

# FACULTY OF BIOLOGY AND BIOTECHNOLOGY

## University of Warmia and Mazury in Olsztyn, Poland



*Field of study:* **Biological sciences**  
*Scientific discipline:* **Biology**  
*Course of study:* **Biology**  
*Specialty training:* **Medical biology**

*Educational profile:* **General academic**  
*Professional degree obtained:* **Bachelor (Licentiate)**  
*Level:* **Bachelor's Degree of Science (Licentiate)**



### EXPECTED LEARNING OUTCOMES AND QUALIFICATIONS

#### IN CATEGORY "KNOWLEDGE" THE GRADUATE:

1. understands and is able to use mathematical tools to describe natural phenomena;
2. has a basic knowledge of statistical methods used in biology;
3. understands physical processes, natural phenomena and their relationship with the functioning of living organisms;
4. understands the relationship between geological, geochemical and climatic diversity and the structure of the biomes;
5. has the required knowledge of chemistry for understanding basic phenomena associated with natural and biological processes;
6. understands the molecular characteristics of prokaryotic and eukaryotic organisms and is able to describe the molecular organization of a cell;
7. can describe metabolic processes in biological systems at cell and organism level;
8. has a knowledge of tools and methods used in metabolic control analyses.
9. can describe biochemical and physiological processes at cellular and molecular level in various groups of organisms;
10. has a knowledge of the chromosomal theory of inheritance and methods for genetic analysis;
11. can describe the genetic code, gene expression and control, DNA replication and translation;

12. has a fundamental knowledge of genetic engineering, molecular diagnostics, gene therapy, molecular basis of inherited diseases and cancer.
13. is familiar with the cell theory describing the level of organization in living organisms, differences between prokaryotic and eukaryotic organisms, differences between plant, animal and fungal cells, has a basic knowledge of cyclical endosymbiosis;
14. has a knowledge of plant and animal functions, including humans, understands the correlations between organ structure and function;
15. has a knowledge of the structure and morphological diversity of organism groups.
16. has a knowledge of the biology of different groups of organisms;
17. has a knowledge of physiological processes of organisms. Understands the relationships between and the regulation of physiological processes, the structure and functions of organisms;
18. has a knowledge of the molecular basis of immune response;
19. understands the role and goals of taxonomy and the principles of contemporary biological nomenclature;
20. can describe the main hypotheses and theories on the origin of groups of organisms;
21. can describe the structure and development of the biosphere, is familiar with the theories on the origin of life. Can describe the main cycles in the biosphere. Understands the circulation of elements in the environment;
22. is familiar with basic ecological concepts. Can describe various levels of biological organization, the production and decomposition of organic matter in the environment. Is familiar with basic ecological terminology;
23. understands the process of evolution. Is familiar with the mechanisms of evolution. Can describe the theories of biological evolution;
24. is familiar with the concept of biodiversity and can describe various forms of biological diversity at the genetic, species and ecosystem level;
25. is familiar with contemporary problems in nature conservation and environmental protection. Has a knowledge of environmental protection laws and basic nature conservation measures in Poland and the EU. Is familiar with methods supporting the preservation of genetic, species and ecosystem diversity;
26. can describe the causes and consequences of environmental degradation. Is familiar with environmental monitoring. Understands the concept of sustainable development. Is familiar with ethical issues in environmental protection;
27. has a knowledge of biotechnological application of living organisms in medicine, agriculture, industry, nature conservation and environmental protection;
28. is familiar with basic equipment used in biological research;
29. understands the specificity of experiments in life sciences;
30. has a fundamental knowledge of experimental methods;
31. is familiar with informatics tools used for processing and interpreting results.

32. has a fundamental knowledge of biochemical, genetic, microbiological, histological and immunological techniques;
33. has a fundamental knowledge of experimental techniques and tools in biology. Has a working knowledge of processes in biological laboratories;
34. has a fundamental knowledge of ergonomics, occupational health and safety principles for handling biological material;
35. is familiar with copyright laws, industrial property and copyright laws applicable to biology and biotechnology;
36. is familiar with the general principles of entrepreneurship in biology and biotechnology;
37. has a fundamental knowledge of English vocabulary in biological sciences;
38. is familiar with the requirements for delivering presentations in Polish and English;
39. has developed learning and teaching skills.

