

CURRICULUM

2026–2030

Course Title & Activities	Semester I		Finalization	ECTS
<i>Advanced-university-studies-based training program</i>	Lecture hours	Seminar / Laboratory hours		
Biological Research Management and Ethics	14 of which • in-person: 5 hours • online: 9 hours (64.28%)	28 of which • in-person: 20 hours • online: 8 hours (28.57%)	E	9
Design and Writing of a Scientific Paper	14 of which • in-person: 5 hours • online: 9 hours (64.28%)	28 of which • in-person: 20 hours • online: 8 hours (28.57%)	E	9
Statistical and Bioinformatics Processing of Experimental Data	28 of which • in-person: 10 hours • online: 18 hours (64.28%)	28 of which • in-person: 20 hours • online: 8 hours (28.57%)	E	9
Academic Ethics and Integrity	14 of which • in-person: 5 hours • online: 9 hours (64.28%)		V	3
Total hours and ECTS	70 of which • in-person: 27 hours • online: 45 hours (64.28%)	84 of which • in-person: 60 hours • online: 24 hours (28.57%)		30

[illegible]

ECTS = European Credit Transfer and Accumulation System; E = Exam; V = verification.

¹Reports evaluated by the doctoral supervisor.

²Every year, at the end of Semester II, the Faculty of Biology organizes the Student Scientific Communications Session, which doctoral students may attend.

³Reports evaluated by the Academic Guidance and Integrity Committee.

The 2 scientific reports from the first year of doctoral studies may be equated with a review published in a BDI-indexed journal (articles may be published in the doctoral school's journal ***Reviews in Biological and Biomedical Sciences***: <https://rev-biomed.unibuc.ro/>)

In years II–IV, the following equivalencies may apply:

- 1 BDI-indexed article may be equated with 1 research report.
- 1 ISI article (review/original article) with an impact factor may be equated with 2 research reports.
- 2 ISI articles (review/original article) with an impact factor (at least 1 of which with an impact factor greater than 3) may be equated with 4 research reports.
- 3 ISI articles (review/original article) with an impact factor (at least 1 of which with an impact factor greater than 4) may be equated with 5 research reports.

COMPETENCIES DEVELOPED WITHIN THE DOCTORAL UNIVERSITY STUDY PROGRAM: BIOLOGY

The competencies acquired upon completion of doctoral university studies in the field of Biology correspond to the Level 8 qualification of the European Qualifications Framework (EQF) and the National Qualifications Framework (NQF), as set out in Order No. 3020 of 8 January 2024 on the Regulation of Doctoral University Studies.

Professional competencies (content-related, cognitive, and research)

1. Advanced knowledge of the field;
2. The ability to identify, formulate, and creatively solve research problems;
3. Mastery of advanced research methods and techniques;
4. Knowledge of research project management;
5. Mastery of new research procedures and solutions;
6. Skills in documenting and making use of scientific papers;
7. The ability to draft scientific papers and other academic materials at an advanced level, in a style appropriate to the field of study and in compliance with its specific requirements at national and international level;
8. The ability to process data at an advanced level, including through the use of dedicated software;
9. Academic-level language skills in internationally used languages, necessary for documentation and the drafting of scientific papers;
10. Understanding of, and the ability to apply, the principles and values of scientific research ethics in the field of biological and biomedical sciences.

Transversal competencies:

11. Written and oral communication skills in the field of biological and biomedical sciences;
12. Advanced language skills in internationally used languages, including the ability to express and formulate ideas in multicultural and multilingual contexts;
13. Advanced digital skills and competencies, as part of society's digital transformation, including through the use of artificial intelligence;
14. Interpersonal and teamwork skills;
15. Knowledge of human, material, and financial resource management;
16. Knowledge of career management, as well as mastery of techniques for job searching and for creating jobs for others;
17. Knowledge of risk, crisis, and failure management;
18. Knowledge of critical thinking, including the ability to analyze, interpret, or formulate reasoning in various contexts;
19. Knowledge of the legislation governing intellectual property rights;
20. The ability to innovate and mastery of concepts relating to economic, technological, and social entrepreneurship.

ESCO 2131.4: Biologists, botanists, zoologists, and related professionals; ESCO 2132: Agriculture, forestry, and fisheries advisers; ESCO 2133: Environmental protection professionals; ESCO 21337: life science professionals (environmental protection researcher); ESCO 2269.14: health professionals (advanced researcher in the biomedical field); ESCO 2310.1.6: higher education teaching professionals (university teaching assistant); ESCO 2310.1.41: research assistant in higher education; ESCO 2330.1.2: biology teacher in secondary education; ESCO 2330.1.18: science teacher in secondary education.

LEARNING OUTCOMES

Knowledge

- R1.** The doctoral student/graduate understands and possesses advanced knowledge of the fundamental concepts, theories, principles, phenomena, and laws of Biology.
- R2.** The doctoral student/graduate acquires knowledge of the national and international regulatory framework relevant to research in the field of their doctoral thesis (research ethics, protection of human and animal subjects, sensitive data, biosecurity, etc.).
- R3.** The doctoral student/graduate understands basic and advanced statistical methods.
- R4.** The doctoral student/graduate identifies the mathematical models and algorithms appropriate for analyzing their own experimental data.
- R5.** The doctoral student/graduate recognizes, lists, describes, and compares classic and modern experimental techniques, understands the principles of the methods applied, and appropriately presents experimental results.
- R6.** The doctoral student/graduate identifies and understands the characterization methods and techniques, as well as the equipment needed to design and carry out experiments in the field of their doctoral thesis.

