MINISTER OF EDUCATION, SCIENCE AND SPORT OF THE REPUBLIC OF LITHUANIA

ORDER
ON APPROVAL OF THE DESCRIPTOR OF THE STUDY FIELD OF ECOLOGY

30 November 2020 No. V-1863
Vilnius

In accordance with Paragraph 11 of Article 53 of the Law on Higher Education and Research of the Republic of Lithuania:

1. I approve the Descriptor of the Study Field of Ecology (enclosed).

2. I determine that the higher education institutions have to adjust their study programmes to the Descriptor of the Study Field of Ecology approved by Clause 1 hereby until 01 September 2021.

Minister of Education, Science and Sport at interim Algirdas Monkevičius

APPROVED
by Order No. V-1863 of the
Minister of Education, Science and
Sport of the Republic of Lithuania
of 30 November 2020

DESCRIPTOR OF THE STUDY FIELD OF ECOLOGY

CHAPTER I
GENERAL PROVISIONS

1. The Descriptor of the Study Field of Ecology (hereinafter – Descriptor) regulates the special requirements for the study programmes in the study field of ecology (D07) in the group of study fields of life sciences (D). The Descriptor regulates the study field of ecology in the scope not covered by the General Requirements for the Studies approved by Order No. V-1168 of the Minister of Education and Science of the Republic of Lithuania of 30 December 2016 "On approval of the General Requirements for the Studies."

2. The Descriptor's requirements shall be applicable to the study programmes of the first and second cycle that are conducted in a full-time and part-time study mode.

3. General goals of the field of ecology:

3.1. to train the specialists in the field of ecology, who would have wide basic knowledge in ecology and nature preservation, and sufficient amount of knowledge and motivation to be able to work according to the acquired qualification of an ecologist, to continue studying or learning, to be able to integrate the tasks encountered in the course of practical activities through analysis, critical and systemic evaluation of these tasks, to create and implant the scientific novelties in the area of applied ecology;

3.2. to provide an environment for gaining of knowledge and skills necessary to research the relations of organisms with the dwelling environment on the levels of individual, populations and ecosystems, and to form the paradigm of thinking in ecology and nature preservation necessary to solve the modern problems of protection of biodiversity;

3.3. to encourage the students to take interest in relevant interdisciplinary academic topics and advanced practice, trough integration of the knowledge in ecology with achievements in other scientific areas and ability to solve the problems of ecology and nature preservation within the context of achievements in modern life sciences;

3.4. to expand or deepen the students' knowledge in general ecology;

3.5. to train the skills to perform the ecological research or applied work that would be in conformity with the latest scientific developments, and that would be linked to researches in other scientific areas;

3.6. to develop the constructive systemic thinking, perspective approach to nature preservation, skills, and sense of civic responsibility.

4. The persons, who complete the studies in the study field of ecology, receive bachelor's/ master's degree in life sciences that is in conformity with the sixth/seventh level of the Lithuanian Qualifications Framework and the European Qualifications Framework for lifelong learning, and first/second cycles of the Framework for Qualifications of the European Higher Education Area attested by the diploma of bachelor's/ master's degree in life sciences and diploma supplement issued by the higher education institution.

5. The studies of ecology may also be provided as studies within the study programmes classified under two study fields organised together with the study programmes in the study fields of informatics, physical, life, engineering, technological, health, social, law, educational, and agricultural sciences. The provided qualifications supplement each other with the acquired skills and skills.

6. The persons, who have at least secondary education and who have passed national maturity and/or school exams in biology, chemistry, and mathematics, may be admitted to the first cycle of study field of ecology through a competition.

7. It is recommended to admit the persons, who have graduated the study programmes in life, health, agricultural, physical, engineering, technological, and social sciences, and who have acquired at least the bachelor's degree, for the studies of the second cycle in the study field of ecology. The learning outcomes of the first cycle must assure the ability to study according to the study programmes of second cycle in ecology; therefore, the higher education institutions conducting such studies shall evaluate the character of the organised studies and make a list of admissible study fields of first cycle. If some candidates with bachelor's degree lack certain knowledge or skills, the bridging courses of the necessary subjects may be organised, yet their volume cannot exceed 60 credits.

CHAPTER II
CONCEPT AND SCOPE OF THE STUDY FIELD

8. Ecology is a science that studies the relations of organisms with the dwelling environment on the levels of individual, populations and ecosystems.

9. The studies of ecology mean an academic field that integrates knowledge and skills in the fields of life, physical and social studies necessary to solve the problems of ecology and nature preservation.

