Master of Ecology and Environmental Protection

Master's program to acquire “Master of Ecology and Environmental Protection" provides a solid theoretical and practical training as a basis for realization of specialists in all areas and activities related to environmental protection.

Training of students in master's program provides comprehensive scientific theoretical and specialized training in the specialty, by building over the fundamental knowledge obtained in the course of training for degree "bachelor" in the specialty "Ecology and environmental protection".

The emphasis is on increasing the professional competence and skill formation for making strategic and tactical management decisions, work in business management programs in the field of environmental protection, performing aspecialized research and on developing creativity teaching and expertise.

The acquisition of “Master of Ecology and Environmental Protection" is a prerequisite for professional development of students such as experts, government officials and heads of departments to manage the environment; in information systems environment, the structures of the ministry’s municipalities and other environmental authorities, in carrying out research and teaching on issues of sustainable (environmentally friendly) development and environmental protection, etc.

Structure of the curriculum

Specialty: Ecology and environmental protection

"Master"

First year

First semester	ECTS credits	Second semester	ECTS credits
Ecosystem services	6	Remote methods for environmental monitoring	4
Water Resources Management	6	Nature Conservation	4
Soil and soil fertility preservation	6	Urbanization and Environment	4
Waste management	6		
Elective course 1 (from Group I)	3	Elective course 1 (from Group II)	3
Elective course 2 (from Group I)	3		
		Development and defense of graduation work	15
Elective courses (Students choose two subjects from Group I)		**Elective courses** (Students choose one subject from Group II)	
I Group	3	**II Group**	3
Renewable energy sources		Management of protected areas	
Ecological programs		Public relations in environmental protection	
Problems of sustainable development		Regional programs for environmental protection	
Ecological Risk			
Computer Cartography and Geographic Information Systems			
Mathematical Models in Ecology and Environmental Protection			
	Total 30		Total 30

TOTAL FOR BOTH SEMESTERS: 60 credits

ECOSYSTEM SERVICES

ECTS credits: 6 **Hours per week: 3**l+1pe
Form of assessment: on-going control and exam **Examination type:** written
Semester: I
Methodological guidance:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assoc. Prof. Lidia Sakelarieva, PhD

Annotation: Prosperity of human society have always been closely linked with the natural environment, and the presence of natural resources such as minerals, oil, valuable timber and fertile land was crucial for the material wealth of each country. Over the past two decades, the notion of the value of natural resources has changed radically as the state of the environment is deteriorating rapidly. Elements of nature such as clean air, abundant clean drinking water, greenery in cities and beautiful landscapes, until recently taken for granted, have become more and more valued by people. The main objective of the course is to provide basic knowledge about ecosystem services - the benefits, direct and indirect, that people derive from ecosystems' functioning, and to develop skills for assessment of these services.

WATER RESOURCES MANAGEMENT

ECTS credits: 6 **Weekly hours:** 3 lectures + 1 practical exercises
Form of assessment: current control and exam Type of exam: written
Semester: I
Methodological guide:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Prof. Dr. Emilia Varadinova
E-mail: emilia.varadinova@swu.bg

Annotation: The course "Water Resources Management" studies the principles and vision of Europe and Bulgaria for ensuring and guaranteeing the necessary quantity and sufficiently good quality of water for all legal needs, through better implementation of the legislative regulations in the field of water, integration of water policy objectives in other areas and overcoming gaps in regulatory regulations.

SOIL AND SOIL FERTILITY PRESERVATION

ECTS credits : 6 **Hours per week**: 3л+0су+0лу+1пу+р
Forms of assessment: on going contorl and exam **Exam type**: Test
Semester: I
Methodological guidance:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assist. Prof. Miroslav Ivanov, PhD
E-mail: m_ivanov@swu.bg

Anotation: The discipline "Soil and soil fertility preservation" is a mandatory course for students enrolled in the specialty "Ecology and Environmental Protection," MSc degree program — 2 semesters. Soil conservation is an extremely important issue on a global and regional scale not only for the food security of humanity but also for the optimal functioning of all terrestrial ecosystems. Natural evolutionary processes of soil formation today are heavily influenced by intensified anthropogenic impact due to the utilization of various natural resources and the development of different economic sectors. Global pollution of the Earth, irrational land use, deforestation, soil erosion, and various other direct and indirect negative effects on soil necessitate urgent and adequate measures for soil protection and enhancement of soil fertility.

