

SOUTH-WEST UNIVERSITY "NEOFIT RILSKI"

Ecology and environmental protection

Information package for students

QUALIFICATION CHARACTERIZATION
OF MAJOR FIELD OF STUDY “Ecology and Environmental Protection”
FOR “BACHELOR OF SCIENCE” DEGREE
WITH PROFESSIONAL QUALIFICATION “Ecologist”

I. Purpose of the major field of science Ecology and Environmental Protection

Graduates received Bachelor of Science (BSc) degree in Ecology and Environmental Protection, can successfully realize themselves as scientists in scientific and educational institutions and as experts in environmental protection in different administrations (state, regional and municipal), production companies and service offices. They could perform various tasks in the field of ecology and environmental protection:

- ✓ Participate in working out programmes, projects, plans for environmental management and protection;
- ✓ Perform ecological monitoring on a local, regional or national level;
- ✓ Make Environment impact assessments and expertise;
- ✓ Study and analyze the environmental quality and the condition of natural and man-made communities and ecosystems.

Graduates received BSc degree in Ecology and Environmental Protection could successfully continue their education in higher degrees (Master of Science and PhD) in Bulgaria and abroad.

II. The curriculum provides:

- ✓ Education in accordance with the modern requirements for analysis, assessment and prognosis of natural and socio-economic objects and processes, as well as for management of environmental protection activities;
- ✓ The necessary theoretical knowledge in physics, chemistry, biology, mathematics, informatics, eco-meteorology, hydrology, soil science etc.;
- ✓ Training in the monitoring, planning and management of the basic environmental components: rocks, soils, water, air, flora and fauna;
- ✓ Acquiring skills for professional contribution in the field of ecology and environmental protection.

The Qualification characterization of Major field of study “Ecology and Environmental Protection” for BSc degree is a basic document that determines the rules for developing the curriculum. This qualification characterization is conformed with the legislation in the area of higher education in the Republic of Bulgaria.

CURRICULUM

Field of Study: Ecology and Environmental Protection, Period of Study: 4 years (8 semesters)

First Year			
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
General Chemistry	6.5	Geology and Geomorphology	6.5
Botany	8	Meteorology	6.5
Informatics	4.5	Zoology	8
Sports		Analytical Chemistry with Instrumental Methods	4.5
Optional I.1	4.5	Sports	
Optional I.2	4.5	Optional II.1	4.5
Optional I.3	2		
<u>Optional Courses</u> I.1 (1 course) Environmental Mapping Cartographical Methods in Ecology		<u>Optional Courses</u> II.1 (1 course) Mathematics Statistics	
<u>Optional Courses</u> I.2 (1 course) General Physics Physical Environmental Factors Assessment on Physical Environmental Factors Impact			
<u>Optional Courses</u> I.2 (1 course) Culture of writing and speaking Foreign Language			
	Total 30		Total 30
Second Year			
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Purification of Fluids	6.5	Pedology, Soil Pollution and Impact on Ecosystems	8
Biogeography	6.5	Hydrology	6.5
Air Pollution and Impact on Ecosystems	8	Sports	0
Ethology	4.5	Optional IV.1	4.5
Sports	0	Optional IV.2	6.5
Optional III.1	4.5	Optional IV.3	4.5
<u>Optional Courses</u> III.1 (1 course) Physical Chemistry Organic Chemistry and Environment Biochemistry Biochemical processes in cells		<u>Optional Courses</u> IV.1 (1 course) Fundamentals of Microbiology Microbiological Methods of Purification	
		<u>Optional Courses</u> IV.2 (1 course) Protection of Biological Resources in Bulgaria Biological Diversity in Bulgaria	
		<u>Optional Courses</u> IV.3 (1 course) Landscape Ecology Landscape Environmental Problems of Bulgaria	
	Total 30		Total 30

Third Year			
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Fundamentals of Ecology	10	Water Pollution and Impact on Ecosystems	8
Conservation of Biological Diversity	4.5	Solid Wastes Treatment	8
Optional V.1	4.5	Urban Ecology	4.5
Optional V.2	4.5	Optional VI.1	3
Optional V.3	4.5	Optional VI.2	6.5
<u>Optional Courses</u> V.1 (1 course)		<u>Optional Courses</u> VI.1 (1 course)	
Ethics and Ecology		Eco tourism	
Human ecology		Oceanology	
Eco philosophy and ecological worldview		<u>Optional Courses</u> VI.2 (1 course)	
Radioecology		Information Systems in Ecology	
<u>Optional Courses</u> V.2 (1 course)		Geographic Information Systems	
Biocenology			
Phytoecology			
Ecological physiology			
<u>Optional Courses</u> V.3 (1 course)			
Global climate changes			
Climates of the past			
Analysis, assessment and risk management in natural disasters			
	Total 30		Total 30
Fourth Year			
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Management of Environmental Protection	6.5	Ecological Requirements and Norms	6.5
Ecological monitoring	8	Optional VIII.1	4.5
Optional VII.1	4.5	Optional VIII.2	6.5
Optional VII.2	4.5	Practice (Ecomonitoring)	2.5
Optional VII.3	6.5	Preparation of Undergraduate Thesis or Preparation for State Exam	10
<u>Optional Courses</u> VII.1 (1 course)		<u>Optional Courses</u> VIII.1 (1 course)	
Agro ecology		Incentives and sanctions in environmental protection	
Soil Ecotoxicology		Management of Ecological Projects	
<u>Optional Courses</u> VII.2 (1 course)		<u>Optional Courses</u> VIII.2 (1 course)	
Fundamentals of Saprobiology		Ecological Basis of Forest Ecosystems	
Biological Indicators		Management	
<u>Optional Courses</u> VII.3 (1 course)		Ecological Requirements to Forestry	
Environmental Assessments			
Environmental Impact Assessment			
	Total 30		Total 30

TOTAL FOR 4 ACADEMIC YEARS: 240 CREDITS

ANNOTATIONS OF ACADEMIC DISCIPLINES

GENERAL CHEMISTRY

ECTS credits: 6,5

Hours per week: 2л + 2y

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Prof. Mario Mirov, PhD, mitovmario@swu.bg

Annotation:

The course "General Chemistry" for students of specialty "Ecology and Environmental Protection" is targeted on development of basic chemical background in relation to the knowledge formed in other subjects from the curriculum. The selected topics have also practical orientation connected with the useful facts for important materials and chemical processes.

Course content:

Structure of atoms; Periodic law and periodic table of elements; Structure of molecules – ionic and covalent bond; Intermolecular interactions. H-bond; Chemical bond in solid matter; Basics of thermodynamics; Chemical kinetics; Chemical equilibrium; Adsorption; Catalysis; Solutions and solubility; Theory of diluted solutions; Theory of electrolytic dissociation; Electrochemistry. Galvanic and electrolysis cells; Hydrogen; Overview of IA to IVA groups of the periodic table; Overview of VA to VIIIA groups of the periodic table; Transition metals chemistry

Technology of education and grading:

The course includes lectures and labs. During semester the students must overpass 2 tests on the lecture material and 2 tests on the practical material. The course finishes with a written exam.

BOTANY

ECTS credits: 8

Hours per week: 3л + 2pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Associate Professor PhD Lidia Sakelarieva,

lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev,

spu@swu.bg

Annotation:

The course "Botany" provides basic knowledge about the diversity of fungi and the plant world - talus and higher plants. The purpose of the course "Botany" is, in the process of training, students to acquire sufficient information and gain knowledge about the anatomy and morphology of plants - cytology, histology, organography, reproduction and plant systematics - taxonomy and nomenclature.

Course content:

Cytology (plant cell). Development of the knowledge of the cell. Types of cellular organization. Prokaryotic and eukaryotic cells. Components of the plant cell. Cell wall, cell membrane, cytoplasm, nucleus. Reproduction of the cell. Amitoza. Mitosis. Meiosis. Plant tissues (histology). Plant organs (organography). Vegetative organs. Root. Stem. Leaf. Generative organs - flower, fruit, seeds. Plant reproduction.

Systematics of plants. Bacteria. Cyanobacteria). Nuclear organisms. Kingdom Fungi. Lichens. Kingdom of Plants. Red algae. Diatoms. Brown algae. Green algae. Subkingdom Higher plants. Riniofiti. Mosses. Ferns. Gymnosperm plants. General characteristics. Systematics. Angiosperm (flower) plants. General characteristics. Systematics.

Areal. Relicts, endemics, cosmopolitans. Origin of cultivated plants.

Technology of education and grading:

The course is conducted on the basis of pre-planning of each lecture , including: theme links between the previous and the new lecture, links to other disciplinary areas, introduction, plan, presentation, discussion and generalization. The process of teaching lectures involves the use of diagrams, tables, models, herbarized plants and others. The practical classes are conducted in a laboratory where the students work with a light microscope, monitor various plant cells, tissues and organs on temporary and permanent microscopic preparations.

During the semester students carry out periodical checks of knowledge by assigning a coursework and solving a test, which corresponds to part of the contents of the lectures. The share of current control is 40 % - the relative weight of the course work is 30 %, of the test - 40 %, of the work during exercise - 30%.

The examination procedure includes a written exam. The relative weight of the exam from the total test score is 60%. Credits are awarded only if the total score is equal to or higher than the average 3, according to the system of accumulation and transfer of credits.

INFORMATICS

ECTS credits: 4.5

Hours per week: 1l + 2pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Lecturer from Department "Informatics"

Annotation:

In this course, the emphasis is on learning about the fundamental concepts of computer science, operating systems, working with office package and Internet. We take a look at technologies for converting a scanned text document into a text file, converting text into speech and particularly synthesizing speech in Bulgarian, which could be used by the

visually impaired or anyone who prefers to listen rather than read. The course is an introduction to technologies for creating and publishing videos and interactive and multimedia presentations.

Discipline content:

The course is one semester and is structured in 10 separate parts. It explores topics relative to: introduction, basic services and advanced searching on the Internet; operating systems; information systems; databases; networks; software for converting scanned documents into text files and for synthesizing Bulgarian speech; videos; creating interactive and multimedia presentations; software products for text editing; working with electronic spreadsheets.

Technology of education and grading:

Lectures are presented with the help of a video projector and exercises are conducted in a computer lab with Internet access.

During lectures students are given homework assignments, which are graded by an assistant.

The final grade (FG) is formed based on grades received on assignments/exams during the semester (SG) and a written exam (WE), where $FG = 0.6 SG + 0.4 WE$.

Only students with a passing SG grade (at least 3 on the scale of 2 to 6, where 6 is the highest grade and 2 is failing) are allowed to sit for the written exam.

ENVIRONMENTAL MAPPING

ECTS credits: 4,5

Hours per week: 2l + 1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Penka Kastreva, PhD penkakastreva@swu.bg

Annotation:

The course "Environmental mapping" is studied by students majoring in "Ecology and Environmental Protection" in order to get acquainted with the basic principles of creating and using maps. The lecture course will help future ecologists to correctly read and interpret the content of various environmental maps, as well as to add their own thematic data related to ecology in a digital environment.

The practical exercises aim at the students to gain skills to compile ecological maps in a digital environment, as well as skills to work with GIS software.

Course content:

Modern cartographic information in the field of ecology is in digital form. This requires the consideration of ecological cartography in the context of computer cartography and geographic information systems. The studied material includes concepts from the main sections of cartography:

Introduction to cartography: Maps and atlases. Classification.

Mathematical cartography: Concepts related to the mathematical basis of maps are considered, such as scale, models defining the figure of the Earth, coordinate systems, map projections, projection selection, map projections in GIS.

Theoretical cartography: Fundamental questions explaining the theory of cartographic imaging, the stages of designing and compiling maps and the principles of cartographic generalization are included.

Topographic cartography: Consider topics related to the nature of topographic maps - classification, purpose, mathematical basis, elements of their content and ways of depicting them on maps.

Ecological cartography: Emphasis is placed on the main types of ecological maps - maps of adverse natural phenomena and destructive processes, maps of anthropogenic landscape disturbances, maps for nature protection. Cartographic ways of depicting their content are also considered.

The practical exercises include the elaboration of a course project for compiling an ecological map on a topic of their choice.

Technology of education and grading:

Lectures and exercises are conducted exclusively on the basis of the material and technical base of the Department of GEOOS. A computer with a video projector, educational videos, specialized GIS software (ArcGIS), visual materials (boards, diagrams and maps) are used to illustrate the taught lecture material, some of which are developed as course and diploma works of students.

A computer multimedia laboratory is used for the practical exercises. For normal conduct of the exercises the students are divided into groups, as each student has a separate computer.

During the semester, periodic control is performed by assigning individual assignments and a written test. The tasks are entirely related to working in a digital environment with specialized software for mapping and using maps.

Students are admitted to an exam with a minimum current grade point average of 3, which is formed as the arithmetic mean of all grades obtained during the semester. The final grade is formed by 40% of the grade of the periodic control and 60% of the grade of the semester exam, according to the system for control of the knowledge and skills of the students developed and accepted in the department.

CARTOGRAPHICAL METHODS IN ECOLOGY

ECTS credits: 4,5

Hours per week: 2l + 1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Penka Kastreva, PhD penkakastreva@swu.bg

Annotation:

The course "Cartographical methods in ecology" is studied by students majoring in "Ecology and Environmental Protection" in order to get acquainted with the basic methods of mapping environmental phenomena and to form in them the ability to use maps. The lecture course will help future ecologists in their work to correctly read and interpret the content of various environmental maps.

The practical exercises aim at the students to gain skills to compile ecological maps in a digital environment, as well as skills to work with GIS software.

Discipline content:

Introduction to cartography: Maps and atlases. Classification.

Mathematical cartography: Concepts related to the mathematical basis of maps are considered, such as scale, models defining the figure of the Earth, coordinate systems, map projections, projection selection, map projections in GIS.

Theoretical cartography: Fundamental questions explaining the theory of cartographic imaging, the stages of designing and compiling maps and the principles of cartographic generalization are included.

Topographic cartography: Consider topics related to the nature of topographic maps - classification, purpose, mathematical basis, elements of their content and ways of depicting them on maps.

Ecological cartography: Emphasis is placed on the main types of ecological maps - maps of adverse natural phenomena and destructive processes, maps of anthropogenic landscape disturbances, maps for nature protection. Cartographic ways of depicting their content are also considered.