10. The studies of first cycle are used to train the specialists in the field of ecology, who would have wide basic knowledge in ecology and nature preservation, who would be able to integrate the tasks encountered in the course of practical activities through analysis, critical and systemic evaluation of these tasks, to create and implant the scientific novelties in the area of applied ecology, to integrate knowledge with achievements in other scientific areas, who would be able to solve the problems of ecology and nature preservation within the context of modern achievements in life sciences, and who would understand the importance of life-long learning.

11. The studies of second cycle are used to train the specialists in the field of ecology, who would be competent to carry out researches of the relations of living organisms with the dwelling environment on the levels of individual, populations and ecosystems, to solve modern problems of biodiversity preservation, who would know well the biodiversity, distribution and totality of species, who would be able to foresee changes in the environment, and who would understand the essential processes taking place in the environment.

12. The learning outcomes of the study field of ecology are directed to the skills developed through the university studies.

13. When the study programmes in the field of ecology are formed, it is recommended to observe the following provisions on their structure:

13.1. at least 5 percent of the credits received in the course of the studies of first cycle must come from general university subjects, 5–10 percent of the credits – from the basic subjects in the study field of mathematics and informatics; 20–30 percent – from the subjects of life sciences; 25–40 percent – from optional subjects that help to deepen or expand knowledge in certain field. The volume of studies is 180 credits;

13.2. at least 50 percent of the credits received in the course of the studies of second cycle must come from subjects that help to deepen or expand knowledge in certain field, not more than 20 percent – from optional subjects or subjects of the other study field, at least 25 percent – graduation work and 5 percent – practical training. The volume of studies is 90 or 120 credits;

13.3. the specializations related to natural, technological, medical and health, agricultural sciences and/or humanities could be provided in the study field of ecology.

14. The graduates of the study field of ecology may work in various educational institutions, research and study institutions, companies of higher technologies, industry, research

and development, analysis, analytics and in other areas, establish new business enterprises, and they may work in other (public) institutions of ecology, nature preservation, economic and management.

15. The knowledge accumulated in the course of study years create preconditions for the graduates for independent life-long learning.

CHAPTER III
GENERAL AND SPECIAL LEARNING OUTCOMES

16. Upon completion of the studies of first cycle in the study field of ecology, the following learning outcomes have to be achieved:

16.1. knowledge, its application. The person:

16.1.1. shall know and understand fundamental natural and anthropogenic phenomena, their qualitative and quantitative manifestation; modern research and assessment methods of condition of the systems of biodiversity in ecosystems and habitations and their application possibilities in present-day complex researches of ecosystems of various types;

16.1.2. shall describe main structures of the relations of organisms with the dwelling environment (populations / communities/ ecosystems), and principles of functioning, possible development, and adaptation of living organisms in the changing environment;

16.1.3. shall explain the most important problems of preservation of biodiversity within the local, regional, national and global scope caused by human activities;

16.1.4. shall summarize the most important problems of interrelations between the environment and organisms / populations / societies, their determinants and probable consequences;

16.1.5. shall substantiate the solution of problems of ecology and nature preservation, based on the ecological principles substantiated by contemporary life sciences and their knowledge;

16.2. research skills. The person:

16.2.1. shall have skills of research planning, shall be able to name the problem of research, to select methodology and research equipment, and to perform the researches safely;

16.2.2. shall be able to apply the latest qualitative and quantitative research methods in the field of ecology and other scientific areas;

16.2.3. shall be able to systemize the acquired knowledge of individual subjects, to analyse and summarize the research data, to interpret the research results, to formulate and defend the research conclusion;

16.3. special skills. The person:

16.3.1. shall be able to use the data bases and bases of research publications in ecology, and other information sources;

16.3.2. shall be able to assess, analyse and interpret the data of ecology monitoring;

16.3.3. shall be able to use the modern information on ecology and/or nature preservation, analytical equipment and software of statistical analysis and environmental researches in order to collect and analyse the data needed for professional activities;

16.3.4. shall be able to assess the impact of economic activities on the ecosystems and diversity of species;

16.4. social skills. The person:

16.4.1. shall be able to evaluate the made decisions according to the ethical, legal, social, economic and nature preservation approach;

16.4.2. shall be able to work independently and in group, while searching and analysing the issues of informational environment and sustainable development, formulating conclusions, and presenting them to the audience;

16.4.3. shall be able to combine interests of various social groups, while analysing and evaluating decisions in ecology and nature preservation;

16.5. personal skills. The person:

16.5.1. shall have the skills of independent learning necessary to ensure continuous professional development;

16.5.2. shall be able to plan and organise individual works and to present them orally and in writing to the audience;

16.5.3. shall be able to find information from primary or secondary sources, including search for operational information, to systemise and structurise the information;

16.5.4. shall be able to use the legal acts and other documents and to analyse the standards related to ecology and nature preservation;

16.5.5. shall understand the moral responsibility for impact of their professional activities and their results on society, economic, cultural development, welfare and biodiversity.