The aim of this course is for students in the specialty of acquiring essential knowledge about soil as a natural body and to understand modern problems related to soil degradation and pollution, as well as soil preservation and restoration of soil fertility in natural landscapes and areas used for agriculture and animal husbandry.

WASTE MANAGEMENT

ECTS credits: 6	**Semester**: I (first)
Methods of teaching: Lectures and lab.	**Hours per week:** 3 lectures+1lab.
Form of assessment: on-going control and examination	**Examination type**: written
Methodological guidance: Department "Geography, Ecology and Environmental Protection" e-mail: **katedrageoos@swu.bg** Faculty of Mathematics and Natural Sciences	**Type of course:** Compulsory
Lecturers: Chief Assistant Prof. Veselina Dalgacheva, PhD, **dalgacheva@swu.bg** Department "Geography, Ecology and Environmental Protection" e-mail: **katedrageoos@swu.bg**	**Registration for the course:** According to the regulations for mandatory courses **Registration for the exam:** Agreed upon with the lecturer and the academic administration

Annotation: The course "Waste management" gives the opportunity to students to study the concept of environmentally friendly waste management; sustainable development, which involves the application of environmentally friendly technologies, as well as the efficient use of resources and the circular economy; modern methods and technologies for waste treatment; regulatory requirements of the European Union and national legislation; economic and health aspects of environmentally friendly waste management and the efficient use of resources.

ECOLOGICAL PROGRAMS

ECTS credits: 3 **Weekly hours:** 2 lectures

Form of assessment: exam **Type of exam**: written
Semester: I
Methodological guide:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Prof. Dr. Emilia Varadinova
E-mail: emilia.varadinova@swu.bg

Annotation: The main goal of environmental protection at the European and national levels is to accelerate the ecological transition in a fair and inclusive manner, with priorities aimed at reducing greenhouse gas emissions, adapting to climate change, striving for zero environmental pollution, protecting and restoring biodiversity. The course "Ecological programs" studies the principles of developing and implementing regulated environmentally friendly mechanisms and incentive initiatives related to the protection of environmental components. An important tool in this direction is the development of environmental plans, programs and strategies, as well as the implementation of the mechanisms of the European Union operational programs.

PROBLEMS OF SUSTAINABLE DEVELOPMENT

ECTS credits: 3 **Weekly hours:** 2l
Form of assessment: exam **Type of exam:** written
Semester: I
Methodological guide:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assoc. Prof. Konstantin Tyufekchiev, PhD
E-mail: konstantinat@swu.bg

Annotation: The aim of the course "Problems of sustainable development" is to give the students in " Ecology and Environmental Protection" – "Master program" basic knowledge of the legal framework and approaches for realizing the concept of sustainable development.

Students acquire skills to analyze and evaluate various issues relating to sustainable development posed by poor forecasting and strategic planning, due to deficiencies in the organization and implementation of "best practices" to achieve sustainable development, etc. Particular attention is paid to the implementation of effective approaches resursopolzvane, greater involvement of renewable energies in energy systems and others.