- R7.** The doctoral student/graduate acquires knowledge of the stages involved in developing a research project and of specific project-management concepts.
- R8.** The doctoral student/graduate identifies, explains, and transfers knowledge/concepts from the field of biology to other scientific or applied fields.
- R9.** The doctoral student/graduate knows, explains, and correctly uses the specific terminology and scientific language of the biology field addressed, interprets experimental results, and drafts academic-level scientific papers.
- R10.** The doctoral student/graduate rigorously describes and interprets experimental data specific to the field of biology, demonstrating in-depth critical analysis by comparing them with validated results from the specialized scientific literature.
- R11.** The doctoral student/graduate identifies and illustrates opportunities for disseminating the scientific results obtained, including in internationally used languages, ensuring their compliance with ethical principles and current legislative regulations.
- R12.** The doctoral student/graduate identifies the optimal methods of analysis for obtaining relevant information in the field of their doctoral thesis.

Skills

- R1.** The doctoral student/graduate implements techniques specific to the field of biology addressed in the doctoral thesis and other related fields, uses complex equipment/instruments, and designs experimental and/or technological workflows for analyzing biological systems.
- R2.** The doctoral student/graduate develops inter- and transdisciplinary skills, formulates and implements research results in various fields of activity, precisely applying biology concepts specific to the doctoral thesis in diverse contexts.
- R3.** The doctoral student/graduate independently plans and conducts original research in the field of the doctoral thesis.
- R4.** The doctoral student/graduate develops and drafts scientific, academic, or technical texts on various topics, makes scientific results public through appropriate means, and develops alliances, contacts, or partnerships.
- R5.** The doctoral student/graduate uses advanced software tools dedicated to documentation and in-depth analysis in the field of biology relevant to the doctoral thesis, applying bioinformatics methods in order to rigorously interpret and correlate their own experimental data with relevant information from the specialized scientific literature.
- R6.** The doctoral student/graduate makes use of specialized IT resources for thorough documentation regarding the dissemination of the scientific results obtained, through the publication of scientific articles and participation in prestigious scientific events, both nationally and internationally.
- R7.** The doctoral student/graduate will have the ability to design, coordinate, and critically assess the ethical and environmental risks associated with a research project in the field of study.
- R8.** The doctoral student/graduate correctly interprets experimental data from the specialized literature and makes comparisons regarding advantages and disadvantages.

R9. The doctoral student/graduate will have the ability to properly manage research data (collection, storage, analysis, archiving, and sharing).

R10. The doctoral student/graduate understands and applies ethical principles and norms in research activity and in the development of the doctoral thesis, including responsibility toward the environment and the community.

R11. The doctoral student/graduate drafts and effectively communicates the results obtained, both in written and oral form, respecting ethical requirements and quality standards.

R12. The doctoral student/graduate identifies problems that may arise in scientific research and, autonomously and creatively, formulates methods for solving them.

Responsibility and Autonomy

R1. The doctoral student/graduate demonstrates initiative and self-control, the ability to anticipate and to conduct prospective evaluation, and responsibility and autonomy in making ethical and professional decisions within the scientific process.

R2. The doctoral student/graduate critically analyzes scientific results from the literature and applies this knowledge to formulate their own opinions and develop innovative solutions in the field of their doctoral thesis.

R3. The doctoral student/graduate responsibly identifies and makes use of opportunities for collaboration and interdisciplinary teamwork as a basis for generating innovative developments.

R4. The doctoral student/graduate drafts, disseminates, and presents, with sound argumentation, their own scientific contributions before a specialized audience, exchanges information with others, and develops professional networks.

R5. The doctoral student/graduate takes responsibility for planning and disseminating their own scientific results, demonstrating autonomy in the critical selection and use of specialized IT resources, in compliance with ethical norms and legislative regulations, in national and international scientific contexts, thereby actively contributing to the development of knowledge in the field.

R6. The doctoral student/graduate takes responsibility for their own professional development, planning and critically evaluating their own progress.

R7. The doctoral student/graduate demonstrates responsibility and autonomy in the use and maintenance of laboratory equipment and in coordinating research teams, in compliance with the principles of ethics and academic integrity.

R8. The doctoral student/graduate demonstrates responsibility and autonomy in drafting and evaluating articles from the perspective of research management and research ethics.

R9. The doctoral student/graduate efficiently organizes their time and resources, complying with deadlines, professional ethics and deontology, and safety and quality standards.

R10. The doctoral student/graduate argues logically and coherently and takes ownership of the conclusions of their own research activity.

R11. The doctoral student/graduate autonomously identifies and appropriately uses available information sources in order to generate new knowledge in the field.

R12. The doctoral student/graduate exercises intellectual initiative and autonomous decision-making in evaluating the scientific value of the experimental data obtained, through critical and well-reasoned reference to validated information in the specialized literature.

Dean,
Prof. dr. Liliana BURLIBAȘA

Director of the Doctoral School,
Prof. dr. Otilia ZĂRNESCU