



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

**ORDER
ON APPROVAL OF THE DESCRIPTOR OF THE STUDY FIELD OF ENVIRONMENTAL
SCIENCE**

8 February 2021 No. V-207
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 Environmental Science (enclosed).
2. I determine that the higher education institutions have to adjust their study programmes to the Descriptor of the Study Field of Environmental Science approved by Clause 1 hereby until 01 September 2021.

Minister of Education, Science and Sport

Jurgita Šiugždiniienė

APPROVED

by Order No. V-207 of the Minister of
Education, Science and Sport of the Republic
of Lithuania of 8 February 2021

DESCRIPTOR OF THE STUDY FIELD OF ENVIRONMENTAL SCIENCE

CHAPTER I GENERAL PROVISIONS

1. The Descriptor of the Study Field of Environmental Science (hereinafter – Descriptor) regulates the special requirements for the study programmes in the study field of environmental science (C04) that belongs to the group of study fields of physical sciences (C). The Descriptor regulates the study field of environmental science (hereinafter – field of environmental science) 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 was prepared in consideration of the professional standard in the sector of environmental protection and the international practice and recommendations for studies of environmental science – Reference Points for the Design and Delivery of Degree Programmes in Earth Science, Tuning Project, and the Earth Sciences, Environmental Sciences and Environmental Studies. UK Quality Code for Higher Education, 2014.

3. The Descriptor’s requirements shall be applied for university studies of the first cycle and second cycle conducted as full-time or part-time studies.

4. General goals of the field of environmental science:

4.1. to provide knowledge and skills necessary to form the paradigm of thinking of environmental management and environmental protection;

4.2. to promote the students’ interest in relevant interdisciplinary academic topics;

4.3. to expand and deepen general competence of the students in the field of environmental science;

4.4. to develop the skills to perform the research work in the second cycle of studies;

4.5. to develop constructive systemic thinking, perspective approach, planning skills of environment management and environment protection, and a sense of civic responsibility.

5. Upon completion of the studies in the field of environmental science, the bachelor’s /master’s degree in physical sciences that is in conformity with the sixth/seventh level of the Lithuanian Qualifications Framework and the European Qualifications Framework for lifelong learning, and the first/second cycles of the Framework for Qualifications of the European Higher Education Area attested by the diploma and diploma supplement issued by the higher education institution are awarded.

6. The studies in the field of environmental science may also be provided as studies within the study programmes classified under two study fields organised together with informatics, physical, life, engineering, technological, health, social (economics, political sciences, public geography), educational, and agricultural sciences. The competences provided in different study fields shall supplement each other.

7. The volume of the studies in the field of environmental science in the study programmes classified under two study fields cannot be smaller than 150 credits, while the minimal volume of the minor study programme cannot be below 60 credits.

8. There are no special requirements established in the Descriptor for the persons, who want to be admitted to the study programmes in the field of environmental science.

9. It is recommended to admit to the studies of the second cycle the persons, who have at least a bachelor’s degree in the study programmes of physical, life, engineering, technological,

informatics, health, agricultural, and social sciences. The learning outcomes achieved in the first cycle of studies have to ensure the capacity to study in the study programmes of the second cycle of environmental science; therefore, the higher education institutions that are conducting the studies of the second cycle in the field of environmental science shall assess the character of the studies they organise and establish the lists of the study fields of the first cycle that may be accepted directly or through the bridging courses. The volume of the bridging courses cannot be smaller than 30 credits.

CHAPTER II CONCEPT AND SCOPE OF THE STUDY FIELD

10. The environmental science are an interdisciplinary science that studies the interrelations between physical, chemical and biological components in the environment with humans, that focuses on the researches of human impact on environment, environmental management and protection, and sustainable development of nature and society.

11. The studies of the environmental science are the interdisciplinary academic field that integrates knowledge and skills of physical (physics, chemistry, geography, geology, geoinformatics), life (ecology, biology) and social sciences (economics, political sciences, law) that are needed to solve the problems of environmental management and protection.

12. The interests of the field of environmental science are related to the following areas: environmental engineering, technologies of natural resources, energy engineering, public health, and agriculture.

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

13.1. 10-15 percent of the credits of the studies of the first cycle should be awarded to the subjects of basic physical sciences (higher mathematics, statistics, chemistry, physics); 15–25 percent – to the subjects of life sciences; 15–25 percent – to the subjects of geosciences, 25–40 percent – to the subjects deepening or expanding knowledge in specialty (including course papers, final work and practice); at least 5 percent should be awarded to general subjects of university studies;

13.2. at least 50 percent of the credits of the studies of the second cycle should be awarded to the subjects intended to deepen or expand the study field, not more than 20 percent should be awarded to optional subjects or subjects in the other study field, at least 25 percent should be attributed to the final work, and 5 percent – to practical training;

13.3. the specialisations related to environmental protection, environmental physics and chemistry, life sciences, renewable energy, geosciences and social sciences are available in the studies of the first cycle of the environmental science.