ECOLOGICAL RISK

ECTS credits: 3	**Semester**: I (first)
Methods of teaching: Lectures and lab.	**Hours per week:** 2 l
Form of assessment: on-going control and examination	**Examination type**: written

Methodological guidance: Department "Geography, Ecology and Environmental Protection" e-mail: **katedrageoos@swu.bg** Faculty of Mathematics and Natural Sciences	**Type of course:** Compulsory
Lecturers: Prof. Emiliya Varadinova, PhD, **emilia.varadinova@swu.bg** Department "Geography, Ecology and Environmental Protection" e-mail: **katedrageoos@swu.bg**	**Registration for the course:** According to the regulations for mandatory courses **Registration for the exam:** Agreed upon with the lecturer and the academic administration

Annotation: The purpose of the course "Environmental Risk" is to enable students to build on their knowledge from the bachelor's degree and to gain new knowledge about the nature of environmental risk, the types of threats to the environment and the achievement of environmental security in the context of sustainable development.

COMPUTER CARTOGRAPHY AND GEOGRAPHIC INFORMATION SYSTEMS

ECTS credits: 3 **Hours per week**: 2l
Form of assessment: on-going control and exam **Examination type**: written
Semester: I
Methodological guidance:
Department: "Geography, ecology and environmental protection"
Faculty of Mathematics and natural sciences
Lecturer: Ass. prof. Galina Bezinska, PhD
E-mail: galinabezinska@swu.bg

Course Description: The elective course *"Computer Cartography and Geographic Information Systems"* is intended for master's degree students specializing in *Ecology and Environmental Protection*. It builds upon the foundational knowledge acquired during bachelor-level studies in cartography and GIS and aims to enhance and apply these competencies through the use of contemporary geospatial technologies in real-world environmental contexts.

The course offers an in-depth exploration of the creation, analysis, and visualization of spatial data. It develops students' ability to integrate various sources of geoinformation—such as satellite imagery, GPS data, field measurements, and open-access datasets. Lectures are practice-oriented and incorporate case-based learning, enabling students to gain proficiency in advanced techniques for thematic mapping, spatial modelling of environmental processes (e.g., pollution, erosion, biodiversity), and the creation of web-based visualizations and Story Maps suitable for both administrative and public communication.

Course content is closely connected to related subjects, including *Ecological Cartography, Geographic Information Systems, Remote Sensing Methods for Environmental Monitoring*, and *Environmental Modelling*. This interdisciplinary alignment fosters a comprehensive understanding of the spatial dimensions of ecological processes and environmental policy-making.

Upon successful completion, students will demonstrate competencies in spatial analysis, map design and interpretation with an ecological focus, and the practical use of GIS

platforms for evidence-based decision-making in environmental management. The course encourages the integration of theoretical knowledge with practical applications, effective communication of spatial data through visual tools, and the use of GIS as a key instrument in environmental planning, monitoring, and assessment within institutional frameworks.

The knowledge, skills, and competencies acquired through the course will prepare students for professional careers in public administration, research institutions, and non-governmental organizations engaged in natural resource management, sustainable development, and environmental monitoring.

MATHEMATICAL MODELS IN ECOLOGY AND ENVIRONMENTAL PROTECTION

ECTS credits: 3 **Hours per week:** 2l
Form of assessment: on-going control and exam **Examination type:** written
Semester: I
Methodological guidance:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assoc. Prof. Kostadin Samardzhiev, PhD,
Department of Mathematics, University of SWU"Neofit Rilski"-Blagoevgrad

Annotation: The educational process in this course includes teaching of ecology in order to apply the methods of mathematical modeling for investigation of ecological problems, ecosystems and problems of the environment, in particular the air and water pollution, climatic changes etc. Basic mathematical models in ecology will be considered and analyzed with special attention to the application of the population theory.

REMOTE METHODS FOR ENVIRONMENTAL MONITORING

ECTS credits: 4 **Weekly hours:** 2l+1pe
Form of assessment: exam **Type of exam:** written
Semester: II
Methodological guide:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assoc. Prof. Konstantin Tyufekchiev, PhD
E-mail: konstantinat@swu.bg

Annotation: The discipline aims to familiarize students with the possibilities and application of aerospace methods, technical means and technologies in solving one of the most important problems of modern humanity, namely - research in the field of ecology and the environment. The curriculum of the discipline examines aerospace research, with an emphasis on remote aerospace research of the Earth. The various methods and means for remote research are discussed, as well as the various techniques and processes for processing the captured images to achieve optimal environmental monitoring.