The practical exercises include the elaboration of a course project for compiling an ecological map on a topic of their choice.

Technology of education and grading:

Lectures and exercises are conducted exclusively on the basis of the material and technical base of the Department of GEOOS. A computer with a video projector, educational videos, specialized GIS software (ArcGIS), visual materials (boards, diagrams and maps) are used to illustrate the taught lecture material, some of which are developed as course and diploma works of students.

A computer multimedia laboratory is used for the practical exercises. For normal conduct of the exercises the students are divided into groups, as each student has a separate computer.

During the semester, periodic control is performed by assigning individual assignments and a written test. The tasks are entirely related to working in a digital environment with specialized software for mapping and using maps.

Students are admitted to an exam with a minimum current grade point average of 3, which is formed as the arithmetic mean of all grades obtained during the semester. The final grade is formed by 40% of the grade of the periodic control and 60% of the grade of the semester exam, according to the system for control of the knowledge and skills of the students developed and accepted in the department.

GENERAL PHYSICS

ECTS credits: 4,5

Hours per week: 2l + 1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Lyuben Mihov, PhD, mihovli@swu.bg

Annotation:

The course aims to give basic knowledge in physics to students majoring in "Ecology and Environmental Protection" and thus facilitate them in studying specialized disciplines.

Major topics in applied physics, such as classical mechanics, electricity and magnetism, are included.

Technology of education and grading:

Assessment determined by a written exam and by current control of the seminar exercise and defense of the protocols from the laboratory exercises, taken with a certain weight.

PHYSICAL ENVIRONMENTAL FACTORS

ECTS credits: 4,5

Hours per week: 2l + 1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Dimitrina Kerina, PhD, d_kerina@swu.bg

Annotation:

The course Physical Environmental Factors is elective for students majoring in Ecology and Environmental Protection, included in the first semester in the curriculum of the specialty Ecology and Environmental Protection, Bachelor's degree.

The course has a total workload of 45 hours, of which 30 hours of lectures, 15 hours of laboratory work and 70 hours of extracurricular activities. The aim of the course is to acquaint students with the physical factors of the environment and methods for limiting their harmful effects.

Course content:

The content of the study material is structured in six sections and acquaints students with the general classification of physical factors; climatic factors; mechanical factors; the factors related to the occurrence and movement of electric charges; ionizing radiation and optical radiation.

Technology of education and grading:

The lectures on the course are organized in accordance with the curriculum of the specialty Ecology and Environmental Protection, Bachelor's degree. The lectures are presented in the form of multimedia presentations. The practical classes are held in subgroups in laboratories in Molecular Physics, Mechanics and Physics of Aerosols at the Department of Physics of SWU "Neofit Rilski". The extracurricular preparation of the students is mainly related to work in the library, internet, individual and group consultations, for the purpose of theoretical preparation for the exercises, acquisition of knowledge for preparation of abstracts and presentations, for the current control and the exam.

The assessment of students is carried out in accordance with the European Credit Transfer System (ECTS). The final grade is formed at the end of the course on the basis of the grades from the written test, the current control of the laboratory exercises and the developed topics in the classes for extracurricular activities. The relative share of current control in the overall assessment is 30%. The final grade is formed according to the six-point system as follows: grade 6 is equal to level A of ECTS; grade 5 is equal to level B of ECTS; grade 4 is equal to level C of ECTS; grade 3 is equal to level D of ECTS;

PHYSICAL ENVIRONMENTAL FACTORS IMPACT ASSESSMENT

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Dimitrina Kerina, PhD, d_kerina@swu.bg

Hours per week: 2l + 1pe

Examination type: written

Semester: I

Annotation:

The Discipline is an elective course for students included in the first semester curriculum of Ecology and Environmental Protection, degree "Bachelor". The course has a total workload of 45 hours, including 30 hours of lectures, laboratory exercises 15 hours and 90 extracurricular hours. The course aim is to provide knowledge about physical factor's impact on the environment and about methods of their evaluation and minimization.

Course content:

The discipline content has been structured in sixth divisions: physical factors, climatic factors, mechanical factors, factors associated with the occurrence and movement of electric charges, non-ionizing and optical radiation. Special attention is spared for physical factor's impact and methods limiting their harmful effects on the environmental. Therefore, most of the sections in the course have practical and applied nature such as: methods to reducing the adverse effect of changes in pressure, noise reduction and its adverse effects on humans, protecting methods from the influence of vibrations, electric currents, optical polychromatic radiations, ultraviolet and infrared radiations etc.

Technology of education and grading:

Lectures are presented in the form of multimedia presentations. Practical exercises are carried out in subgroups. Student's extracurricular training is mainly related to work in a library, internet, individual and group consultations on training exercises and presentations for on-going control and on exam.

Students are carried out in accordance with the European system of credit transfer (ECTS). The final evaluation form at the end of the course is based on the written test and monitoring. The share of current control in the overall assessment is 40%. The final grade is based on six-point scale as follows: 6 evaluation is equivalent to level A of ECTS; 5 assessment equivalent to level B of ECTS; a score of 4 equals the level C of ECTS; a score of 3 is equal to the level of D ECTS.

CULTURE OF WRITING AND SPEAKING

ECTS credits: 2

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Prof. Antony Stoilov, PhD, antony100@swu.bg

Hours per week: 2 pe

Examination type: written

Semester: I

Annotation:

The course aims to form in students the ability to use correctly the spelling and orthographic rules in force in the modern Bulgarian literary language. To form in students the ability to explain the mechanism of the admitted spelling or orthographic inaccuracy and the reasons that led to it - assimilation or dissimilation process, dialectal influence, etc. The discipline "Written and spoken culture" is in direct connection with any discipline of the specialty related to the correct speech communication of the person with the professional qualification "Ecologist".

Discipline content:

The assessment of the acquired knowledge in the discipline in the course of the training is performed through current control. The current control is carried out during the classes by performing practical tasks and tests. The final grade in the course is formed through a semester exam.

FOREIGN LANGUAGE

ECTS credits: 2**Hours per week:** 2 pe**Form of assessment:** on-going control and examination**Examination type:** written**Methodological guidance:****Semester:** I

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assistant from Department "Foreign Languages"

Annotation:

The English language course provides practical training for students, focusing on the acquisition of basic knowledge of vocabulary and grammar at lower levels and improving and expanding knowledge and increasing the level of language proficiency at higher levels.

The English language curriculum is divided into 6 main levels, corresponding to the Common European Framework of Reference for Languages (CEFR).

Technology of education and grading:

The assessment of the acquired knowledge in the discipline is performed on the basis of current control during the semester and semester exam.

GEOLOGY AND GEOMORPHOLOGY

ECTS credits: 6,5**Hours per week:** 2l + 2pe**Form of assessment:** on-going control and examination**Examination type:** written**Methodological guidance:****Semester:** II

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:Assoc. Prof. Krasimir Stoyanov, PhD, krasi_sto@swu.bg**Annotation:**

The course "Geology and Geomorphology" is studied by students in specialty "Ecology and Environmental Protection" and aims to make them familiar with the problems, purposes, objectives, basic concepts and natural laws of these fundamental natural subjects.

The acquired knowledge of this course will be used as a basis for future ecological experts to develop their scientifically considered and actual notion of geological, geomorphological and great part of the natural geographic phenomena and processes.

Course content:

Learning material is distributed within 30 hours of lectures and 30 hours of exercises. A total curriculum, summaries of individual lectures and illustrations (digital form) will be provided for students during the lectures. The exercises will be accompanied by an acquaintance of the materials in academic geological collections of the University. On geological topics, students will dispose with the manual issued for this purpose. It is recommended to take student on one or more day field trips for directly observation of the geological and geomorphologic sites - Stob Pyramids, volcano Kozhuh, Seven Lakes in Rila, Iskar Gorge, Belogradchik Rocks and more.

During the exercises is given attention to assimilation of basic practical skills for field and laboratory geological and geomorphological studies. Special attention is paid to work with geological compass, field identification of the main types of rocks and minerals, detection and identification of determined tectonic landforms, barometric leveling and more activities described in the manual issued for this purpose. Students acquire knowledge in design and analysis of geological and geomorphological profiles, morphometry of relief and more.

Technology of teaching and evaluation:

During the semester an ongoing control by assigning a paper or presentation is carried out. It includes solving a test, too. Criterion for assessing is the degree of implementation of tasks (paper, test) taking into account: the level of competence, analysis, and understanding.

Examination procedure includes a test or written exam after a predefined syllabus. The relative weight of the exam of total test score is 60%.

METEOROLOGY

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Krasimir Stoyanov, Ph.D., krasi_sto@swu.bg

Assoc. Prof. Emil Gachev, Ph.D, emil.gachev@swu.bg

Hours per week: 2l + 2pe

Examination type: written

Semester: II

Annotation:

The course "Meteorology" is studied by students in specialty "Ecology and Environmental Protection" and aims to make them familiar with the structure, composition and processes developing in the atmosphere and laws of formation, geographical distribution and historical changes of the climate. Mainly in the course is studied the climate system consisting of secondary components - atmosphere, ocean, cryosphere, land surface and biomass.

Course content:

The students acquired knowledge about the weather, the factors that determine and their characterization. They assimilate basic skills to prepare weather forecasts, too. An attention is given to hazardous phenomena related with weather – hails, tornadoes, dry winds, heavy rainfall, storms and more.

During the course students are introduced to the genesis of climate and climatic division of the Earth. The object of the examination is also the nature and specificity of the microclimate and especially of urban environment.

Special attention is paid to climate change in historical view as well as its contemporary variations. The causes of global warming and environmental consequences for the Earth and Bulgaria are analyzed. An emphasis is also put on the problem of air pollution caused by human activity.

A great part of the course “Meteorology” is devoted to practical exercises that enable students to acquire skills in meteorological instruments and equipment, processing climatic data and also to produce climatic characteristics of an area, etc.

Technology of teaching and evaluation:

The tuition is realised by lectures, practical exercises and individual work. Modern interactive methods of teaching are used.

During the semester an ongoing control by assigning a paper or presentation is carried out. It includes solving a test, too. Criterion for assessing is the degree of implementation of tasks (paper, test) taking into account: the level of competence, analysis, and understanding.

Examination procedure includes a test or written exam after a predefined syllabus. The relative weight of the exam of total test score is 60%.

ZOOLOGY

ECTS credits: 8

Hours per week: 3l + 1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: II

Department “Geography, Ecology and Environmental Protection”

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. PhD Lidia Sakelarieva, lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev, spu@swu.bg

Annotation:

The course in Zoology is designed to teach students of ecology and environmental protection, “Bachelor” degree, the basic knowledge about the diversity and evolution of animals, the morphology, physiology, and ecological characteristics of the representatives of the major phyla of kingdom of Animalia. The included material could help students in their further education in ecology and environmental protection.

Discipline content:

The course in Zoology presents the systematics of basic animal taxa – protozoa, invertebrate and vertebrate animals. The morphology, anatomy, physiology, classification, and ecology of the most important groups of animals for the world as well as for the Bulgarian fauna are considered. Special attention is given to the role of animals in the

biogeochemical cycles and the energy flow in the ecosystems and also to their economic and medical significance.

Technology of education and grading:

The lectures are elaborated as Power point presentations. The exercises are conducted in a laboratory, as field trips, or at the Regional Historical Museum of the city of Blagoevgrad.

The final grade is formed on the basis of continuous control and written exam. The continuous control takes place during the semester and includes a test, an assignment, and the students' preparation and work during the exercises. The share of the continuous control from the final grade is 40%.

The written exam includes 2 questions from the discipline content. The share of the written exam from the final grade is 60%. The final grade is formed on condition that the student' grade on the written exam is at least 3.00.

ANALYTICAL CHEMISTRY WITH INSTRUMENTAL METHODS

ECTS credits: 4,5

Hours per week: 2l + 1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: II

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Ph.D. Petko Mandjukov, pmandjukov@swu.bg

Chief assistant Prof. Petranka Petrova, ppd@swu.bg

Annotation:

Topics of the course: Basic principles of the Analytical Chemistry. General approaches for modeling of complex equilibrium in solution and estimation of the parameters related to the chemical analysis. Basic principles of the classical quantitative analysis. Gravimetric and volumetric analytical methods. Major steps in analytical procedures using instrumental methods. Relative and absolute methods, calibration, basic metrological characteristics of the instrumental analytical methods. Atomic spectral, electrochemical, magneto-chemical and radiochemical methods for analysis.

Course Aims:

Students should obtain basic knowledge and skills in field of Analytical Chemistry and basic principles of the most widely used instrumental analytical methods. Special attention is paid to the selection of analytical method for solving specific problems and the environmental analysis in general.

Teaching Methods: lectures, tutorials, individual student's work

Requirements/Prerequisites: Basic knowledge of General and Inorganic chemistry and Mathematics

Assessment: laboratory tutorial mark L; Course project C and written final exam E

Rating: = $0.1 \times [L] + 0.6 \times [C] + 0.3 \times [E]$

Note: In case of $L = C = 6$, the final rating is 6 without written final exam.

Registration for the Exam: coordinated with the lecturer and Students Service Department

MATHEMATICS

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. professor Kostadin Samardzhiev, PhD

k_samardzhiev@swu.bg

Hours per week: 2l + 1pe

Examination type: written

Semester: II

Course Description:

The course includes the studying of basic topics from traditional course in Linear Algebra, Analytical Geometry, Differential Calculus and ordinary Differential Equations.

Course Aims:

Students should obtain knowledge necessary for studying chemistry, physics and engineering course.

Teaching Methods: lectures, seminars, homework.

Requirements / Prerequisites: High School Mathematic

Assessment: written final exam

Registration for the Course: by request at the end of the current semester

Registration for the Exam: coordinated with lecturer and Student service Department

STATISTICS

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. professor Elena Karashtranova, PhD, helen@swu.bg

Hours per week: 2l + 1pe

Examination type: written

Semester: II

Course description:

The course is introduction in nonparametric statistic and possibility to apply new IT in this area.

Objectives:

The students should obtain knowledge of:

- To apply the methods of nonparametric statistics in practice
- To realize concrete applications with tools of IT.

Methods of teaching: seminars, tutorials, discussions, project based method.

Pre- requirements: Probability and Statistics, Information Technology

Assessment and Evaluation

Project- 30%

Final Test- 70%

The course is successful completed with at least 65% of all scores.