14. The graduates of the field of environmental science may work in educational, research and higher education institutions, high-tech and traditional industrial, research and development and manufacturing companies and other institutions, in the areas of analytics and in other areas, as civil servants, and they may establish new businesses or work in other institutions.

15. The knowledge obtained in the years of studies create preconditions for independent lifelong learning for the graduates.

CHAPTER III GENERAL AND SPECIAL LEARNING OUTCOMES

16. The following learning outcomes have to be achieved at the completion of the first cycle of studies in the field of environmental science:

16.1. knowledge and its application. The person:

16.1.1. knows and understands fundamental natural and anthropogenic manifestations, their qualitative and quantitative expression;

16.1.2. describes main natural and anthropogenic components of the environment, their interrelations and impact on the state of natural and human environment;

16.1.3. describes the main problems of the environmental state, the determining factors and possible consequences;

16.1.4. explains the key environmental preservation problems caused by human activities on the local, regional and global level, and is able to offer their solution methods;

16.1.5. knows and is able to apply the methods of mathematics, statistics and data analysis, as well as information technologies to describe the environmental processes and problems;

16.2. research skills. The person:

16.2.1. has skills to plan the research work, is able to formulate the research problem, to select methodology and research equipment, and to carry out the researches safely;

16.2.2. is able to apply the latest qualitative and quantitative environmental research methods;

16.2.3. is able to analyse, to summarise the environmental research data, to interpret the research results, to formulate and defend the research conclusions;

16.3. special abilities. The person:

16.3.1. is able to use the databases of environmental observation and scientific publications, other information sources, to assess, analyse and interpret the data of environmental observation;

16.3.2. is able to formulate the problems of practical activities related to the study field, to plan, design and control their implementation by choosing and applying the appropriate equipment and methods;

16.3.3. is able to use the modern equipment for analysis of environmental researches, their geoinformatics, statistical analysis and mathematical modelling in order to obtain and analyse the data needed for professional activities;

16.3.4. is able to assess the impact of economic activities on environment and society;

16.4. social abilities. The person:

16.4.1. is able to work independently and in team, to search for information on environment and sustainable development, to analyse it, to formulate the conclusions and to present them to audience;

16.4.2. is able to evaluate the made decisions using the ethical, legal, social, economic and environmental protection approaches;

16.4.3. is able to assume responsibility for quality and assessment of own work and that of employees subordinate to him/her, acts in compliance with the professional ethics and public spirit, as well as social responsibility principles;

16.4.4. is able to coordinate the interests of various social groups when analysing and assessing the decisions on environmental management and protection;

16.5. personal abilities. The person:

16.5.1. understands the importance of lifelong learning and has abilities necessary for continuous professional development;

16.5.2. is able to plan and organise independent works, to present them in writing and orally to the audience;

16.5.3. is able to find information in the primary and secondary sources, including the strategical information, to systemise and structure it;

16.5.4. is able to use legal acts and other documents, and to analyse the standards related to environmental science and environmental protection;

16.5.5. is able to assess critically own professional practice and that of his/her colleagues, understands moral responsibility for the impact of own activities and their outcomes on society, economic, cultural development, welfare and environment.

17. The learning outcomes of the second cycle of studies in the field of environmental science are deeper knowledge and skills in the field of environmental science or expanded competence in neighbouring fields:

17.1. knowledge and its application. The person:

17.1.1. knows classical and modern concepts of environmental science and environmental protection and is able to apply them in own professional activities;

17.1.2. substantiates the legal, political, administrative, economic and technical measures used to reduce the negative impact on environment or society and to preserve good state on the basis of the principles of sustainable development;

17.1.3. is able to integrate the knowledge of environmental science to solve the problems of new character in different areas;

17.2. research skills. The person:

17.2.1. is able to analyse and assess integrally the research data in the scientific fields relevant to environmental science, and to raise the research hypotheses;

17.2.2. is able to plan, organise and perform fundamental and applied researches of environmental science;

17.2.3. is able to formulate scientific conclusions and to give recommendations based on the systemised results of environmental researches;

17.3. special abilities. The person:

17.3.1. is able to assess critically and offer new concepts and strategical measures for environmental science, environmental protection, environmental policy and fight with the consequences of climate changes;

17.3.2. is able to plan and organise the environmental researches, works of environmental protection and environmental management, and to apply the latest interdisciplinary knowledge;

17.3.3. is able to apply mathematical and statistical analysis methods, as well as GIS technologies to evaluate the processes taking place in the environment;

