Learning outcomes for the graduate university study of experimental biology

1. Associate the structure of organisms, their evolutionary course of development, and the systematic affiliation with their physiological functions and the flow of energy in nature.
2. Outline the interdependence of the fundamental morphological and anatomical assumptions with the physiological principles with the function of structural parts of autotrophic and heterotrophic organisms that are necessary for maintaining homeostasis.
3. Apply scientific methods according to the set hypotheses and conceived experimental design for resolving problems in transplantation immunology, tumour immunology, immunology of microorganisms and pharmaceutical immunology.
4. Apply the appropriate methods and techniques in researching immunological responses in individual diseases and assess the effect of certain therapies on animal models and *in vitro* studies.
5. Analyse and recognise the physiological changes and effects of toxic substances, give a critical overview of toxicity testing experiments from a bioethical perspective.
6. Analyse the mechanisms of animal defence from infections, tumours and the mechanisms of maintaining antigenic and genic homeostasis.
7. Analyse the position and role of microorganisms in the biosphere, in processes of cycling of biogenic elements, and their influence on all living beings, including humans.
8. Critically apply the concepts of population and quantitative genetics in other relevant branches of biology (botany, zoology, evolutionary biology and ecology) and applied biology (conservation biology, agronomy, medicine and forensics).
9. Master the identification of biologically important molecules and their significance for individual life processes in plants, for the purpose of analysing the molecular foundation of life processes of plants in normal and pathophysiological conditions.
10. Discuss and recognise the main characteristics and problems in the protection and management of national parks and nature parks in Croatia, giving a comparative and critical analysis of the different levels of categories of protected areas in Croatia.
11. Recognise the significance of the ecological network and Natura species in nature conservation, and assess the influences on the environment, addressing the representation of individual forms of organisms among the protected taxa, given their ecological significance and degree of study.
12. Explain the economic potential of the national flora, with a view to endemism and invasiveness of plants.
13. Master the searching of databases, independently using network resources in scientific research, using structural databases and tools for modelling and visualisation.
14. Design an appropriate biodiversity study using the appropriate sampling methods, processing and statistical analysis of data on biodiversity, assimilating data on biogeography, plant communities, climate and fauna of a given area.
15. Research (observation, recording, geocoding) the distribution, biodiversity and biological characteristics of organisms during field study.
16. Experimentally test the hypothesis set during field studies.
17. Implement experiments with the application of basic and specific laboratory methods and instruments, with the prior independent planning of research in the area of physiology, immunology and ecology.

18. Use various devices, measurement instruments and optical aids in research methods in biology when planning and implementing routine analyses, experiments, research and projects.
19. Use the appropriate computer programmes for analysis and preparation of an overview of the results of routine analyses and scientific research, and their expert, scientific or multimedia presentation for the purposes of preparing expert reports and scientific articles.
20. Prepare documentation of a project proposal of a scientific study and documentation for the evaluation of an executed project.
21. Independently execute the planned study, analysis and presentation of the overall research project, with written and verbal communication of the results in line with scientific criteria.
22. Display the research results in the form of a report, expert or scientific article and poster, with appropriate communication with experts and other interest groups of experts or the general public.
23. Critically evaluate the project proposal, results and overview of the research, scientific work, article, journal and work of scientists.
24. Lead research and the laboratory with the organisation and coordination of teams participating in the implementation of experimental work of routine, scientific and medical analyses.
25. Lead a laboratory and research group in the area of the physiology of metabolic diseases (obesity, diabetes and other metabolic disorders), transplantation immunology and medicine.
26. Propose possibilities for improving methods and techniques in professional, scientific and experimental research.
27. Implement knowledge from plant and animal ecology and environmental protection in planning and developing gardens, protected areas, rural and urban centres for the purpose of achieving a healthier and more natural living environment.
28. Educate society on the importance of preserving the natural environment through the application of ecologically acceptable solutions, mastering the knowledge of seeking out solutions with an emphasis on a strong link with ecology, biogeography and conservation biology.
29. Lead tasks in conservation and managing natural resources in the state administration and private sector, using the prescribed national and international laws and directives.
30. Organise and lead the breeding of laboratory animals, and the *in vitro* breeding of plants, abiding by the prescribed national and international legal directives.