Registration for the Course: required

Registration for the Exam: coordinated with the lecturer and the Student Service Office

PURIFICATION OF FLUIDS

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Dimitrina Kerina, PhD, d_kerina@swu.bg ;

Chief Assistant Prof. Veselina Dalgacheva, PhD

dalgacheva@swu.bg

Hours per week: 2l + 1pe

Examination type: written

Semester: III

Annotation:

Discipline *Purification of fluids* is mandatory for students included in the third semester curriculum of Ecology and Environmental Protection, degree "Bachelor". The course has a total workload of 60 hours, including 30 hours of lectures, laboratory exercises 30 hours and 135 extracurricular hours. The course aim is to provide knowledge about the methods for purification of fluids.

Discipline content:

The discipline content has been structured in three divisions:

I. Fluid Mechanics including kinematics and dynamics of fluids;

II. Methods for treatment of dust and gas fluids - absorption and adsorption, condensation, chemical, mechanical, filtration;

III. Methods for purification of waste water - mechanical, evaporation and crystallization, chemicalp biochemical and extraction.

Technology of education and grading:

Lectures are presented in the form of multimedia presentations. Practical exercises are carried out in subgroups. Student's extracurricular training is mainly related to work in a library, internet, individual and group consultations on training exercises and presentations for on-going control and on exam.

Students are carried out in accordance with the European system of credit transfer (ECTS). The final evaluation form at the end of the course on the basis of the written test and monitoring. The share of current control in the overall assessment is 40%. The final grade is based on six-point scale as follows: 6 evaluation is equivalent to level A of ECTS; 5 assessment equivalent to level B of ECTS; a score of 4 equals the level C of ECTS; a score of 3 is equal to the level of D ECTS.

BIOGEOGRAPHY

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Konstantin Tyufekchiev, PhD,

konstantinat@swu.bg

Hours per week: 2l + 1pe

Examination type: written

Semester: III

Annotation:

The course "Biogeography" provides the necessary knowledge about the patterns in the distribution of different combinations of organisms around the globe and the relationship of this distribution with the relationships between organisms and the geographical conditions of the area, the biotic zoning of land and Bulgaria's place in the biome system, the historical development of its flora and fauna. Biogeography provides answers to complex questions, such as: why different parts of the Earth are inhabited by different organism combinations; what is the reason for the convergence of a number of organism communities, separated by huge spaces; why related plant and animal forms inhabit continents between which large bodies of water stretch, etc.

The course is included in the curriculum of students majoring in "Ecology and Environmental Protection", Bachelor's degree, and is studied for one semester. It is divided into two parts. The first part includes the theoretical aspects of modern "traditional biogeography" and basic land biomes. It provides the theoretical foundation of the science of biogeography and information about the modern geographical distribution of organisms. The second part examines the biotic kingdoms of the land and the biogeographical zoning of Bulgaria.

Discipline content:

Biogeography as a science. Definitions. Goals and tasks. Methods. Relationship with other sciences. Basic concepts. Distribution and dispersal of organisms. Causes and ways. Passive propagation. Active distribution. Areas. Overview. Designation. Structure. Reasons for limiting the areas. Origin and development of habitats. Area typification. Theory of the formation and development of continents as a basis for solving some biogeographical problems. The climatic zonation of the Earth and its influence on the distribution of flora and fauna. Basic approaches in the biogeographical zoning of the Earth. Equatorial and tropical rainforests. Rain green (seasonal green) tropical forests and savannas. Sclerophilous, coniferous and laurel forests and shrub communities of subtropical and temperate tropical zones. Communities of arid areas and tropics, subtropics, and temperate latitudes. Herbaceous communities on the steppes, prairies, and pampas. Deciduous and mixed forests of temperate latitudes. Coniferous and small-leaved boreal forests. Tundra and subpolar deserts. High mountain areas.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on Power point and is presented with a video projector. The process of teaching the lecture material is associated with the use of visual aids - graphics, printed and copied materials, slides.

The practical classes are held in subgroups. Part of the classes are held in a classroom, where theoretical facts, processes and phenomena are discussed, after which practical tasks are set, which students perform individually. The rest of the exercises are conducted in certain biogeographical regions for the collection of herbarium materials and are determined by the most important tree, shrub and grass species in Bulgaria. They are finally accepted and evaluated at the end of the semester. The grade is taken into account in the final assessment of the student during the exam session.

Only students who have met the requirements of the Regulations for the educational activity of SWU, have fulfilled the requirements for mastering the content of the course, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average. 3.

The examination procedure includes a test or a written examination on one topic from the two sections of the content of the course after a previously distributed syllabus. The relative weight of the exam from the total grade is 60%.

AIR POLLUTION AND IMPACT ON ECOSYSTEMS

ECTS credits: 8

Hours per week: 31 + 2 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: III

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Emilia Varadinova, PhD,

emilia.varadinova@swu.bg

Chief Assistant Prof. Veselina Dalgacheva, PhD,

dalgacheva@swu.bg

Annotation:

The course "Air pollution and the impact on ecosystems" studies the sources of air pollution and the main factors influencing the processes of pollution and pollutant transport. Climate change, the adverse effects of air pollution on abiotic and biotic components of the environment are analyzed, health and economic aspects of air pollution are considered.

Course content:

The course examines the composition, structure of the atmosphere, the main sources of air pollution, the impact of pollution on ecosystems, noise, electromagnetic and radioactive air pollution, basic laws and regulations regarding clean air, priorities in our national policy, health and economic aspects of pollution.

Technology of education and grading:

The course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on Power point and presented with a video projector.

The practical classes are held in subgroups in a laboratory, where students analyze established in national legislation definitions related to the assessment of ambient air quality and the bioindicative capacities of living organisms. Practical examples of the negative effects of air pollution on ecosystems and humans are discussed. Some of the exercises are related to a visit to an atmospheric air monitoring point to read the data from an automatic measuring station. At the end of each lesson, the questions for preliminary preparation of the students for the next exercise are asked.

During the semester a periodic control of the acquired knowledge through preparation presentations is carried out, and at the end of the semester - a course work dedicated to local, regional or global issues in the field of air pollution and cleanliness. Students are admitted to the exam when they have fulfilled the requirements of the Regulations for the educational activity of SWU, for mastering the content of the discipline, set in their classroom and extracurricular employment, and the general assessment of the current control is not lower than Average 3.

The evaluation procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

ETHOLOGY

ECTS credits: 4,5

Hours per week: 2l + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: III

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Chief Assistant Prof. Alexander Pulev, PhD, spu@swu.bg

Annotation:

The training course reviews the basic concepts and stages in the development of knowledge about animal behavior. The stimuli and motivation of the behavior, the innate and acquired behavioral reactions, the ontogenesis of the behavior are considered. Attention is paid to the adaptive nature of the behavior and to the biorhythmological behavior. The individual, social and reproductive behavior of animals and the evolution of behavior are studied. The areas of application of knowledge about animal behavior are indicated.

Discipline content:

The course "Ethology" examines the basic concepts and stages in the development of knowledge about animal behavior, classification, basic areas, levels and approaches in the study of behavior. Particular attention is paid to the different types of behavior related to both reflexes and complex social behavior, as well as the reasons that determine it.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed in the form of Power point presentations and is presented with a video projector.

The practical classes are held in subgroups in the laboratory or in the field (in the field), discussing the issues addressed in the lectures and consolidating the knowledge of students. The various causes, motives and forms of individual, social and reproductive behavior of animals are discussed.

At the end of each lesson, the questions for preliminary preparation of the students for the next exercise are asked. During the exercises, current control of the acquired knowledge and skills is carried out by conducting a test, course assignment or essay. Based on the test results, attendance and work during the exercises and the development of the course assignment or report, a current assessment is formed. Only students who have met the requirements of the Regulations for the educational activity of SWU, have met the requirements for mastering the content of the discipline, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average 3.00 .

The training in the discipline ends with a written exam on a previously distributed syllabus. The relative weight of the written exam from the final grade is 60%. The final grade

is formed provided that the student has received a grade from the written exam at least Average 3.00.

PHYSICAL CHEMISTRY

ECTS credits: 4,5

Hours per week: 2l + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: III

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Prof. Mario Mitov, PhD, mitovmario@swu.bg

Annotation:

The course in Physical Chemistry includes the study of the principles of thermodynamics and their application on basic macroscopic objects. The aim of the program is to broaden the professional horizons and culture of students, building on the knowledge gained from previous chemical disciplines and adding new facts and methods.

Discipline content:

Introduction to thermodynamics; First and second thermodynamic principles; Thermodynamics of open systems; Phase equilibria in one-component systems; Thermodynamics of multicomponent systems; Thermodynamics of chemical equilibrium; Chemical kinetics and catalysis; Surface phenomena - adsorption, adsorption isotherms; Solutions and solubility of substances; Ideal and diluted solutions; Electrolyte solutions - electrolyte dissociation; Liquid mixtures; Distillation and rectification

Technology of education and grading:

- Teaching methods: Lectures and exercises.
- Assessment method: The overall assessment is formed by:
 - a) Two tests related to the learning content D1 and D2 (combined tests).
 - b) Two ongoing assessments related to laboratory exercises and problem solving (K1 and K2).
 - c) Written exam (Exam) - a combined test with questions of different types.

Final score = 0.2. [(D1 + D2) / 2] + 0.2 [(K1 + K2) / 2] + 0.6. (Exam)

ORGANIC CHEMISTRY AND ENVIRONMENT

ECTS credits: 4,5

Hours per week: 2l + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: III

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Atanas Chapkanov, PhD, chapkanov@swu.bg

Annotation:

The course will address some theoretical issues related to modern ideas and concepts about the chemical bonds in the molecules of organic compounds, determining the composition, structure and reactivity of organic compounds, the main types of reactants and reactions and problems of stereochemistry of organic compounds. Emphasis in the study of the main classes of organic compounds will be placed on those directly related to their impact on the environment: aliphatic and aromatic hydrocarbons, hydroxyl, carbonyl and carboxyl derivatives, as well as important biologically active substances such as carbohydrates, aminocarboxylic acids and pec acids. .

The laboratory classes aim to acquire practical skills and habits in order to better perceive and make sense of the lecture material and creative application of knowledge.

The lectures are illustrated and illustrated with examples in solving problems of theoretical and practical nature. Multimedia and PC systems are used for their presentation.

Purpose and tasks:

The aim of the course is to acquaint students with the basic laws and knowledge related to the composition, structure and chemistry of organic compounds, as well as those phenomena and processes occurring in nature that are directly related to its conservation and preservation.

1. Introducing students to the specifics and structure of basic processes and phenomena occurring in our environment.
2. Acquisition of knowledge about the main classes of organic compounds.
3. Development of creative thinking and ability for independent analysis of phenomena and processes and choice of approaches and methods in solving them.

Technology of education and grading:

Teaching methods: Lectures, laboratory work; solving tasks; tests; extracurricular work.

Prerequisites: Basic knowledge of inorganic and analytical chemistry is required.

Assessment: four control tests; elaboration of laboratory exercises; written exam

The final grade (CO) is formed only on condition that the student has received a grade from the current control at least Average 3.00.

BIOCHEMISTRY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Ivanka Stankova, PhD, ivastankova@swu.bg

Hours per week: 2l + 1 pe

Examination type: written

Semester: III

Annotation:

The biochemistry course studies the complex multimolecular organization of living matter, chemical processes and the main metabolic chains that take place in living organisms, enzymes, their chemical nature and mechanism of action, the basics of biological oxidation, energy supply and conversion in the cell, the role of vitamins and hormones in metabolism, etc.

Aim of the course:

The course aims to provide students with knowledge of the basic biochemical processes that underlie metabolism, biological oxidation and related energy conversion. An idea of regulation, control and integration of biochemical processes in organisms is gained. Receiving generalized knowledge of biochemistry, students make sense of the studied material in chemistry from a general biological point of view.

Technology of education and grading:

Pedagogical method: Lectures illustrated with diagrams and figures, demonstrated with the help of an overhead projector, laboratory exercises, periodic tests.

Assessment: Two T1 and T2 tests and a written exam

Final grade: $0.4 [(T1 + T2): 2] + 0.6 (\text{Exam})$

BIOCHEMICAL PROCESSES IN CELLS

ECTS credits: 4,5

Hours per week: 2l + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: III

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Ivanka Stankova, PhD, ivastankova@swu.bg

Annotation:

The course of study in the discipline "Biochemical processes in the cell" presents basic knowledge about the biochemical basis of cellular functions. The composition, structure, properties and functions of the basic and derived organic structures are considered. Emphasis is placed on biological macromolecules (proteins, nucleic acids and polysaccharides) and the lipids and supramolecular complexes they form. The composition, structure, properties and functions of the membranes in the cell and in particular of the cell membrane are studied. Attention is paid to the relationship between the structure and functions of cellular organelles. Enzymes and the mechanism of enzymatic action, biochemical energy and the formation of macroergic compounds (ATP) are considered. The types of metabolism in the cell are presented - autotrophic and heterotrophic, aerobic and anaerobic type of metabolism, as well as the main catabolic (degradation processes) and anabolic pathways (biosynthetic processes).

Aim of the course:

The aim of the course "Biochemical processes in the cell" is to acquaint students with the basic concepts, principles, issues, concepts related to the structure and functions of biological macromolecules and biochemical processes in cells.

The main tasks are aimed at:

- the acquisition of theoretical knowledge about: the chemical composition, structure and functions of biological macromolecules, supramolecular complexes and cellular organelles; for the storage and transmission of hereditary (genetic) information and for the flow of energy and its transformation in the cell.
- formation of practical skills for recognition of basic biological macromolecules, organelles and metabolic processes in cells (endergonic and exergonic) and for application of specific research methods.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed in the form of Power point presentations and is presented with a video projector.

Laboratory classes are held in subgroups in a chemical laboratory, discussing the issues discussed in lectures, consolidating students' knowledge, applying various methods for proving and studying chemicals and processes in cells.

At the end of each lesson, the questions for preliminary preparation of the students for the next exercise are asked.

Only students who have met the requirements of the Regulations for the educational activity of SWU, have fulfilled the requirements for mastering the content of the course, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average. 3.00.

The examination procedure includes a written examination on one topic from a previously distributed syllabus or a final test on topics from the content of the course. The relative weight of the exam from the total grade is 50%.