NATURE CONSERVATION

ECTS credits: 4 **Weekly hours:** 2l+1pe
Form of assessment: on-going control and exam **Type of exam:** written
Semester: II
Methodological guide:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assoc. Prof. Konstantin Tyufekchiev, PhD
E-mail: konstantinat@swu.bg

Annotation: Discipline "Nature Conservation" is learned by students in the specialty "Ecology and Environmental Protection (EEP)" in order to obtain basic knowledge for the conservation of natural areas and objects by placing them under a certain mode of protection (conservation). The course is relatively new scientific discipline that separates mainly focus on theoretical and practical problems of conservation as a current method in modern nature conservation.

URBANIZATION AND ENVIRONMENT

ECTS credits: 4 **Hours per week:** 2l+1pe
Form of assessment: on-going control and exam **Examination type:** written
Semester: II
Methodological guidance: Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assoc. Prof. Lidia Sakelarieva, PhD

Annotation: As the population grows, the relative share of people living in cities also increases. Never have cities been so large in size and population and never have they had such a significant impact on natural ecosystems. With their production and consumption patterns, they contribute significantly to environmental problems. As heterotrophic ecosystems, whose existence is impossible without the constant supply of huge amounts of energy, water, food and many other resources, they act as parasites on the natural environment - they destroy it directly, deplete its resources, release large amounts of solid, liquid and gaseous substances that pollute the soil, water and air. The course examines the process of emergence, development and growth of cities, as well as the impact of urbanization on the atmosphere, lithosphere, atmosphere and biosphere. Attention is paid to sustainable urban development, criteria and indicators for such development, urban agglomerations and the cities in Bulgaria and environmental problems they cause.

PROTECTED AREAS MANAGEMENT

ECTS credits: 3 **Weekly hours:** 2l+1pe
Form of assessment: on-going control and exam **Type of exam:** written
Semester: II

Methodological guide:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Assoc. Prof. Konstantin Tyufekchiev, PhD
E-mail: konstantinat@swu.bg

Annotation: Course "Protected Areas Management" is learned by students in the specialty “EEP" degree of Master of Ecology to broaden and deepen the knowledge of management of protected areas. By students acquire skills for making management decisions on various activities in guarding and use of protected areas.

The course "Protected Areas Management" includes issues related to methodologies for developing strategies, programs and management plans for various types of protected areas.

PUBLIC RELATIONS IN ENVIRONMENTAL PROTECTION

ECTS CREDITS: 3 Weekly workload: 2 lect.
Form of knowledge control: **Exam** Exam type: **Written**
Semester: **II**
Methodological Guidance:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Chief Assistant Professor Milena Yankova, PhD
Department of Public Relations
e-mail: yankova_milena@swu.bg

Annotation: The course aims to inform the students about the history and development of Public Relations. Emphasis is placed on the communication with various target audiences for raising environmental awareness, with the aim of changing attitudes and modifying behaviour.

The lectures place an emphasis on effective communication for promoting an inclusive, fair and productive dialogue on issues related to the environment. The course pays attention to the professional and ethical principles of communication on environmental topics.

REGIONAL PROGRAMMES FOR ENVIRONMENT PROTECTION

ECTS credits: 3 **Weekly hours:** 2 lectures
Form of assessment: exam **Type of exam**: written
Semester: I
Methodological guide:
Department of Geography, Ecology and Environmental Protection
Faculty of Mathematics and Natural Sciences
Lecturer: Prof. Dr. Emilia Varadinova
E-mail: emilia.varadinova@swu.bg

Annotation: Solving the problems of the protection of environment components and the stable development of a particular region is based on developed programmes with events planned within the action plans.

Plans and programmes on regional level provide integrated environment management in accordance with the principles and objectives of the Environment Protection Law, the Law on Regional Development and their corresponding National strategies.