17.3.4. is able to act in compliance with the principles of sustainable development and legal acts of the European Union and the Republic of Lithuania in work related to environmental science and environmental protection;

17.3.5. is able to prepare a plan of prevention and reduction of negative impact of economic activities on environment and society;

17.3.6. is able to analyse the complex problems of environmental protection and climate change, to determine their factors, interrelations, and to integrate the interdisciplinary knowledge;

17.3.7. is able to make optimal decisions about the changing environmental management based on the latest scientific information, environmental protection law, and the best practice;

17.4. social abilities. The person:

17.4.1. is able to organise and combine independent and team work, to assume responsibility for quality and improvement of independent and team work;

17.4.2. is able to communicate effectively on the topics of environmental science and sustainable development in the national and international professional ambient;

17.4.3. is able to organise and perform the scientific research work independently and in groups or in the interdisciplinary team, acts in in compliance with the professional ethics and public spirit within the national and international context;

17.4.4. is able to communicate and cooperate in the reasoned mode with the specialists of environmental science and society, to present the results of professional activities, to solve the problems of environmental science and environmental protection, and to discuss on topical issues of environmental protection and sustainable development;

17.5. personal abilities. The person:

17.5.1. is able to study independently and to set the aims of professional improvement;

17.5.2. is able to analyse the problems, to formulate the conclusions, to write research reports, and to prepare scientific articles;

17.5.3. is able to make independent decisions in complex situations, to assess critically the most suitable national and international information sources, and to understand the environmental protection, legal, social, economic and sustainable development-related aspects of the made decisions;

17.5.4. is able to consider strategically the issues of environmental protection, to endeavour at implementation of innovative solutions in environmental management and environmental science;

17.5.5. is able to adjust to the continuously changing professional work environment, advanced knowledge, technologies and work organisation.

CHAPTER IV TEACHING, LEARNING AND ASSESSMENT

18. The teaching, learning and assessment activities have to be organised in such a way so that the students would be able to achieve effectively the learning outcomes provided in the study programme.

19. The teaching content has to be updated and improved regularly. The new knowledge and teaching methods in compliance with the concept of lifelong learning have to be integrated into the study process. The students have to be prepared and encouraged to use the principles of the above concept in the course of their studies.

20. The learning methods necessary to consolidate practical abilities have to be provided in the studies.

21. The didactic system of the programmes has to train critical thinking, creativity, analytical, metacognition and generic abilities. It is recommended to include complex tasks and researches applicable in business, industry, civil service or other areas into the study process.

22. The university teachers have to know the didactic concept of the study programme and to apply various teaching methods in order to use optimally the available material resources.

23. The choice of the teaching methodology shall depend on the particular learning outcomes of the taught subject, aimed learning outcomes, knowledge granted to the student, and the trained competences. It is recommended to use the student-oriented educational methods that enable the students to play an active role in the process of studies.

24. The same teaching and learning methods may be applied in different cycles of studies; however, the volume and complexity of tasks, independent input of the student, etc. must differ. For example, lectures (interactive lectures); laboratory exercises; seminars (studies in small groups); workshop (modelling, solution of exercises); individual consultations; practical training (recommended in an industrial company, civil service or in another research and higher education institution); individual and/or team projects (solution of real problems in projects); interactive learning methods; field trips; case analysis; writing of written papers (reports, essay, papers); search and generalisation of the needed information, reading of books and original scientific articles; preparation, public presentation and defence of reports; discussions, and debates.

25. In the beginning of the studies, the university teachers have to introduce thorough curriculum, goals of the subject, their relations to generic goals of the study programme, expected learning outcomes, expected learning load, assessment procedure and criteria of learning achievements (influence of the examination and interim tests on final grade, examination terms, etc.) to the students.

26. The assessment system of studies has to ensure a feedback to the students about their learning achievements and validity of evaluation of performed works.

27. The assessment methods may be of generalising, forming and diagnostic character. The generalising assessment allows measuring the students' achievements at the end of the subject's studies, semester, course or study programme. The forming and diagnostic assessment allow the teacher and the student to observe the course of studies, to identify the difficulties, and to analyse the achievements.

28. The university teachers have to be familiar with universally accepted assessment methods, their application methodology, and their contribution into successful acquisition of knowledge and development of the skills of the students. The university teacher may choose the most appropriate assessment methods, depending on the aims of assessment and the taught subject,

expected results, and other factors. The students' participation in the (self-)assessment process should be aimed at.

29. The procedures applied to assess the students' achievements have to be based on clearly formulated criteria that enable to reflect correctly and reliably the level of knowledge, abilities and practical skills achieved by the student in the course of studies (of the subject). The assessment criteria have to manifest, how the level of knowledge and skills obtained by the student comply with the aimed outcomes of the study programme and the trained competences.