SOIL POLLUTION AND IMPACTS ON THE ECOSYSTEMS

ECTS credits: 8

Hours per week: 3l + 2 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: IV

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Boyko Kolev, PhD, E-mail: bkolev@swu.bg

Annotation:

Soil Pollution and Impacts on the Ecosystems is one of the compulsory subject for students in bachelor program (B.Sc.) in 'Ecology and Environmental Protection'. The course provides students with basic knowledge about the origin and development of soils and the problems that arise in their pollution and degradation. Special attention is given to approaches to overcome these problems and ways to restore soil fertility. Raised issues relating to soil science as a science and discipline, studying the soil as a natural body, and an important part of the ecosystem in which to spread and develop living terrestrial organisms, as well as the basic means of production in agriculture.

In the laboratory exercises, students will learn about the principles of GIS application software to compile thematic soil maps and their use in the cadaster, land division, monitoring and management of land resources.

Course content:

- Formation and development of the soils in Bulgaria;
- Properties and classification of soils in Bulgaria;
- Classification and major soil groups, classes and soil types in Bulgaria;
- The soils in Bulgaria, evaluation and storage.

Technology of education and grading:

Lectures developed Power point and presented with video - projector. In the process of teaching lectures connected with the use of visualization tools - graphics, print and copy materials, parts of which are developed as real regional strategies, plans, programmes projects and etc.

Grading the results shown in the course of education complies with the provisions of Regulation No. 21 of the Ministry of Education and Science from 30.09.2004 for applying the system for accumulation and transfer of credits.

A periodical control is held in the semester by assigning course papers (K) and/ or papers (R) and/ or by solving tests (T). Requirements for the semester are regularly visited classes; perform the tasks required GPA and test average 3.00.

The examination process includes a written exam topics (at least two) of the content of the course syllabus distributed in advance. The relative weight of the total test score is 50%.

The final grade constitutes 40% of the periodical control grade and 60% of the grade from the semester examination according to developed and approved in GEEP Chair system of control and grading students' competence.

HYDROLOGY

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Michail As. Michailov, PhD,

michail.a.michailov@gmail.com

Hours per week: 2l + 2 pe

Examination type: written

Semester: IV

Abstract:

"Hydrology" is thought to broaden and deepen the knowledge of the water through the processes and phenomena occurring in the atmosphere, hydrosphere and lithosphere.

Learn the basic methods of research and evaluation of the quantitative and qualitative parameters for different water bodies, peculiarities in the formation of runoff, methods and means for determining (measuring) the main characteristics of watercourses and their catchment basins, genetic structure and the flow regime, and others.

Students are given the opportunity to learn the basic methods of conducting hydrologic observations and measurements related to the determination of the parameters of the water currents - water levels, speed of water flow, characteristics of the riverbed and others.

The curriculum provides for obtaining the necessary knowledge to make observations, measurements and procedures for identifying and assessing key parameters of the flow in a given area, the requirements and prospects for the use and protection of water and more.

Course content:

Classification of water and water bodies. Formation and mode of groundwater. Classification and distribution. Structure and hydrographic characteristics of rivers and their catchment basins. Genetic structure of river flow. Factors and conditions for their formation. Hydrometric. Basic concepts. Organization hydrometric measurements. Measurement of water levels, the speed and other parameters of the current. Basic methods and means. Key

features of the river flow. Norma, module, runoff rates and others. In year distribution of river runoff. Minimum flow. Flooding and maximum river flow. Genesis. Frequency and duration. Temperature regime and water chemistry. Lakes. Dams. Classification and characteristics.

Technology training and assessment

The course "Hydrology" is done by teaching 30 hours of lectures and 30 hours of conducting practical exercises. The lectures cover the basic questions on the content of the discipline, and various visualizations - multimedia, educational videos, demo software, visual aids (posters and schemes), some of which were developed as term papers for students.

During the practical exercises exercise ongoing control of the acquired knowledge and skills. Students shape their work on individual topics such as assignments that are evaluated and only a positive assessment (at least average 3.25) are examined. The course ends with a written exam. The final grade is based on the results of the course assignments and the semester examination (40/60%) as developed and adopted at the department "GEOOS" system for monitoring and evaluation of students' knowledge.

FUNDAMENTALS OF MICROBIOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof PhD Lidia Sakelarieva, lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev, spu@swu.bg

Hours per week: 2l + 1 pe

Examination type: written

Semester: IV

Annotation:

The course "Fundamentals of Microbiology" provides basic knowledge about the morphology, taxonomy, physiology and biochemistry of prokaryotic and eukaryotic microorganisms. The genetics and distribution of microorganisms in soil, air and water are considered. Particular attention is paid to the role of microorganisms in biogeochemical cycles. The course "Fundamentals of Microbiology" is included in the curriculum of students majoring in "EOS", Bachelor's degree, in order in the learning process, students gain good theoretical and practical training for the diversity, metabolism and importance of microorganisms in nature.

Discipline content:

1. Subject of microbiology. Historical review. Prokaryotic and eukaryotic cells. Morphology of bacteria. Shape and size.
2. Prokaryotic cells. Bacterial cell structure. Actinomycetes. Mycoplasmas and rickettsiae.
3. Eukaryotic cells. Yeast. Mold fungi.
4. Metabolism. Penetration of nutrients into the microbial cell.
5. Nutrition. Carbon absorption. Types of nutrition. Heterotrophic type of diet.
6. Assimilation of nitrogen by microorganisms. Aminoautotrophs and aminoheterotrophs.
7. Bioenergetic processes in microorganisms.
8. Fermentation processes. Alcoholic and lactic fermentation.
9. Growth and cultivation of microorganisms.

10. Growth. Stages of growth. Continuous cultivation of microorganisms. Metabolic products (metabolites).
11. Influence of external factors on microorganisms. Physical factors. Biological factors.
12. Enzymes of microorganisms. Regulation of metabolic processes.
13. Genetics of bacteria. Gene recombination. Genetic Engineering
14. Spread of microorganisms. Microorganisms in the soil. Microorganisms in the air.
15. Microorganisms in aquatic ecosystems.

Technology of education and grading:

The training in the discipline "Fundamentals of Microbiology" is carried out according to the current curriculum of the specialty EEA.

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary.

The practical classes are held in subgroups in a laboratory. Visits are made to the microbiological laboratory at the Drinking Water Treatment Plant - Blagoevgrad, to a training microbiological laboratory at Sofia University "St. Kliment Ohridski" or other microbiological laboratories. In the course of study in the discipline students develop one course task on a pre-set topic.

During the semester there is a periodic control of the acquired knowledge by assigning a course assignment and solving a test that corresponds to part of the content of the lecture material. The preparation and work of the students during the exercises are also evaluated. Evaluation criterion is the degree of performance of the task, test and work during the exercises, taking into account: the levels of competence, analytical, understanding. For exceptional performance of a student in the educational process (100% fulfillment of the tasks from the current control, active and correct methodical participation in the discussion of the lecture material) he is exempted from the semester exam. The share of the current control from the general assessment is 40% and in it the relative weight of the course task is 40%, of the test - 40%, of the work during the exercises - 20%.

The examination procedure includes a written examination on two topics from the content of the course after a previously distributed syllabus. The relative weight of the exam from the total grade is 60%. The assessment is performed according to the six-point assessment scale, according to the Higher Education Act and Ordinance № 21 of the Ministry of Education and Science / 30.09.2004. The written works are stored for six months from the date of the exam.

MICROBIOLOGICAL METHODS OF PURIFICATION

ECTS credits: 4,5

Hours per week: 2l + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: IV

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof PhD Lidia Sakelarieva, lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev, spu@swu.bg

Annotation:

The course "Microbiological methods of purification" provides basic knowledge about morphology, taxonomy, physiology and biochemistry, genetics, the distribution of

prokaryotic and eukaryotic microorganisms in nature. Particular attention is paid to the role of microorganisms in biogeochemical cycles, the role of microbial communities in self-purification processes is emphasized and a logical connection is made between microbial metabolism and various microbiological methods for wastewater treatment.

The course "Microbiological methods of purification" is included in the curriculum of students majoring in "EOS", Bachelor's degree, in order in the process of training, students to acquire good theoretical and practical training for the diversity, metabolism and importance of microorganisms in nature.

Discipline content:

Subject of microbiology. Historical review. Prokaryotic and eukaryotic cells. Morphology of bacteria. Shape and size. Prokaryotic cells. Bacterial cell structure. Actinomycetes. Mycoplasmas and rickettsiae. Eukaryotic cells. Yeast. Mold fungi. Eukaryotic cells. Yeast. Mold fungi. Metabolism. Penetration of nutrients into the microbial cell. Carbon absorption. Types of nutrition. Heterotrophic type of nutrition. Nutrition. Carbon absorption. Types of nutrition. Heterotrophic type of diet. Assimilation of nitrogen by microorganisms. Aminoautotrophs and aminoheterotrophs. Bioenergetic processes in microorganisms. Fermentation processes. Alcoholic and lactic fermentation. Growth and cultivation of microorganisms. Stages of growth. Continuous cultivation of microorganisms. Metabolic products (metabolites). Influence of external factors on microorganisms. Physical factors. Biological factors. Enzymes of microorganisms. Regulation of metabolic processes. Bacterial genetics. Gene recombination. Genetic Engineering Spread of microorganisms. Microorganisms in the soil. Microorganisms in the air. Microorganisms in aquatic ecosystems. Microbial methods for wastewater treatment. Microbial oxidation in wastewater treatment. Biological systems for biodegradation. Regulation of biodegradation processes.

Technology of education and grading:

The training in the discipline "Microbiological methods of purification" is carried out according to the current curriculum of the specialty EEA.

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary.

The practical classes are held in subgroups in a laboratory. Visits are made to the microbiological laboratory at the Drinking Water Treatment Plant - Blagoevgrad, to the WWTP - Blagoevgrad, to a training microbiological laboratory at Sofia University "St. Kliment Ohridski" or other microbiological laboratories. In the course of study in the discipline students develop one course task on a pre-set topic.

During the semester there is a periodic control of the acquired knowledge by assigning a course assignment and solving a test that corresponds to part of the content of the lecture material. For exceptional performance of a student in the educational process (100% fulfillment of the tasks from the current control, active and correct methodical participation in the discussion of the lecture material) he is exempted from the semester exam. The share of the current control from the general assessment is 40% and in it the relative weight of the course task is 40%, of the test - 40%, of the work during the exercises - 20%.

The examination procedure includes a written examination on two topics from the content of the course after a previously distributed syllabus. The relative weight of the exam from the total grade is 60%. The assessment is performed according to the six-point assessment scale, according to the Higher Education Act and Ordinance № 21 of the Ministry of Education and Science / 30.09.2004. The written works are stored for six months from the date of the exam.

PROTECTION OF BIOLOGICAL RESOURCES IN BULGARIA

ECTS credits: 6,5

Hours per week: 21 + 2 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: IV

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Konstantin Tyufekchiev, PhD,

konstantinat@swu.bg

Annotation:

The course "Protection of Biological Resources in Bulgaria" is studied by students majoring in "EEA" in order to gain the necessary knowledge of what are bioresources in Bulgaria, the ability to produce biomass, their ability to meet the needs of the population with biological products and ways and methods of their protection.

Discipline content:

The course includes acquaintance with the ecological bases of bioproductivity, land bioresources (Bulgarian forest, meadows and pastures, herbs, aromatic, vitamin, ornamental and honey plants, fungi and animals in terrestrial ecosystems) and aquatic bioresources (mountain lakes, dams, Danube and Danube). reservoirs, inland rivers, the Black Sea and coastal lakes and swamps). It examines modern ways and methods for the conservation of individual bioresources, both individually and comprehensively.

The course is divided into three parts. The first examines the ecological foundations of bioproductivity, goals and objectives in the conservation of bioresources in Bulgaria. The second part covers the bioresources of the land and the problems of their protection. The third part discusses aquatic bioresources and ways and methods for their conservation.

Technology of education and grading:

The course of study in the discipline includes theoretical preparation on the basis of a lecture course on main topics of the curriculum, combined with discussed independent preparation of students on important topics of the course and practical exercises to specify students' knowledge at a practical level. During the exercises we work with real objects, models and research data, samples of research methods, using interactive teaching methods. Some of the topics are developed outside the classroom - in the natural environment on areas exploited by man.

The acquisition of the learning content is supported by the use of visual materials (boards, presentations, hard copies, software) and technical means (computer, multimedia, etc.).

During the semester, periodic control is performed by assigning homework (D), term papers (K), and / or essays (R), and / or by conducting tests (T). The final grade is formed by 40% of the grade of the periodical control and 60% of the grade of the semester exam, according to the system for control and assessment of students' knowledge developed and accepted in the GEOOS department.

During the semester, students visit certain areas and businesses in industries exploiting natural bioresources. Each student develops an essay on a type of natural bioresource in a particular region, assessing its productivity and the degree of its load to achieve sustainable exploitation and defending it to other students. The other students also take part in its assessment, and the assessment is taken into account in the final assessment

of the student during the examination session. A control inspection is conducted during the semester.

The exam is written and includes three questions - one of the first part (Ecological bases of bioproductivity, goals and objectives in the conservation of bioresources of Bulgaria), one of the second part (Bioresources on land and their conservation problems) and one of the third part (Aquatic bioresources and ways and methods for their conservation). The written works are stored for six months from the date of the exam.

Upon receiving grades above very good, students are released from the second and third part of the exam at the end of the semester.

BIOLOGICAL DIVERSITY IN BULGARIA

ECTS credits: 6,5

Hours per week: 21 + 2 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: IV

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Konstantin Tyufekchiev, PhD,

konstantinat@swu.bg

Annotation:

The course "Biodiversity of Bulgaria" is included in the curriculum of students majoring in "EE", Bachelor's degree, in order, in the process of training, students to acquire good theoretical and practical training for the nature, features and conservation of species, the genetic and ecosystem diversity of Bulgaria.

Discipline content:

The course of the course "Biodiversity of Bulgaria" examines the nature and importance of biodiversity - species, genetic, ecosystem. The fungal, flora and fauna of Bulgaria are studied - fungi, mosses, ferns, gymnosperms and angiosperms, invertebrates and vertebrates. The peculiarities of the Bulgarian mycota, flora and fauna are pointed out. Natural habitats included in the Red Book of the Republic of Bulgaria and in Annex 1 of the Biodiversity Act, as well as the biodiversity of wetlands and cities in Bulgaria are considered. Attention is paid to the threats to biological diversity and the development of the Bulgarian nature protection legislation is traced in historical terms. The essence and significance of the Biodiversity Act and the National Strategy for Biodiversity Conservation are clarified.