17. The learning outcomes of the study field of ecology of second cycle are the following: deeper knowledge and skills in ecology or expanded competence of borderlands are acquired:

17.1. knowledge, its application. The person:

17.1.1. shall know and understand classical and modern concepts of ecology and nature preservation and shall be able to apply them for professional activities;

17.1.2. shall be able to analyse complex problems of biodiversity protection and climate changes, by establishing their factors and interrelations and integrating interdisciplinary knowledge;

17.1.3. shall be able to evaluate biodiversity, services of ecosystems, distribution of species of organisms in the ecosystems, and complex impact of environmental changes on living nature and society, based on the latest scientific achievements;

17.1.4. shall be able to make offers based on the latest knowledge in ecology, law on protection of biodiversity and its best practice necessary to make decisions of environmental management;

17.2. research skills. The person:

17.2.1. shall be able to analyse and assess the data of researches relevant for ecology in the integrated way, as well as to raise hypotheses;

17.2.2. shall be able to plan, organise and conduct fundamental and applied ecological researches;

17.2.3. shall be able to formulate scientific conclusions based on the systemised results of ecological researches;

17.3. special skills. The person:

17.3.1. shall be able to assess critically and suggest new concepts and strategic means in ecology, nature preservation and environmental policy;

17.3.2. shall be able to plan and organise ecological researches, nature preservation and environmental management, and shall apply the latest interdisciplinary knowledge;

17.3.3. shall be able to apply mathematical and statistical analysis methods and use information technologies, knowledge of statistical/ data analytical programming, work with big data, spatial (satellite, geographical information systems (GIS)) data, and shall have basic knowledge of information technologies (IT) necessary to manage and process such data flows in the course of evaluation of processes of biodiversity in ecosystems;

17.3.4. shall be able to use the sustainable development principles and the European Union’s and Lithuanian legal acts in the ecological and nature preservation activities;

17.4. social skills. The person:

17.4.1. shall be able to organise and coordinate independent and team work, and undertake responsibility for quality of own and team work and its improvement;

17.4.2. shall be able to communicate in the national and international professional space;

17.4.3. shall be able to communicate in the reasoned way with various target social groups and to present publicly the outcomes of professional activities during discussions of problems of ecology and nature preservation, with the help of the latest communication technologies and application of visualization methods;

17.5. personal skills. The person:

17.5.1. shall be able to study independently and choose the direction of professional development;

17.5.2. shall have the skills of strategical ecological thinking and shall endeavour at implementation of innovative decisions in ecology and nature preservation;

17.5.3. shall be able to adjust to the environment of professional activities that is changing all the time because of progress in knowledge, technologies and work organisation.

CHAPTER IV
TEACHING, LEARNING AND ASSESSMENT

18. Teaching has to be based on the integration of the latest achievements into the study process. The foundation of the study programme of ecology is competent and qualified university teachers, who want to teach a student to learn and systemise knowledge, who are able to improve the content of teaching and studying, to select suitable methods of student-directed teaching and assessment of achievements, to create new teaching methods, and to develop the life-long learning aspiration.

19. The teaching has to be based on the fundamental knowledge of ecology and other natural and social sciences. The teaching methods should expand the student's understanding of conceptual ecological fundamentals and increase professional competence.

20. The learning methods have to comply with the life-long learning concept. In the course of studies, the students should be trained and encouraged to acquire skills, how to learn.

21. Teaching and learning have to be based on clear goals formed by the university teacher and the student, that would comply with the goals of the study programme and the learning outcomes.

22. The choice of learning methods has to ensure possibility to achieve the learning outcome. General and special learning methods may be applied: active (analysis and solution of problems, teaching and professional practical training, preparation of report or notice, discussion, project-based activities, research work, and other methods directed to active and independent learning of the student), interactive (electronic teaching course of the subject, virtual conferences, video lectures), passive (lectures, practice, seminars and other traditional studying methods), as well as the methods of use of information technologies and field and experimental researches. The same methods may be applied in different cycles of studies; however, the content of the given task, the complexity degree and manifestation of the student's independency would differ.

23. When the higher education institution determines the procedure for assessment of the students' achievements, it provides the university teacher with the right to choose the assessment methods. The learning outcomes of the subject studied by the student shall be evaluated according to 10-point evaluation system. The evaluation system of the study field of ecology should allow observing the progress in pursue of the set outcome, noticing deviations on time, and maintaining the feedback. The achieved compulsory outcome is described by the evaluation criteria and allows evaluating the student's knowledge according to the principles of clarity, usefulness and impartiality.

