously completed or equivalent will be mentioned*

[xv] *Board, video projector, flipchart, specific teaching materials, online platforms, etc.*

[xvi] *Computing technology, software packages, experimental stands, online platforms, etc.*

[xvii] *The learning outcomes will be stated in accordance with the specific standards of the ARACIS expert commissions (https://www.aracis.ro/ghiduri/)*

[xviii] *Chapter and paragraph titles*

[xix] *Exposition, lecture, board presentation of the studied topic, use of video projector, discussions with students (for each chapter, if applicable)*

[xx] *The relationship with other disciplines, the usefulness of the discipline on the labour market*

[xxi] *CPE – Conditions Exam Participation; nCPE – Does Not Condition Exam Participation; CEF - Conditions Final Evaluation; N/A – not applicable*

[xxii] *The number of tests and the weeks in which they will be taken will be specified*

[xxiii] *Scientific circles, professional competitions, etc.*

[xxiv] *The minimum performance standard in the competence grid of the study program is customized to the specifics of the discipline, if applicable*