Technology of education and grading:

The lecture material is developed on Power point and is presented with a video projector. The practical classes are held in subgroups in a laboratory, where students get acquainted with the general characteristics, structure and systematic of the different groups of fungi, plants and animals that inhabit Bulgaria. Attention is paid to species that are important for human health, the economy and the stability of natural ecosystems. Some of the exercises are held in the field - in Bachinovo Park and in the Hunting House Park. The base of the Regional Historical Museum - Blagoevgrad is also used.

During the semester there is a periodic control of the acquired knowledge by preparing and presenting PowerPoint presentations for species of Bulgarian flora and fauna and solving a test that corresponds to part of the content of the lecture material. The preparation and work of the students during the exercises are also evaluated. The share of

the current control from the total assessment is 40%, as in it the relative weight of the PowerPoint presentation is 40%, of the test - 30%, of the work during the exercises - 30%.

Only students who have met the requirements of the Regulations for the educational activity of SWU, have fulfilled the requirements for mastering the content of the course, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average. 3.00.

The examination procedure includes a written examination on two topics from the content of the course. The relative weight of the exam from the total grade is 60%.

The final grade is formed provided that the student has received a grade from the written exam at least Average 3.00. Credits are awarded only if the overall score is equal to or higher than Average 3, according to the credit accumulation and transfer system.

LANDSCAPE ECOLOGY

ECTS credits: 4,5

Hours per week: 21 + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: IV

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Ivan Drenovski, PhD, ldri@swu.bg

Annotation:

The aim of the course "Landscape Ecology" is to acquaint students with basic theoretical knowledge about the structure and functioning of the landscape of the Earth, as well as its constituent natural complexes - landscapes, as a single interconnected whole as a result of the combination of all natural components of a particular territory. The acquired knowledge has a practical application in the planning of the rational use of natural resources, the assessment of the landscape-ecological problems related to the impact on the environment (EIA), the territorial-settlement and landscape-planning.

Discipline content:

Information on the genetic order of origin and the hierarchy of natural components (factors) is presented. The essence, peculiarities and differences between the main geographical regularities of the Earth - zonality and azonality are clarified. Particular attention is paid to the nature and direction of the relationships between the individual components as a prerequisite for tracking the sequence of changes in the landscape and forecasting the expected changes. Basic knowledge is given about the resistance of natural components and complexes to different types of anthropogenic impact as a prerequisite for assessing and limiting the negative changes in landscapes and the manifestations and consequences of some adverse processes in nature. Students are also introduced to the methods and principles of landscape classification and regionalization, as well as differences in the characteristics of typological and individual (regional) units of different taxonomic rank. Their genesis, structure, natural resource potential and the degree and tendencies of anthropogenic change are clarified. In the practical classes students build and improve skills for collecting information from various sources, for its analysis and synthesis, comparison and interpretation, for teamwork.

Technology of education and grading:

The training is carried out through 30 hours of lectures, 15 hours of practical exercises and 70 hours of independent work. Teaching is based on modern interactive teaching methods - extensive use of multimedia forms and e-learning platform.

The current control includes an assessment of prepared maps, one written development / presentation and one semester test. Only students who have received a grade of at least Average 3 from the current control are admitted to the exam. The final grade takes into account the results of the current control and the performance of the exam in the ratio 33.3: 66.6.

LANDSCAPE ENVIRONMENTAL PROBLEMS OF BULGARIA

ECTS credits: 4,5

Hours per week: 21 + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: IV

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Ivan Drenovski, PhD, idri@swu.bg

Chief Assistant Prof. Nadezhda Nikolova, PhD, nin@swu.bg

Annotation:

The course "Landscape and Ecological Problems of Bulgaria" is studied by students majoring in "Ecology" in order to upgrade basic theoretical knowledge about the construction of landscapes, as a single interconnected whole as a result of the combination of all natural components in a given area. The nature and direction of the connections between the separate components of the natural environment are clarified in order to trace the sequence of the changes in it as a result of the anthropogenic impact. In addition to upgrading their theoretical knowledge, students are introduced to the most acute and acute landscape and environmental problems in different regions of our country. In the majority of cases they are related to previous or current pollution or damage to the environment, as a result of various industrial activities such as mining and flotation of minerals, development of metallurgical, chemical or other industries. To a lesser extent, construction, transport, agriculture and tourism can also lead to serious conflict situations related to environmental protection and biodiversity.

Discipline content:

Establishing the resilience of natural components to different types of anthropogenic impact makes it possible to take measures to limit the negative changes in landscapes and the manifestations and consequences of some adverse processes in nature. The acquired knowledge has a practical application in the planning of the rational use of natural resources, the assessment of the impact on the environment, the territorial-settlement and landscape-planning. Emphasis is placed on the relationship between the economic development of individual regions and the state of environmental protection in them. The natural resource potential of the regions, the history of their economic development, as well as the degree and tendencies of anthropogenic change are clarified. In the practical classes students build and improve skills for collecting information from various sources, for its analysis and synthesis, comparison and interpretation, for teamwork.

Technology of education and grading:

The training is carried out through 30 hours of lectures, 15 hours of practical exercises and 70 hours of independent work. Teaching is based on modern interactive teaching methods - extensive use of multimedia forms and e-learning platform.

Ongoing control includes assessment of one written paper / presentation and one semester test. Each student prepares a map of anthropogenic landscapes at a scale of 1:50,000 in which the landscapes are classified according to the degree of anthropogenic impact.

Only students who have received a grade of at least Average 3 from the current control are admitted to the exam. The final grade takes into account the results of the current control and the performance of the exam in a ratio of 40:60.

FUNDAMENTALS OF ECOLOGY

ECTS credits: 10

Hours per week: 4l + 2 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: V

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof PhD Lidia Sakelarieva, lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev, spu@swu.bg

Annotation:

The course goes into the basic issues of ecology as an interdisciplinary science that links together the biological, physical and social sciences and that is closely tied to the environmental protection. The aim of the course is to present the basic characteristics of biological macro-systems – populations, communities, ecosystems.

Discipline content:

The discipline content has been structured in two divisions:

Division I. Ecology as a science. Environmental factors. Subject, tasks, and methods of research in ecology. Basic environmental factors – biotic, abiotic, and anthropogenic. The concept of limiting factors. Light, temperature, air, water and soil as physical factors. Ecological groups of organisms depending on their adaptations to different light, temperature and moisture regimes. Water and soil as mediums for life. Ecological classification of water and soil organisms.

Division II. Population ecology, synecology, ecosystem ecology. Population characteristics – structure, density, birth rate, death rate, age distribution, dispersion, growth form. The biotic community concept. Community structure – species, morphological (vertical and horizontal) and functional. Types of interactions between two species. Ecological niche. Concept of the ecosystem. Productivity, energy flow and biogeochemical cycles. Ecosystem development. Primary and secondary succession. Concept of the climax. Nature and organization of biosphere.

Technology of education and grading:

The lectures are elaborated as Power point presentations. The exercises are conducted in a laboratory or as field trips.

The final grade is formed on the basis of continuous control and written exam. The continuous control takes place during the semester and includes a test, an assignment, and the students' preparation and work during the exercises. The share of the continuous control from the final grade is 40%. The written exam includes 2 questions from the discipline content. The share of the written exam from the final grade is 60%.

CONSERVATION OF BIOLOGICAL DIVERSITY

ECTS credits: 6

Hours per week: 3l + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: V

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Konstantin Tyufekchiev, PhD,

konstantinat@swu.bg

Annotation:

The course Conservation of Biological Diversity provides the necessary knowledge of contemporary issues in protecting the rapidly diminishing biological diversity (biodiversity - for short), which is the result of evolutionary processes and random genetic changes over a period of several billion years back in the past. It is an integrated approach to the protection and management of biodiversity that uses appropriate principles and knowledge: from basic biological fields such as genetics, biology and ecology, management of areas of natural resources, such as hunting, fishing and wildlife, and the social sciences such as anthropology, sociology, philosophy and economics.

Discipline content:

The course is divided into three parts. The first addresses the goals, objectives, importance and methods in the conservation of biodiversity, processes and trends in the development of global biodiversity. The second part covers the problems of conservation of biological diversity at the species, population and system level. The third part deals with practical applications, and the consideration of human activities on the protection of biodiversity at the global, but also at the regional level. This knowledge will enable students to use an integrated approach in the defense of biodiversity and to achieve the necessary powers to take appropriate advanced solutions in the management of protected natural territories and objects, as well as many practical skills such as the development and maintenance of new travel programs, routes in cognitive and ecological tourism.

Technology of education and grading:

The lectures are elaborated as Power point presentations and involving the use of visualizations - graphics, print and copy materials. Some of the classes are held in the school hall where discuss theoretical facts, processes and phenomena, then place practical tasks that students perform individually. The rest of the classes are conducted within the selected protected areas.

The final grade is formed on the basis of continuous control and written exam. The continuous control takes place during the semester and includes a test, an assignment, and the students' preparation and work during the exercises. The share of the continuous control from the final grade is 40%.

Examination procedure includes a test or exam on a topic of the three sections from the discipline content. The share of the written exam from the final grade is 60%. The final grade is formed on condition that the student' grade on the written exam is at least 3.00.

ETHICS AND ECOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Nikolay Mihailov, PhD

Hours per week: 2l + 1 pe

Examination type: written

Semester: V

Annotation:

The course "Ethics and Ecology" is dedicated to examining the complex relationship of man with nature and its components. The growing pursuit of human well-being often includes the misuse of natural resources, environmental pollution, and the reduction of biodiversity, which upsets the fragile balance of the biosphere. Many prominent scientists, philosophers, biologists, even politicians, emphasize the need to build a new morality, a new, responsible attitude towards nature. This attitude includes the inclusion of future professionals in values and worldviews that will allow them to treat nature not only professionally competent but also morally responsible.

Discipline content:

SECTION I. Definition and main stages of ethics development. Human responsibility to nature. The idea of the moral value of nature in the history of ethics. Modern environmental ethics. Modern principles of ethical attitude to nature. Moral problems of human interaction with nature. Responsibility, humanism, sustainable development.

SECTION II. Contemporary trends in the development of the anthropocentric approach. Radical ecological theories - ecofeminism, social ecology, neotribalism. Aldo Leopold and his "Ethics of the Earth". Peter Singer and the problem of "animal rights". The global environmental crisis and political conflicts. The human idea of well-being and the consequences for biodiversity.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The practical classes are held in groups in a classroom, where the issues discussed at the lectures are discussed and the students' knowledge is strengthened.

During the semester, periodic control is performed by assigning an essay or term paper. Evaluation criterion is the degree of performance of the tasks (abstract, course work) taking into account: the levels of competence, analytical, understanding.

HUMAN ECOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Chief Assistant Prof. Nadezhda Nikolova, PhD, nin@swu.bg

Hours per week: 2l + 1 pe

Examination type: written

Semester: V

Annotation:

The course is designed for students who are studying for a bachelor's degree in "Ecology and Environmental Protection". It acquaints students with the achievements of science important for human health and disease prevention. The aim of the course is to determine the nature and direction of the processes arising from the impact of the environment on human communities, and to assess their impact on human activity. The most frequently discussed issues are related to the impact of man on the environment and his inseparable connection with nature. The issue of settlements (urbanization) is also at the center of attention in the study of human ecology, as the population of cities is growing at a very rapid pace. Many environmental problems are known to be faced by people in overcrowded areas, but the main problem is the severe deterioration of the quality of the living environment.

Discipline content:

Subject, purpose, methods and tasks of the scientific discipline human ecology. Human adaptation to the environment. Impact of the natural environment on humans. Cosmic and terrestrial rhythms and their connection with the human body. Influence of geophysical factors on the human body. Influence of natural radiation and ionizing radiation on the human body. Abiotic factors and their importance for human health. Importance of water for human health. Soils and their importance for human health. Soil infections. Biotic factors and their importance for human health. Mass effect and consequences of the high density of human populations. Urbanization and human health. Relationship between health indicators and environmental pollution. Influence of the state of the environment on human health. Chemicals and human health. Heavy metals and stable organic solvents. Bad habits and human health. Smoking, alcoholism, drug addiction. General principles of disease prevention. Immunity. Food and nutrition. Food safety criteria and control methods.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. Part of the lecture material is developed on Power point or Prezi and is presented with a video projector.

Computers and internet connection, educational videos, visual materials - photos, diagrams, diagrams, etc. are used to illustrate the taught lecture material. The practical classes are held in subgroups. Classes are held both in the classroom, where theoretical facts, processes and phenomena are discussed, and independently in a library or research center.

At the end of each lesson, the questions for preliminary preparation of the students for the next exercise are asked.

The control is carried out with a test with questions on the relevant topics. The topics for the seminar, solving the cases and the implementation of the course work are certified at the end of the semester. The final grade is formed by the written exam and the results of the current control in a ratio of 60/40%.

ECO PHILOSOPHY AND ECOLOGICAL WORLDVIEW

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Hours per week: 2l + 1 pe

Examination type: written

Semester: V

Lecturer:

Assoc. prof. Nikolay Mihailov, PhD

Annotation:

The course "Ecophilosophy and Ecological Worldview" is included in the curriculum of students majoring in "EOS", Bachelor's degree, in order to give them a basic anthropocentric principle, but also for relatively new ideas about "animal rights", the zoocentric approach, the value of life on the planet, etc .. The main emphasis in teaching will be modern ethical statements about the relationship man - nature, the consideration of the principle of anthropocentrism, the so-called. consumerism or consumer morality and its detrimental effects on natural diversity

Discipline content:

SECTION I. Definition and main stages of ethics development. The principle of anthropocentrism at the heart of moral regulation. The idea of the moral value of nature in the history of ethics. Moral problems of human interaction with nature. Responsibility, humanism, sustainable development.

SECTION II. Contemporary trends in the development of the anthropocentric approach. Basic paradigms of the principle of anthropocentrism. Oldo Leopold and his "Ethics of the Earth". Peter Singer and the problem of "animal rights". Contemporary philosophical and ethical principles of ecological attitude to nature. Hans Jonas and The Ethics of Responsibility. Environmental issues in the programs of political parties.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary.