### **IN CATEGORY "SKILLS" THE GRADUATE:**

1. is able to describe biological phenomena with the use of simple mathematical methods and mathematical descriptions.
2. can analyse data with the use of basic statistical methods.
3. can perform simple observations and simple physical, biological and chemical measurements.
4. is familiar with basic biochemical, genetic, microbiological, histological and immunological techniques in biology.
5. can deploy standard methods in molecular biology.
6. can perform quantitative and qualitative analyses to the extent required for explaining biological phenomena and processes.
7. is familiar with simple techniques for processing biological material.
8. can use simple research equipment.
9. is able to perform simple experimental tasks and evaluations under the supervision of a tutor.
10. understands Polish and English scientific literature.
11. is able to evaluate and select scientific information in Polish and English.
12. knows how to use sources of scientific data.
13. knows how to store, process and transfer scientific data.
14. observes intellectual property laws when developing and publishing manuscripts, using graphical works and patents.
15. is able to prepare an oral presentation, discuss fundamental issues in biology in Polish and deliver public presentations.
16. learns individually under guidance, is capable of transferring the acquired knowledge and skills.
17. demonstrates foreign language competency at B2 level according to the Common European Framework of Reference for Languages.
18. uses professional language in the studied field.

## IN CATEGORY "SOCIAL SKILLS" THE GRADUATE:

1. is able to use professional language in discussions with specialists from related scientific areas.
2. is able to plan a scientific career, recognizes the need for lifelong learning and skills improvement.
3. is capable of performing different roles and choosing priorities in a team effort.
4. recognizes the need for competence building and personal development.
5. recognizes the need for updating knowledge of biology.
6. is aware of responsibility in assessing the risks arising from the use of biological tools and hazardous materials in the workplace, recognizes the significance of health and safety regulations.
7. has a knowledge of the possible applications of biological material. Recognizes the need for ethical behaviour in handling biological material.
8. can think and act as an entrepreneur or a member of an organized volunteer effort.

## Qualifications

The graduate has the skills and knowledge required for handling biological materials in research and analytical laboratories. He/she has the theoretical and practical knowledge necessary for designing and performing basic biological procedures. He/she has fundamental knowledge in basic fields of biology, understands basic natural phenomena and correlations between environmental components. He/she can plan and perform field studies aiming to identify plants and animals as well as basic tasks related to environmental protection and nature conservation. He/she has a pro-active attitude towards learning and solving scientific and practical problems in biology. He/she has fundamental knowledge of biology. He/she observes health and safety regulations in laboratories. He/she has teamwork and organizational skills. He/she can collaborate with experts from all relevant fields. He/she is creative and has developed self-study skills. He/she is able to share the acquired knowledge with the public. He/she is ready to start a career or pursue a Master's degree.

Specifically, **the graduate of Medical Biology training** has knowledge of human physiology and understands the relationships between and the regulation of human physiological processes. He/she is able to define and describe biochemical and physiological processes in the human body at the molecular, cellular, tissue and organ level. He/she has knowledge of basic methods of molecular detection, genetic engineering, diagnostic parasitology, mycology, toxicology and microbiology. He/she is familiar with basic methods of health status assessment. He/she is familiar with basic

psychological and social concepts and mechanisms related to health and health protection. He/she is familiar with the basic principles of health and healthy lifestyle promotion. He/she is familiar with legal, organizational and ethical principles in biological research. He/she is familiar with basic equipment and instruments used in biomedical laboratories. He/she understands basic work principles in medical laboratories. He/she is able to operate basic equipment and instruments applied in biomedical research. He/she maintains the required level of physical fitness for performing professional tasks relevant to the field of study. He/she shows respect for patients, clients and social groups, and demonstrates concern for their welfare. He/she uses correct nomenclature in the field of medical biology. He/she is familiar with the general principles of entrepreneurship in the field of natural sciences and medical biology. He/she is able to handle and work safely with biological materials. He/she can cooperate with certified experts in medical analysis and diagnosis and can participate in research involving biological materials.