

SYLLABUS

Individual project in bioinformatics

Academic year **2025-2026**

1. Information regarding the programme

1.1. Higher education institution	Babeş-Bolyai University
1.2. Faculty	Faculty of Biology and Geology
1.3. Department	Department of Molecular Biology and Biotechnology
1.4. Field of study	Biology
1.5. Study cycle	Master, 4 semesters
1.6. Study programme/Qualification	Bioinformatics Applied in Life Sciences (English)/ Biologist
1.7. Form of education	Full-time

2. Information regarding the discipline

2.1. Name of the discipline		Individual project in bioinformatics					Discipline code		BME 1142		
2.2. Course coordinator					Prof. Horia Leonard Banciu, PhD						
2.3. Seminar coordinator					Prof. Horia Leonard Banciu, PhD						
2.4. Year of study		2	2.5. Semester		4	2.6. Type of evaluation		E	2.7. Discipline regime		Mandatory

3. Total estimated time (hours/semester of didactic activities)

3.1. Hours per week	5	of which: 3.2 course	0	3.3 seminar/laboratory	5
3.4. Total hours in the curriculum	70	of which: 3.5 course	0	3.6 seminar/laborator	70
Time allotment for individual study (ID) and self-study activities (SA)					hours
Learning using manual, course support, bibliography, course notes (SA)					25
Additional documentation (in libraries, on electronic platforms, field documentation)					25
Preparation for seminars/labs, homework, papers, portfolios and essays					25
Tutorship					26
Evaluations					4
Other activities: two-way communication with the course holder / tutor					21
3.7. Total individual study hours	126				
3.8. Total hours per semester	196				
3.9. Number of ECTS credits	8				

4. Prerequisites (if necessary)

4.1. curriculum	Not applicable
4.2. competencies	Computer skills and Linux proficiency Ability to analyze, evaluate, and synthesize information in order to make informed decisions and solve problems logically and reasoned

5. Conditions (if necessary)

5.1. for the course	Not applicable
5.2. for the seminar / lab activities	PC/ notebook with licensed software and internet access

6.1. Specific competencies acquired ¹

Professional/essential competencies	<ul style="list-style-type: none"> • Analysis and formalization of problems for solving which bioinformatics knowledge is required; • Using bioinformatics applications and strategies to solve problems; • Analysis, design and implementation of biological data analysis programs; • Use of specific methodologies and tools for biological data analysis. 	•
Transversal competencies	<ul style="list-style-type: none"> • Scientific and professional communication skills; concise written and oral description of scientific and professional results. • Communicating the results in English. 	•

6.2. Learning outcomes

Knowledge	<p>The student knows:</p> <ul style="list-style-type: none"> • The methodologies and best practices for designing, implementing, and documenting an individual research project in bioinformatics. • Advanced bioinformatics techniques, including algorithm development, statistical analysis, and data visualization relevant to the chosen project.
Skills	<p>The student is able to:</p> <ul style="list-style-type: none"> • Independently plan and execute a bioinformatics project, applying appropriate computational tools and analytical approaches. • Identify and address technical and scientific challenges encountered during project development.
Responsibility and autonomy:	<p>The student has the ability to work independently to obtain:</p> <ul style="list-style-type: none"> • Critically evaluate and synthesize scientific literature to support project objectives and methodologies. • Present project findings in a structured and scientifically rigorous manner, both in written and oral formats.

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	<ul style="list-style-type: none"> • To develop students' ability to independently design, execute, and communicate a research or applied project in bioinformatics. Through this course, students will integrate theoretical knowledge with practical computational skills to solve complex biological data analysis problems, fostering autonomy, critical thinking, and scientific rigor.. 	•
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> • Developing the ability to design and carry out a bioinformatics project using suitable methods and tools. • Developing the ability to identify and solve technical and scientific problems in their projects. • Developing the ability to present their project results clearly in both written and oral formats. 	• • •

¹ One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

8. Content

8.1 Course	Teaching methods	Remarks
Not applicable		
8.2 Seminar / laboratory	Teaching methods	Remarks
1. Endorsing the research topic and defining the problem	Conversation, debate, case studies	
2. Bibliographic documentation	Conversation, debate, case studies	
3. Content of the paper: version 1.0	Conversation, debate, case studies	
4. Establishing the relevance of bibliographic sources for the proposed project	Conversation, debate, case studies	
5. Identification of possible original contributions; discussion and decision on experimental modelin	Conversation, debate, case studies	
6. Processing the documentation and writing the first version of the research report	Conversation, debate, case studies	
7. Finishing the research report	Evaluation	
Bibliography 1. References will be provided depending on the chosen research topic. 2. Electronic resources of literature and software, specific online databases for investigating the research topic.		



9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- The course enables the acquisition of theoretical and practical skills necessary for individual work in the research and development field within academic entities, as well as in R&D units of private companies.
- The course is included in the curricula of similar specializations at universities both Romanian and foreign.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	Not applicable		
10.5 Seminar/laboratory	Completion and submission of the assigned stage-level tasks	Written exam	50%
	Completion and submission of individual project in bioinformatics		50%
10.6 Minimum standard of performance			
<ul style="list-style-type: none">• Obtaining a minimum grade of 5.00 (five) in the final average for the course.• Completion and submission of at least one stage-level assignment, in accordance with the established requirements.• Completion and submission of individual project in bioinformatics, in accordance with the established requirements.			

11. Labels ODD (Sustainable Development Goals)²

	General label for Sustainable Development							
								

Date:
08.01.2025

Signature of course coordinator

Prof. Horia Banciu, PhD

Signature of seminar coordinator

Prof. Horia Banciu, PhD

Date of approval:

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Signature of the head of department

Assoc. Prof. Beatrice Kelemen, PhD

² Keep only the labels that, according to the [Procedure for applying ODD labels in the academic process](#), suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „*Not applicable.*”.