The practical classes are held in groups in a classroom, where the issues discussed at the lectures are discussed and the students' knowledge is strengthened.

During the semester, periodic control is performed by assigning an essay or term paper. Evaluation criterion is the degree of performance of the tasks (abstract, course work) taking into account: the levels of competence, analytical, understanding.

RADIOECOLOGY

ECTS credits: 4,5

Hours per week: 2l + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: V

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Chief Assistant Prof. Nadezhda Nikolova, PhD, nin@swu.bg

Annotation:

The course "Radioecology" is designed for students who are studying for a bachelor's degree in "Ecology and Environmental Protection". This is an elective, general education discipline that aims to study the basics of radioecology - radioactivity, types of decay of radionuclides and associated emissions, the kinetics of decomposition and accumulation of radioactive isotopes, radiation sources, methods of registration of ionizing radiation and methods. statistical processing of radiometric measurement results. The lecture course provides information about the biological effects of radiation, the methods of radiation dosimetry discussed and the safety measures when working with radionuclides. It also gives

an idea of the impact of radioactivity from the environment on humans, the transfer of radionuclides along the food chain and the ways of contamination. Emphasis is placed on current issues for our country such as the extraction and processing of radioactive ores and the closing uranium mining industry. Attention is paid to the accident at the Chernobyl power plant and the consequences for our country in parallel with the accident in Fukushima. The migration of radionuclides in the food chain, their behavior, depending on the environment, fixation, absorption and transfer are studied.

Discipline content:

SECTION I. Radioecology and ionizing radiation. Subject, purpose, methods and tasks of the scientific discipline. Basic concepts. Radiation and radioactivity. Natural and anthropogenic sources of radiation. Characteristic. Peculiarities in the chemical behavior of radioactive substances. Methods for measuring ionizing radiation. Irradiation doses, quantities, units. Types of radiometric devices. Gamma spectrometers. Determination of radioactivity in air and water. Behavior of radionuclides in soils and plants. Radioactive families.

SECTION II. Global and regional radioecological problems. Global radioactive deposits. Migration and influence of radionuclides in different landscapes. Radioecological consequences of the use of nuclear weapons and of the Chernobyl and Fukushima accidents. Radioecological consequences of the uranium mining industry in Bulgaria. Radioecological risk. Institutional control and management in Bulgaria. Radiation protection of the environment. Concepts for radiation protection of the population and settlements.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. Part of the lecture material is developed on Power point or Prezi and is presented with a video projector.

Computers and internet connection, educational videos, visual materials - photos, thematic maps, boards, schemes, diagrams, etc. are used to illustrate the taught lecture material.

The practical classes are held in subgroups. Classes are held both in the classroom, where theoretical facts, processes and phenomena are discussed, and in the field or in the laboratory where each student performs a specific practical task.

At the end of each lesson, the questions for preliminary preparation of students for the next exercise are asked.

The control is carried out with a test with questions on the relevant topics. The laboratory workshop is evaluated with a colloquium on the topics of the seminar and the tasks of the workshop, and is certified after the implementation of the practical exercises. The final grade is formed by the written test and the result of the colloquium in a ratio of 60/40%.

BIOCENOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Konstantin Tyufekchiev, PhD,

konstantinat@swu.bg

Hours per week: 21 + 1 pe

Examination type: written

Semester: V

Annotation:

The course "Biocenology" provides the necessary knowledge about the structure and functioning of ecosystems. It mainly covers functional biocenology, which includes the main functional features of biocenoses and ecosystems, such as the place of communities in energy transfer and the cycle of substances and the role of biodiversity and anthropogenic factors for the functioning of ecosystems. Different methodological approaches for measuring the primary and secondary bioproduction of basic elements of biocenoses and for studying the transmitted energy and biological cycle in different ecosystems - freshwater, steppe, forest, etc. are considered.

The course is included in the curriculum of students majoring in "Ecology and Environmental Protection", Bachelor's degree, and is studied for one semester. It is divided into two parts. The first part includes the theoretical aspects of functional biocenology and a number of methodological approaches for measuring primary and secondary bioproduction and the biological cycle in diverse ecosystems. It explains the terminology used in the scientific literature and examines the functioning of ecosystems in general through the quantitative relationships between the main elements of the biocenosis. The second part examines the interdependence between biodiversity, anthropogenic factors and the functioning of ecosystems.

Discipline content:

Subject and tasks of functional biocenology. Geochemical characteristics of the environment. Clark and the migration of chemical elements. Biogenic migration (biological cycle). The trophic structure of biocenoses - a reflection of the functional features of ecosystems. Biocenoses and energy flow in ecosystems. Self-management of biocenoses and sustainability of ecosystems. Biodiversity and ecosystem functioning. Biodiversity and ecosystem functioning. The biosphere as a mega ecological system. Biosphere cycle of substances. Anthropogenic factors and functioning of biocenoses. Ecological and anthropogenic capacity of the environment. Concept for sustainable development as an attempt to regulate the anthropogenic impact on the biosphere.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on Power point and is presented with a video projector. The process of teaching the lecture material is associated with the use of visual aids - graphics, printed and copied materials, slides.

The practical classes are held in subgroups. Part of the classes are held in a classroom, where theoretical facts, processes and phenomena are discussed, after which practical tasks are set, which students perform individually. The rest of the exercises are held in certain geographical areas for observation and collection of materials for the practical classes. The grade from the practical classes is taken into account in the final assessment of the student during the exam session.

Only students who have met the requirements of the Regulations for the educational activity of SWU, have fulfilled the requirements for mastering the content of the course, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average. 3.

The examination procedure includes a test or a written examination on one topic from the two sections of the content of the course after a previously distributed syllabus. The relative weight of the exam from the total grade is 60%.

PHYTOECOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Lidia Sakelarieva, PhD, sakelarieva.lidia@swu.bg

Hours per week: 2l + 1 pe

Examination type: written

Semester: V

Annotation:

Phytoecology (or plant ecology) is a biological science, division of ecology that studies: the interactions between plants and their communities and between them and their habitat; the management and change (dynamics, development, evolution) of plant biosystems of different rank in time and space, as well as their rational use and conservation. The course aims to present the basic concepts, issues, areas and divisions of modern phytoecology.

Course content:

The course presents the autecology and synecology of plants - the relationship between structural and functional indicators of plant biosystems of different ranks and major environmental regimes (light, temperature, humidity and regime of nutrients) and the other environmental factors, such as orographic factors, air masses, soil biotic and anthropogenic factors, etc., which redistribute the environmental regimes. Attention is drawn to the importance of plants and their communities as bio-resources, for maintaining the balance in the biosphere and for the environmental monitoring. Issues related to the conservation of flora and vegetation are also discussed.

Technology of education and grading:

The lectures are designed in the form of PowerPoint presentations. The practical exercises are conducted in a laboratory or in the field. The final grade is formed on the basis of continuous control and final examination. The continuous control takes place during the semester and includes an assignment and/or a test. The students' preparation and work during the exercises are also assessed. The relative weight of the continuous control from the final grade is 50%. The examination procedure includes a final test on themes from the course content. The final grade is formed if only the student's grade on the final examination is at least 3.00.

ECOLOGICAL PHYSIOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. PhD Lidia Sakelarieva, lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev, spu@swu.bg

Hours per week: 2l + 1 pe

Examination type: written

Semester: V

Annotation:

The proposed discipline "Ecological Physiology" examines the physiological processes (including adaptive forms of animal behavior) in their ecological significance. In other words - how the mechanisms ensure the maintenance of the integrity of biological macrosystems (organism, population, biocenosis) and the stability of functions in complex and dynamic conditions of existence.

Knowledge of physiological processes, explaining the adaptation of organisms, populations and biocenoses, allows to find the right solution to problems related to increasing productivity in agriculture, fisheries and hunting, to ensure the efficiency of acclimatization of beneficial animal species, to develop effective preventive measures against diseases and harmful species damaging yields. Knowledge of ecological physiology is also important for the protection of rare and endangered species in accordance with national conservation legislation.

Discipline content:

Subject and tasks of ecological physiology. Biosphere. Levels of organization of living matter. Water-salt metabolism in animals. Osmoregulation. Adaptations to the habitat of arid habitats. Gas exchange and respiration. Gas exchange in water and air. Heat exchange and thermoregulation. Poikilothermic and homeothermic animals. Reversible hypothermia. Diurnal and seasonal biological rhythms. General regularities in the course of rhythms. Reproduction regulation. Physiology and regulation of molting. Seasonal migrations. General principles of adaptations of the organism. Mechanisms and types of physiological adaptation. Optimum rule. Complex impact of environmental factors. Rule of minimum. Population. Spatial structure. Ethological structure. Population density regulation. Regulation of fertility and mortality. Regulation of the resettlement of individuals. Maintaining genetic heterogeneity. Ecological significance of genetic heterogeneity. Mechanisms for maintaining heterogeneity. Population homeostasis. Trophic structure of the biocenosis. Ecology of nutrition. Physiology of nutrition. Energy role of animals in ecosystems. Principles of energy in the body. Energy assessment. Population relationships in the biocenosis. Relationship of populations at trophic level.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed in the form of Power point presentations and is presented with a video projector.

The practical classes are held in subgroups in the laboratory or in the field (in the field), discussing the issues addressed in the lectures and consolidating students' knowledge. The various causes, motives and forms of individual, social and reproductive behavior of animals are discussed.

Only students who have met the requirements of the Regulations for the educational activity of SWU, have fulfilled the requirements for mastering the content of the course, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average. 3.00.

The examination procedure includes a written examination on one topic from a previously distributed syllabus or a final test on topics from the content of the course. The relative weight of the exam from the total grade is 50%.

GLOBAL CLIMATE CHANGES

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Ivan Drenovski, PhD, idri@swu.bg

Assoc. Prof. Krasimir Stoyanov, Ph.D., kraasi_sto@swu.bg

Hours per week: 2l + 1 pe

Examination type: written

Semester: V

Annotation:

The course "Global Climate Change" is studied by students majoring in "EEA" in order to gain knowledge about climate change on our planet and the challenges facing human society today. An overview of climate change in the geological history of the Earth, during the historical period and to this day. Information is given on the main causes of climate change - natural (astronomical, geological, tectonic, circulating, biological, etc.) and anthropogenic (greenhouse gas emissions from transport, industry, agriculture and utilities, deforestation and many others).). Emphasis is placed on the periodicity and cyclicity of astronomical factors. The essence of the greenhouse effect is clarified and the tendencies for change of the concentration of greenhouse gases in the earth's atmosphere are traced. The global warming observed in recent decades and its immediate and forthcoming consequences on a regional scale, their impact on the environment, the economy and people's daily lives are commented on.

Discipline content:

The course "Global Climate Change" is considered in three sections. These include the Chronological Review of the Earth's Climate Change, the Factors Determining Climate Change and the Climate Change Mitigation and Adaptation Measures.

Technology of education and grading:

The lecture course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. An electronic version of the course in the e-learning platform Blackboard Learn is in the process of creation. Some of the lectures are prepared in the form of Power point presentations and are presented with a multimedia projector. The process of teaching the lecture material is richly illustrated with maps, graphics, photos, tables, diagrams and more. The practical classes are held in subgroups. Most of the exercises are held in a classroom, where the established facts, processes and phenomena are discussed from a theoretical point of view, after which practical tasks are set, which the students perform individually. Another part is held in a computer room or in the field. At the end of each lesson, the questions for preliminary preparation of students for the next exercise are asked.

According to the Regulations for the educational activities of SWU, only students who have met the requirements for mastering the content of the course, set in their classroom and extracurricular activities and have an overall grade of current control is not lower than Average 3.

The examination procedure includes a written examination on one topic from the syllabus. The relative weight of the examination grade in the formation of the final grade is 60%.

The assessment is performed according to the six-point assessment scale, according to the Higher Education Act and Ordinance № 21 of the Ministry of Education and Science / 30.09.2004.

The written works are stored for one year from the date of the exam.

Credits in the discipline are awarded only after successfully passing an exam with a grade equal to or higher than Average 3, according to the system for accumulation and transfer of credits.

CLIMATES OF THE PAST

ECTS credits: 4,5

Hours per week: 21 + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: V

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Dr. Emil Gachev, emil.gachev@swu.bg

Annotation:

Paleoclimatology is a specializing teaching course, aimed to upgrade knowledge obtained from the discipline „Meteorology and Climatology“ with a more concise and detail information about climates of Earth’s geological and historical past. During the long course of history of our planet the climate has changed many times, and knowledge of such changes has increased manifold in the recent years due to the application of wild range of innovative research methods and techniques. To know the climates of the past is considered one of the most valuable tools for the analysis of present-time climate changes, and especially in forecasting of their impact on Nature and people. The course accentuates on the most important moments of Earth’s climate history, as far as it is known at present. Revision and analysis is made on the presently existing methods for research of past climates. Climatic models of past and future states of climate are discussed.

The course corresponds with the subject of the disciplines „Meteorology and Climatology“, „Geology and Geomorphology“, and others, which are comprised in the undergraduate programme.

Course content:

The contents of this course is structured in three parts. The first part is introductory: it reveals the teaching of past climates, its theoretical fundamentals, links with other branches of science, and the methods applied in it. The second part, the core of the course, is focused on past climates. Climates of the Paleosoic, Mesosoic, Tertiary, Quaternary and historical times, are studied in chronological order. Greatest load is put on the Quaternary period, as then climatic variations were pronounced to a greatest extent. Quaternary climates are directly connected to present ones. The third part is dedicated to the climates of the future. A special reference is made to the issue of climate change, existing climate models, scenarios and forecasts.

During practices students illustrate the knowledge gained through drawing climatic maps of the world for the respective periods of the past. Work on course task, given individually to each student, is also part of practice activities.

Techniques of teaching and evaluation

Teaching in Climates of the Past is done according to the regulations of the actual teaching plan of the undergraduate programme "Ecology and Environmental Protection".

Teaching is performed in a lecture hall, where theoretical facts, processes and phenomena are discussed. Some particular tasks are appointed individually to each student.

In-term control mark is granted to each student based on the level of performance in map preparation and the individual project task. Only students who have an in-term mark equal or higher than 3.00 are allowed for the final exam.