30. The achieved learning results are graded according to the ten-point grading system. The following assessment methods of learning achievements may be applied: written or oral examination; test; report on results of laboratory works and their defence; modelling works; solution of exercises; report on individual or team work; oral and stand-based presentations; colloquium; tests when questions of closed and/or open type are asked; written works (review of literature, report, essay, etc); course, final paper and its defence; and peer review of scientific research work.

31. The final work (project), its defence and assessment summarise knowledge, general and special competences obtained by the student that satisfy qualification requirements for the degrees of bachelor or master.

32. An important part of assessment of the students' achievements and learning outcomes is a feedback provided by the students to the teacher, as it creates preconditions for development and improvement of the efficiency of the study process and to improve the teaching quality. The students should receive timely information about the works they have done.

33. The appeals regarding the assessment process have to be submitted and considered in the procedure established by the higher education institution.

CHAPTER V REQUIREMENTS FOR IMPLEMENTATION OF STUDY PROGRAMMES

34. General requirements for teachers of the study programmes in the field of environmental science:

34.1. at least half of the subjects of the university studies of the first cycle in the field of environmental science have to be taught by scientists;

34.2. at least 80 percent of the teachers in the studies of the second cycle must have an academic degree;

34.3. at least 10 percent of the subjects of the studies of the first cycle, and at least 20 percent of the subjects of the studies of the second cycle have to be taught by persons, who hold an office of a professor;

34.4. at least 60 percent of the subjects in the study field have to be taught by the teachers, whose research fields correspond to the taught subjects;

34.5. the exchange of teachers and scientists with other Lithuanian or foreign higher education institutions and research centres shall be encouraged in the studies in the field of environmental science;

34.6. the competence of the university teachers shall be assessed according to the academic level of the taught subjects, pedagogical and scientific research experience, ability to communicate fluently in at least one foreign language used for international scientific cooperation, initiatives to create more effective learning methods, participation in refresher programmes, and skills of respectful and colleague-like communication with the students;

34.7. the university teacher should be encouraged to write textbooks, to prepare new subjects, methodical aids, and to initiate renewal of the laboratory equipment in order to grant new skills and abilities to the studying persons.

35. General requirements for other employees and persons, who are implementing subjects of the study programmes (teachers of laboratory works, practical exercises, supervisors of practical training):

35.1. the laboratory works and other practical exercises of the study programmes of all cycles of the studies of environmental science should be conducted and the practical training should be supervised by the persons, who have completed the studies related to the taught subject and have at least the master's degree in the field of environmental science;

35.2. the professional practical training of the students of the first cycle in the place of practice (enterprise, institution or organisation) should be supervised by the persons, who have at least the professional bachelor's degree and at least 3 years of practical work experience in the field of environmental science.

36. General requirements for the process of studies:

36.1. the process of studies has to be based on consistent expansion and development of the student's knowledge and abilities with regard to the subjects taught in the study programme;

36.2. the process of studies shall be conducted in the procedure established by the higher education institution.

37. The studies of the first and second cycle shall end in a final work (project) prepared independently by the student:

37.1. the final work (project) of the studies of the first cycle has to be based on researches, application of knowledge or it has to be prepared as a project that manifests the skills complying with the programme's goals. The final work (project) serves for the student to show his or her adequate level of knowledge in environmental science and initial level of performance of independent experimental or theoretical work, ability to analyse the selected topic, to take the previous works performed by other persons into consideration, to describe own research work and its results in correct and coherent language, using the accepted special terms, formulations, and to formulate clear and reasoned research conclusions. The topics of the final works may be related to real problems identified by business or public authorities that would be in compliance with the goals of the field of environmental science;

37.2. the final work (project) of the studies of the first cycle has to be presented and defended in the procedure established by the higher education institution;

37.3. the final work (project) of the second cycle has to be based on individual scientific or applied researches, application of acquired knowledge or it has to be prepared as a project that manifests the skills acquired during the studies. The final work (project) serves for the student to show his or her level of good understanding of the solved problem of environmental science, ability to analyse the selected topic thoroughly, to take the results of earlier researchers under the same topic in consideration, to plan and carry out researches independently, to describe own research work in correct and coherent language, using the accepted special terms and formulations. The student has to manifest his or her ability to summarise briefly his or her work and to formulate reasoned and generalising conclusions and recommendations on the basis of analysis of the work results. The topics of the final works may be related to real problems identified by business or public authorities that would be in compliance with the goals of the field of environmental science;

37.4. the final work (project) of the studies of the second cycle has to be presented and defended in the procedure established by the higher education institution in the assessment commission of final works;

37.5. the assessment commission of the final work shall be formed from competent specialists of the study field – scientists, professional practitioners and representatives of probable employers. At least one member of the commission has to be from another research and higher education institution.