24. When the academic achievements of the student are assessed, the cumulative (the learning outcomes are assessed through interim tests), collegial (the students are examined by a competent panel of ecological specialists – scientists, practicians – professionals, representatives of stakeholders), and diagnostic (it is conducted in order to learn the student's achievements and made progress in the end of the topic or part of the course) assessment may be used. The evaluation methods may be the following: written or oral examination; individual or group oral examination; testing; case analysis; report and defence of the laboratory work, course project or practical training; graduation work and its defence.

25. The university teacher shall inform the students in the beginning of the semester about the assessment procedure of the learning outcomes and present the thorough curriculum of the subject, its goals, expected learning outcomes, particular assessment structure of learning outcomes of the taught subject, impact of the interim tests on the final mark, and evaluation criteria.

26. The studies shall be finished by defending the graduation works on relevant scientific problems. The graduation works may be theoretical, experimental, applied, analytical and mixed. They have to reveal the knowledge and skills in ecology acquired in the course of studies, and experience of research conduction and analysis. The skills demonstrated in the graduation works of first and second cycle have to conform to the Lithuanian Qualifications Framework and the sixth (programmes of the first cycle) or seventh (programmes of the second cycle) level of the European Qualifications Framework for lifelong learning.

CHAPTER V
REQUIREMENTS FOR IMPLEMENTATION OF STUDY PROGRAMMES

27. The foundation of the study programme's implementation is competent and qualified university teachers, who carry out fundamental or experimental development researches, are well familiar with future work condition of the graduates, and who are able to help the students to get prepared for the future activities of ecologists.

28. General competence of the university teachers is assessed according to the following criteria: level of academic education, versatility of education, publication of scientific works in the recognized ecological publications, practical experience in performance of scientific research projects, teaching experience, ability to communicate in correct English or Lithuanian language orally and in writing, and participation in scientific conferences. The university teachers shall be able to advise the students properly on the issues of study- and career planning, and know the evaluation procedures and accreditation criteria of the study programmes in the field of ecology.

29. Professional competence of the university teachers shall be determined in accordance with the procedure approved by appropriate higher education institution.

30. The competent university teachers – practicians recognized in their area, who have at least the master's degree or equivalent higher education qualification may be invited to teach the subjects.

31. The assistants of university teachers may be involved in conduction of practical exercises for the students. In order to ensure quality of the laboratory works, the higher education institution may appoint the laboratory assistants competent to work with modern laboratory equipment. If necessary (e.g., to prepare the graduation work), the assistants of university teachers and/or laboratory assistants shall help he students to operate the laboratory equipment and to perform the investigations.

32. The defence board of the graduation work shall be formed from competent scientists. The chairman has to be an active scientist, who has a doctoral degree and who is familiar with the particularity of the graduate's future work, and employed in another higher education institution or research, business or industrial institution.

33. The university teachers teaching respective subjects and tutors of the graduation works, projects and practical training shall consult the students on the issues of the curricula or issues related to studies and raised individually by certain students. The consultations may be direct or virtual. The university teacher or researcher (also PhD student) may supervise the bachelor theses; while the scientists with a doctoral degree and active in scientific researches may supervise the master theses.

34. Responsible administration staff of the higher education institution, vice deans of the faculties, heads of departments, supervisors of study programmes and other responsible persons may consult on the issues of studies' organization and selection of the learning model. The universities' career centres shall organise and coordinate the career projecting activities for the students and shall provide individual and group consultations for the students.

35. The material base necessary to assure implementation of the study programme:

35.1. the lecture halls have to satisfy the hygienic and occupational safety requirements. There must be modern audio and video equipment and demonstration aids;

35.2. the laboratory equipment and devices have to be sufficient to teach the students to apply modern research methods independently or with the help of a laboratory assistant. The laboratories have to satisfy safety requirements and quality standards, to provide the students with the possibilities to investigate and learn plants, animals and microorganisms, to acquire skills to perform physical and chemical analysis of materials of ecosystems, as well as their microbiological and molecular analysis, to learn and understand the energy flows and conversions of the ecosystems;

35.3. the students have the possibility to use the university laboratories and other teaching basis according to the curriculum or individual needs coordinated with the director of the higher education institution or the authorized person, in the course of studies or while performing researches and projects;

35.4. each student has to perform research works using the equipment, inventory and base of the teaching training practice, and to learn to use the research devices in order to analyse the received results;

35.5. the teaching field practice is compulsory in the first study cycle. It is an integral part of the study field of ecology;

35.6. the number of textbooks, schoolbooks or summaries of lectures available in the libraries for each subject has to comply with the students' needs. The sufficient number of computers with suitable software, information equipment and accesses to databases has to be present in the libraries;

35.7. the number of the computers in use has to meet the needs of the study programme. All the computers must have standard text and necessary specialized program packages and Internet connection. The modern computerized teaching programmes are compulsory.

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