Examination procedure comprises a written exam – students write on two questions from the teaching programme, provided to them on a question list. Final mark is calculated on the basis of in-term control and final exam, following a ratio of 35/65.

ANALYSIS, ASSESSMENT AND RISK MANAGEMENT IN NATURAL DISASTERS

ECTS credits: 4,5

Hours per week: 21 + 1 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: V

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Krasimir Stoyanov, Ph.D., krasi_sto@swu.bg

Annotation:

The discipline Analysis, assessment and risk management in natural disasters is taught to students educating on the master program Ecology and Environment Protection. The discipline has mainly practical orientation and aims at enlarging and deepening the competence of students on air pollution due to harmful emissions occurring following a fire and emergencies provoked by natural disasters. Obeying the regulations stipulated in the Environment Protection Law, the Forestry Law, Regulation No. 2-FCTS (Fire-Precaution Construction and Technical Standards) guarantees to a large extent the admissible rates of environment pollution. Emergency plans provide events for limitation and localization of an emergency occurring in case of natural disasters.

The discipline allows the students use their competence on technology of fluid purification and Ecological legislation and regulations.

Discipline content

The discipline gives basic competence on:

- The various types of hazardous processes caused by the anthropogenous factor;
- Environment pollution due to natural disasters;
- Effect of harmful emissions on humans and ecosystems;
- Regulatory basis – laws, regulations, instructions (Environment Protection Law, Forestry Law, Regulation No.2-FCTS, etc.) concerning the environment protection

Technology of education and grading:

Lectures are provided for the students in the course of the education. During the lectures they become familiar with the theoretical basis of the discipline. The lectures are held following the classical manner and are visualized by means of EU documents and documents approved in Bulgaria, the world good practices concerning the lecture content

are discussed. The students develop a paper on a topic from the syllabus that they defend. The grade is considered a current control.

The extracurricular classes are predominantly consisting of work in libraries and Internet, individual and group consultations.

The final grade constitutes 50% of the periodical control grade and 50% of the grade from the semestrial examination according to developed and approved in GEEP Chair system of control and grading students' competence.

WATER POLLUTION AND IMPACT ON ECOSYSTEMS

ECTS credits: 8

Hours per week: 3l + 2 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VI

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Emilia Varadinova, PhD,

emilia.varadinova@swu.bg

Annotation:

The course "Water pollution and impacts on ecosystems" studies the sources of water pollution, anthropogenic pressure, the factors influencing the processes of pollution, decomposition and transportation of pollutants, the impact of water pollution on ecosystems.

The practical classes provide an opportunity for students to work independently on the sampling of biological elements for water quality, measurement of basic physico-chemical parameters of the aquatic environment, determination of nutrients. Additionally, visits are organized to institutions responsible for water supply, treatment of domestic and industrial waste, which are authorized to control the purity and pollution of surface and groundwater bodies.

Course content:

The training course contains topics dedicated to the sources of pollution, types of water pollutants, water typology, status assessment of standing and lotic aquatic ecosystems, water treatment, health risk analysis and economic aspects of water use.

Technology training and assessment

The course is conducted on the basis of advance planning of each lecture, that includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on Power point and is presented with a video projector.

The practical classes are held in subgroups in a laboratory, where students are introduced to practical examples related to water pollution, assessment of the ecological status of water bodies, the bioindicative abilities of water organisms. The negative impacts of water pollution on ecosystems and people are discussed and analyzed. Some of the exercises are related to field research and visits to institutions

authorized to perform water analysis, as well as drinking water / wastewater treatment plants.

During the semester a periodic control of the acquired knowledge through preparation presentations is carried out, and at the end of the semester - a course work dedicated to local, regional or global issues in the field of air pollution and cleanliness. Students are admitted to the exam when they have fulfilled the requirements of the Regulations for the educational activity of SWU, for mastering the content of the discipline, set in their classroom and extracurricular employment, and the general assessment of the current control is not lower than Average 3.

The evaluation procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

TREATMENT OF SOLID WASTE

ECTS credits: 8

Hours per week: 31 + 2 pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VI

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Chief assistant prof. Veselina Dalgacheva, PhD,
dalgacheva@swu.bg

Annotation:

The purpose of the course is to acquaint students with the basic concepts of the accepted European and Bulgarian hierarchy in waste management and the resulting priorities. The discipline aims to prepare staff to carry out waste integrated management, the control activities, to participate in the development of plans, programs, expertise and EIA reports in the field of waste management. Emphasis in the training is placed on sustainable development, involving the application of environmentally friendly technologies, the specific benefits of their implementation, with elements of waste minimization, recovery, reuse and final disposal.

Course content:

The course provides an opportunity to obtain the necessary knowledge of regulatory requirements and procedures for collection, transportation, analysis of the quantities and properties of waste. Particular attention shall be paid to the obligations of waste generators to prevent or reduce the quantities and hazardous properties of the waste generated by:

- development and application of modern environmentally friendly technologies that save the use of primary natural resources;
- development of appropriate methods for final disposal of hazardous substances contained in waste destined for recovery.

Technology training and assessment

The course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on Power point and is presented with a video projector.

The practical classes are held in subgroups in a laboratory, where students are introduced to practical examples related to waste treatment.

During the semester a periodic control of the acquired knowledge through preparation presentations is carried out, and at the end of the semester - a course work dedicated to local, regional or global issues in the field of air pollution and cleanliness. Students are admitted to the exam when they have fulfilled the requirements of the Regulations for the educational activity of SWU, for mastering the content of the discipline, set in their classroom and extracurricular employment, and the general assessment of the current control is not lower than Average 3.

The evaluation procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

URBAN ECOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Chief assistant prof. Veselina Dalgacheva, PhD,

dalgacheva@swu.bg

Hours per week: 2l + 1 pe

Examination type: written

Semester: VI

Annotation:

The course "Urban Ecology" introduces students to the importance of green areas as a modifier of urban climate, urban biodiversity and the relationship between biotic communities in urban environments, urban metabolism, environmental problems (internal and external) caused by development and functioning of cities, planning and management of urban areas, the sustainable way of urban development.

Course content:

The training course contains topics dedicated to the acquisition of theoretical knowledge of the basic concepts, approaches and methods in urban ecology, in particular in the development and functioning of cities as ecosystems and environmental problems in them, the application of various thematic approaches to analysis, including remote techniques for monitoring cities.

Technology training and assessment:

The course is conducted on the basis of advance planning of each lecture, which includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on power point and is presented with a video projector.

The practical classes are held in subgroups in a laboratory, where students are introduced to specific examples related to the problems of urban ecology. The negative effects of pollution in cities are discussed. Some of the exercises are related to field research and visits to specialized institutions.

During the semester, periodic test control is performed. The work activity during the exercises is also evaluated. The share of the current control from the general assessment is 50%, as in it the relative weight of the course task is 30%, of the test - 60%, of the work during the exercises - 10%.

Students with a total grade from the current control not lower than average 3 are admitted to the exam. The relative weight of the exam from the general grade is 50%.

ECO TOURISM

ECTS credits: 3

Hours per week: 21

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VI

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Konstantin Tyufekchiev, PhD,
konstantinat@swu.bg

Annotation:

The course "Ecological Tourism" is aimed at acquainting students with environmentally friendly practices for rational and gentle use of natural resources for the needs of tourism and their protection while taking into account the interests of the local population. The content of the course is structured in three sections. The first section clarifies the nature, main characteristics and features of natural tourist resources. The second section is dedicated to ecological tourism. The third section focuses on the development and peculiarities of ecotourism in Bulgaria and the network of created eco-trails.

Technology of education and grading:

The training is carried out through lectures, discussions and individual work. In the course of study, students develop an essay on a pre-set topic. The developed papers are defended in front of the other students. The course ends with a written exam.

OCEANOLOGY

ECTS credits: 3

Hours per week: 21

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VI

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Emil Gachev, PhD, emil.gachev@swu.bg

Annotation:

The teaching course in Oceanography provides special knowledge with the aim to upgrade knowledge obtained in the fundamental discipline "Hydrology", adding particular and detail knowledge about World Ocean. As the programme of the fundamental discipline

is focused most of all on river waters, there the extensive topic of the ocean, its processes, resources and ecological problems it has been facing, remains almost uncovered. It is the main object of the present discipline to fulfill this gap. Oceanology is extraordinary important in recent times, as the ocean occupies more than two thirds of Earth's surface, and is still far not enough researched. Another issue of global importance is still unsolved – how will the ocean react to progressing climate change? The discipline corresponds with the subject of the disciplines „Hydrology“, „Pollution of water“, and others, which are comprised in the teaching plan of the undergraduate programme.

Discipline contents:

The teaching material is structured in four parts:

The largest, first part (21 lecture hours) is dedicated to World Ocean. A detail reference is made to the spatial division, structure and evolution of World Ocean. Sea water properties and motion: waves, currents, tides, are studied in detail. Specialized knowledge is provided of the configuration and structure of ocean bottom, of the interactions between ocean and Earth's climatic system. Special attention is paid on the impact of sea on landforms.

The second part contains information about ocean resources – hydro and bioresources, and how extremely important they are for Nature and people.

The third, regional part, is dedicated to the Black sea, and in particular the Bulgarian coast, and to the Mediterranean, as a sea with increasing economical and social importance for Bulgaria and Bulgarian people.

The fourth, conclusion part, is dedicated to the utilization and protection of the sea. Introduction is also done to the international sea and ocean legislation, in general and for particular areas.

Practices are not comprised in this course. On students demand it is possible to organize a several day terrain activity on the Aegean coast, near the town of Kavala (Greece).

Teaching and evaluation techniques

Teaching in Oceanology is done according to the actual teaching plan of the undergraduate programme in Ecology and Environmental Protection.

Studies are organized in a lecture hall, where theoretical facts, processes and phenomena are discussed. Film projections are also included. The core of the examination procedure is the written final exam that follows preliminarily given question list. Each student individually writes on two topics from the list.

INFORMATION SYSTEMS IN ECOLOGY

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department “Geography, Ecology and Environmental Protection”

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. prof. Penka Kastreva, PhD, penkakastreva@swu.bg

Chief Assistant Prof. Galina Bezinska, PhD,

galinabezinska@swu.bg

Hours per week: 21+2pe

Examination type: written

Semester: VI

Annotation:

The course "Information Systems in Ecology" is elective and is studied by students majoring in "Ecology and Environmental Protection" in order to learn the basic principles of creating and using environmental maps (models) in a digital environment. The lecture course presents the general concepts for building and implementing information systems in the field of ecology.

The practical exercises aim to provide specific knowledge and skills for working with custom GIS software.

Discipline content:

Due to limited hours, the topics cover a basic theoretical foundation of questions that remain unchanged over time:

Topic 1. Main aspects of GIS: Types of systems. Main components. The technical and software provision of GIS. Applications of GIS in ecology.

Topic 2. Database designed for the needs of ecology. Data types. Construction of spatial models. Topological models and topological data. Spatial data formats. Attribute data models. Coordinate systems and map projections. The time factor in GIS. Use of geographical attributes and metadata. Main features of the GIS database.

Topic 3. Basic data operations: Data entry and coding. Data aggregation. Coordinate transformations. Data management. Data presentation

The practical exercises include: 1) introduction to the interface and functionality of ArcGIS; 2) selection of types and structuring of the data; 3) application of modern methods for data storage and management - input, processing and presentation of graphic and attribute data; 4) examples for performing geographical analyzes in the treatment of various environmental problems in the management of economic life in the country.

Technology of education and grading:

The lectures and exercises are held exclusively on the basis of the material and technical base of the Department of GEOOS. To illustrate the taught lecture material, a computer with a video projector, educational videos, specialized GIS software (ArcGIS), visual materials (boards, diagrams and maps) are used, some of which are developed as course and diploma works of students.

A computer multimedia laboratory is used for the practical exercises. For normal conduct of the exercises the students are divided into groups, as each student has a separate computer.

During the semester, periodic control is performed by assigning individual assignments and a written test. The tasks are entirely related to working in a digital environment with specialized software for mapping and using maps.

Students are admitted to an exam with a minimum current grade point average of 3, which is formed as the arithmetic mean of all grades obtained during the semester. The final grade is formed by 40% of the grade of the periodical control and 60% of the grade of the semester exam, according to the system for control of the knowledge and skills of the students developed and accepted in the department.

GEOGRAPHIC INFORMATION SYSTEMS

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Hours per week: 2l+2pe

Examination type: written

Semester: VI

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. prof. Penka Kastreva, PhD, penkakastreva@swu.bg

Chief Assist. Prof. Galina Bezinska, PhD,

galinabezinska@swu.bg

Annotation:

The course "Geographic Information Systems" is elective and is studied by students majoring in "Ecology and Environmental Protection" in order to get acquainted with the general concepts for building and implementing GIS in the field of ecology.

The practical exercises aim to provide specific knowledge and skills for working with custom GIS software.

Discipline content:

Due to limited hours, the topics cover a basic theoretical foundation of questions that remain unchanged over time:

Topic 1. Main aspects of GIS: Types of systems. Main components. The technical and software provision of GIS. Applications of GIS in ecology.

Topic 2. Database designed for the needs of ecology. Data types. Construction of spatial models. Topological models and topological data. Spatial data formats. Attribute data models. Coordinate systems and map projections. The time factor in GIS. Use of geographical attributes and metadata. Main features of the GIS database.

Topic 3. Basic data operations: Data entry and coding. Data aggregation. Coordinate transformations. Data management. Data presentation

The practical exercises include: 1) introduction to the interface and functionality of ArcGIS; 2) selection of types and structuring of the data; 3) application of modern methods for data storage and management - input, processing and presentation of graphic and attribute data; 4) examples for performing geographical analyzes in the treatment of various environmental problems in the management of economic life in the country.

Technology of education and grading:

The lectures and exercises are held exclusively on the basis of the material and technical base of the Department of GEOOS. To illustrate the taught lecture material, a computer with a video projector, educational videos, specialized GIS software (ArcGIS), visual materials (boards, diagrams and maps) are used, some of which are developed as course and diploma works of students.

A computer multimedia laboratory is used for the practical exercises. For normal conduct of the exercises the students are divided into groups, as each student has a separate computer.

During the semester, periodic control is performed by assigning individual assignments and a written test. The tasks are entirely related to working in a digital environment with specialized software for mapping and using maps.

