SYLLABUS

Curricular internship

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	**Curricular internship**					Discipline code	**BME 1141**
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	VP	2.7. Discipline regime	Mandatory

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

3.1. Hours per week	**14**	of which: 3.2 course	**0**	3.3 seminar/laboratory	**14**
3.4. Total hours in the curriculum	196	of which: 3.5 course	0	3.6 seminar/laborator	**196**
Time allotment for individual study (ID) and self-study activities (SA)					**hours**
Learning using manual, course support, bibliography, course notes (SA)					20
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					10
Tutorship					60
Evaluations					4
Other activities: two-way communication with the course holder / tutor					40
3.7. Total individual study hours	154				
3.8. Total hours per semester	350				
3.9. Number of ECTS credits	14				

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	The internship partner provides at least the following resources: • Scientific references for the scientific problem to be investigated • Relevant data to help in the validation of any software implementation • Fully licensed computer programs.

6.1. Specific competencies acquired [1]

Professional/essential competencies	• Identification of appropriate methodologies for software development in bioinformatics; • Use of methodologies, specification mechanism and development frameworks for developing bioinformatic applications • Development of dedicated bioinformatics projects
Transversal competencies	• Application of efficient work rules and responsible attitudes towards the scientific domain, for the creative exploitation of one's own potential according to the principles and rules of professional ethics • Efficient conduct of activities organized in an interdisciplinary group and development of empathic capacity of interpersonal communication, networking and collaboration with diverse groups • Use of efficient methods and techniques for learning, information, research and development of abilities for knowledge exploitation, for adapting to the needs of a dynamic society and for communication in a widely used foreign language.

6.2. Learning outcomes

Knowledge	The student knows: • The fundamental principles of bioinformatics workflows and computational pipelines used in research and industry settings. • The ethical, legal, and professional responsibilities in bioinformatics, including data privacy, intellectual property, and reproducibility.
Skills	The student is able to: • Apply bioinformatics tools and computational methods to analyze biological data in a real-world research or industry setting. • Integrate and interpret heterogeneous biological datasets to derive meaningful conclusions and support decision-making.
Responsibility and autonomy:	The student has the ability to work independently to obtain: • Communicating bioinformatics results effectively in both written and oral formats, adapting to scientific and non-specialist audiences. • Collaborating in interdisciplinary teams, understanding the role of bioinformatics within broader biomedical or biotechnological projects

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

7.1 General objective of the discipline	• Gaining skills of team working for developing a software or generating results and the subsequent documentation writing under the coordination of the practice partners and the guiding tutor.
7.2 Specific objective of the discipline	• Creating a data analysis program in a team or solving a bioinformatics problem starting from the available data • Preparation of a report • Presentation of the application / results

[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**
Stage 1 Establish the problem statement to be solved. Study the theoretical implications.	Exposure, description, explanation	
Stage 2 Establish the scientific methods and models to pursue Scientific investigation on the methods and models and their suitability for the task	Dialog lecture, discussions, team debate	
Stage 3 Develop detailed specifications of the project Project analysis: entities and relations identification, use scenarios, data flow diagrams	Dialog lecture, discussions, team debate	
Stage 4 Design : conceptual data model, logical data model, computation design, physical data model, user interface, application architecture Implementation and testing.	Questioning, discovery	
Stage 5 Integration, testing experiments, data collection, results evaluation	Case study, cooperation, questioning	
Stage 6 Reporting of the developed application or scientific results	Evaluation	
Bibliography 1. Heath, L. S., & Ramakrishnan, N. (Eds.). (2010). Problem solving handbook in computational biology and bioinformatics (No. 784). Springer Science & Business Media. 2. Sperschneider, V. (2008). Bioinformatics: problem solving paradigms. Springer Science & Business Media. 3. 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 teamwork 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 bothRomanian 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 of the planned tasks.	Performance monitoring	50%
	Writing of an activity report		50%
10.6 Minimum standard of performance			
• Obtaining a minimum grade of 5.00 (five) in the final average for the course. • Completion and submission of at least one activity report, 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:
...

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.*”.