Students are admitted to an exam with a minimum current grade point average of 3, which is formed as the arithmetic mean of all grades obtained during the semester. The final grade is formed by 40% of the grade of the periodical control and 60% of the grade of the semester exam, according to the system for control of the knowledge and skills of the students developed and accepted in the department.

MANAGEMENT OF ENVIRONMENTAL PROTECTION

ECTS credits: 6,5

Hours per week: 21+2pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Emilia Varadinova, PhD,
emilia.varadinova@swu.bg

Annotation:

The purpose of the course "Management of environmental protection" is to acquaint students with the approaches, methods and principles in the implementation of management activities aimed at environmental protection. In the process of study, students acquire skills for analysis and assessment of various environmental situations related to pressures and impacts on air, water, soil, biodiversity, as well as the adverse effects of noise, radioactive and electromagnetic loading, and waste generation. The education provides students with the necessary knowledge and competencies to participate in expert teams in the development of strategies, programs and management plans, as well as in the preparation of environmental expertise and assessments.

Course content:

Basic principles in environmental protection - current strategies and programs. Characteristic features of control systems. Goals and functions of the management system. Matrix model of the functions and types of management activities. State policy and environmental management bodies. Basic statements and regulatory requirements. Information about the state of the environment - types, ways and means of obtaining. Model of management process technology. Management of activities in the use and protection of the earth's bowels, soil, atmospheric air, water and biological diversity, prevention and reduction of industrial pollution and others.

Technology of education and grading:

The training in the discipline "Management of environmental protection" is carried out by teaching 45 hours of lectures and conducting 30 hours of practical exercises. The lecture material covers the main issues on the content of the studied discipline, as well as various means of illustration - multimedia, demonstration software, visual materials (boards, posters, etc.), etc. Students form their works on individual topics as a course project, which are evaluated and only with a positive grade (at least an average of 3.00) are admitted to the exam. The training in the discipline ends with a written exam.

The final grade is formed on the basis of the defense results of the course assignments and the semester exam (in a ratio of 50/50%), according to the developed and accepted in the department system for control and assessment of students' knowledge.

ECOLOGICAL MONITORING

ECTS credits: 8

Hours per week: 3l+2pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. Emilia Varadinova, PhD,

emilia.varadinova@swu.bg

Chief Assist Prof. Veselina Dalgacheva, PhD,

dalgacheva@swu.bg

Annotation:

As a result of the high rates of industrialization and the increased negative human impact, the environment is being polluted at such a rate and scale that the problem of its protection is becoming of paramount importance on a global scale. International thematic initiatives prioritize the need for periodic, large-scale and objective assessment of the state of the components of the environment, which should be carried out through a unified methodological monitoring system.

The subject of the course "Ecological Monitoring" is the study of the information system for monitoring, registration and control of the state, quality and changes of the main components of the natural environment in unaffected conditions and as a result of anthropogenic pressure.

Course content:

Course covers two groups of theoretical questions:

- basic concepts, structure and capacity of the system for environmental monitoring, environmental problems in the regions for economic development in Bulgaria, a European scheme for trading greenhouse gas emissions and national allocation of quotas;
- monitoring of environmental components, noise and waste - the conditions for deployment of stations, instrumental analysis, limits eligible concentrations and results of the monitoring programs.

Technology training and assessment:

In the process of training students are provided lectures and practical exercises. In the lectures students get acquainted with the theoretical basis of the discipline, divided into two groups. The lecture material is visualized at the power point, illustrating with thematic graphic material specific environmental situations, maximum permissible concentrations of various pollutants of environmental components, commenting on best available techniques and environmentally friendly practices. The practical exercises are conducted in a laboratory, as the students under the guidance of the teacher mark on a map of Bulgaria the points of the ecological monitoring on the separate components of the environment, the most polluted zones are outlined and analyzed.

The examination procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed by 40% of the exercises and 60% of the exam.

AGRO ECOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Boyko Kolev, PhD, E-mail: bkolev@swu.bg

Hours per week: 21+1pe

Examination type: written

Semester: VII

Annotation:

The course "Agroecology" is one of the main elective courses for students in the bachelor's program in "Ecology and Environmental Protection". Agroecology as an independent science is relatively new. In essence, it is a science that studies the processes and interactions that take place in a specific anthropogenic ecosystem called the agroecosystem. Agroecology as a science is developing on the basis of the development of modern ecology, plant physiology, biology, earth sciences, physics, chemistry, mathematics and informatics, ecotoxicology and migration of toxic substances into the biosphere with the direct participation of man. It is studied in order to expand and deepen students' knowledge of anthropogenic ecosystems through the processes and phenomena occurring in the pedosphere, atmosphere, hydrosphere and lithosphere. The issues related to agroecology as a science and academic discipline, which studies the agroecosystem as a natural anthropogenic ecosystem in which the products of agricultural production are produced, are considered. From an ecological point of view, the agroecosystem is an important part of the biosphere in which living terrestrial organisms spread and develop.

The course "Agroecology" is studied in the specialty "EEOS" in order to acquaint students with modern productions in the field of agroecology worldwide. The most general task of agroecology as a science is based on the scientific knowledge of anthropogenic ecosystems to ensure their most rational use and protection, in order to maximize the yields of all crops and increase the productivity of livestock, with mandatory compliance with the principles of sustainable development in agriculture.

Discipline content:

Influence of ecological factors in plant growing. Ecological bases of agrotechnics and development of the strategy of ecologically (organic) agriculture. Environmental problems in the use of pesticides and mineral fertilizers and the problems of environmental pollution with heavy metals, dusts, gases, etc., including radioactive contamination.

Technology of education and grading:

Students take two tests during the semester. Requirements for admission to the exam are that the total grade from the current control (grades from the tests and the performance of the set tasks) is not lower than an average of 3.00.

During the semester, current control is performed by solving tests (T) and developing a course work (K) and a course project (P).

The final grade is formed as the share of the current control of the total grade is 40%, and of the exam - 60%, according to a system for control and assessment of students developed and accepted in the GEOOS department.

SOIL ECOTOXICOLOGY

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Boyko Kolev, PhD, E-mail: bkolev@swu.bg

Hours per week: 21+1pe

Examination type: written

Semester: VII

Annotation:

The course "Soil Ecotoxicology" is one of the elective courses for students in the bachelor's program in "Ecology and Environmental Protection". The discipline is a part of ecotoxicology, which as a science is relatively new. It is a science that studies the problems and interactions that take place in ecosystems (including agroecosystems) under the influence of various toxic substances. It is also a science about the impact of chemical pollution on populations, biocenoses and ecosystems. Soil ecotoxicology develops as a result of the development of a number of sciences: ecology, agroecology, plant physiology, biology, earth sciences, physics, chemistry, mathematics and computer science, toxicology and migration of toxic substances into the biosphere with the direct participation of man. It is studied in order to expand and deepen students' knowledge of ecosystems through the processes and phenomena occurring in the pedosphere. Issues related to soil ecotoxicology are considered as a discipline that studies the soil in terms of their ecotoxicological characteristics.

The course "Soil Ecotoxicology" is studied in the specialty "EOS" in order to acquaint students with modern productions in the field of soil ecotoxicology worldwide. The most general task of soil ecotoxicology is to ensure the most rational use and protection of soils on the basis of scientific knowledge about soils.

Discipline content:

Soil ecotoxicology as a part of ecotoxicology. Subject, principles and tasks. Toxicology and ecotoxicology general features and fundamental differences. Ecotoxicological characteristics of chemical elements. Major pollutants of the pedosphere. Ecotoxicological characteristics of pesticides. Radioactivity and radioactive contamination.

Technology of education and grading:

Students take two tests during the semester. Requirements for admission to the exam are that the total grade from the current control (grades from the tests and the performance of the set tasks) is not lower than an average of 3.00.

During the semester, current control is performed by solving tests (T) and developing a course work (K) and a course project (P).

The final grade is formed as the share of the current control of the total grade is 40%, and of the exam - 60%, according to a system for control and assessment of students developed and accepted in the GEOOS department.

FUNDAMENTALS OF SAPROBIOLOGY

ECTS credits: 4,5

Hours per week: 21+1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. PhD Lidia Sakelarieva, lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev, spu@swu.bg

Annotation:

The course "Fundamentals of Saprobiology" is included in the curriculum of students majoring in "EOS", Bachelor's degree, in order in the training process, students to acquire good theoretical and practical training for direct application of knowledge in the field of determining water quality, categorization and ecological classification of water bodies, biological control and biological monitoring of waters.

Discipline content:

In the course "Fundamentals of Saprobiology" the biological bases of the processes of pollution and self-purification and their effects on the composition, structure and functioning of natural aquatic ecosystems are studied. Historically, the development of the understanding of saprobity as an ecological situation and water quality, as well as the systems for ecological classification and categorization of natural waters from a biological point of view is traced. The ecological bases and the applicability of different groups of methods, criteria and indicators for biological assessment and monitoring of waters (saprobic indices, diversity indices, biotic indices, etc.) are considered.

Technology of education and grading:

The lecture material is developed on Power point and is presented with a video projector. The practical classes are held in subgroups in a laboratory or in the field, where various parameters and indicators of the aquatic environment and hydrobiocenoses are measured and determined, categorization and classification of water bodies is performed, the issues discussed at the lectures are discussed, etc.

During the semester there is a periodic control of the acquired knowledge by assigning a course assignment and solving a test that corresponds to part of the content of the lecture material. The preparation and work of the students during the exercises are also evaluated. The share of the current control from the general assessment is 40% and in it the relative weight of the course task is 40%, of the test - 40%, of the work during the exercises - 20%.

Only students who have met the requirements of the Regulations for the educational activity of SWU, have fulfilled the requirements for mastering the content of the course, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average. 3.00.

The examination procedure includes a written examination on two topics from the content of the course. The relative weight of the exam from the total grade is 60%.

The final grade is formed provided that the student has received a grade from the written exam at least Average 3.00. Credits are awarded only if the overall score is equal to or higher than Average 3, according to the credit accumulation and transfer system.

BIOLOGICAL INDICATORS

ECTS credits: 4,5

Hours per week: 21+1pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturers:

Assoc. Prof. PhD Lidia Sakelarieva, lidia.sakelarieva@swu.bg

Chief assistant Prof. Alexander Pulev, spu@swu.bg

Annotation:

The course "Biological Indicators" is included in the curriculum of students majoring in "EOS", Bachelor's degree, in order in the process of training, students to acquire good theoretical and practical training for direct application of knowledge in the field of determining the state and air, water, soil, ecosystem quality, based on biological control and biological monitoring.

Discipline content:

The course of the discipline "Biological Indicators" studies the nature, principles, historical development, ecological basis, different levels and areas of application of the biological indication. Organisms, species and groups of species (communities) of plants, animals and microorganisms that are used as indicators for assessing the state (quality) of air, soil, water, ecosystems, as well as the applicability of different groups of methods, criteria and indicators are considered. For biological assessment and monitoring of air, soil and water (saprobic indices, diversity indices, biotic indices, etc.), adopted in Bulgaria and in European countries. Plants and animals, indicators of minerals, as well as the applicability of microorganisms-bioindicators in industry, medicine, geology are studied.

Technology of education and grading:

The lecture material is developed on Power point and is presented with a video projector. The practical classes are held in subgroups in the laboratory or in the field (in the field), where the issues discussed in the lectures are discussed and the students' knowledge and skills to analyze various problems are strengthened.

During the semester there is a periodic control of the acquired knowledge by assigning a course assignment and solving a test that corresponds to part of the content of the lecture material. The preparation and work of the students during the exercises are also evaluated. The share of the current control from the general assessment is 40% and in it the relative weight of the course task is 40%, of the test - 40%, of the work during the exercises - 20%.

Only students who have met the requirements of the Regulations for the educational activity of SWU, have fulfilled the requirements for mastering the content of the course, set in their classroom and extracurricular activities and the overall grade of the current control is not lower than Average. 3.00.

The examination procedure includes a written examination on two topics from the content of the course. The relative weight of the exam from the total grade is 60%.

The final grade is formed provided that the student has received a grade from the written exam at least Average 3.00. Credits are awarded only if the overall score is equal to or higher than Average 3, according to the credit accumulation and transfer system.

ENVIRONMENTAL ASSESSMENTS

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Emilia Varadinova, PhD,

emilia.varadinova@swu.bg

Chief Assist Prof. Veselina Dalgacheva, PhD,

dalgacheva@swu.bg

Hours per week: 21+2pe

Examination type: written

Semester: VII

Annotation:

The course "Environmental Assessments" presents the stages, procedures and legislative framework for the development of environmental assessments and compatibility assessments as preventive evaluation tools of possible significant impacts on environmental components, as a result of the implementation of investment proposals, plans and programs at national, regional and local levels that are under preparation.

The aim of the course "Environmental Assessments" is to gain normative-based theoretical knowledge related to passing all stages of the procedures for different types of environmental assessments, analysis of negative anthropogenic impacts, assessment of the cumulative effect, development of relevant prevention and control measures. mitigation of adverse effects on environmental components.

Course content:

The training includes studying the procedures of different types of environmental assessments, compatibility assessments, as well as complex permits developed during the construction of new and operation of existing installations and facilities for the categories of industrial activities within the requirements of the Environmental Protection Act.

Technology training and assessment

The course is conducted on the basis of advance planning of each lecture, that includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on power point and is presented with a video projector.

The practical exercises are held in subgroups in a laboratory, where students are introduced to environmental reports developed for planned plans, programs and investment proposals in various sectors of the economy. The state of the components of the environment is analyzed before the implementation of specific plans, programs and investment proposals.

The evaluation procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

ENVIRONMENTAL IMPACT ASSESSMENTS

ECTS credits: 6,5

Hours per week: 2l+2pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Emilia Varadinova, PhD,

emilia.varadinova@swu.bg

Chief Assist Prof. Veselina Dalgacheva, PhD,

dalgacheva@swu.bg

Annotation:

The national environmental strategy papers prioritize the growing need to protect and improve the quality of the environment, which is seen as one of the pillars of sustainable development, together with economic and social development. Environmental processes and challenges are reflected in all sectors of the economy and life and require new, more integrated and integrated approaches to address them.

The subject of the course "Environmental Impact Assessment" is the study the application of preventive actions and measures to ensure the protection of significant adverse effects on the components of the environment and natural ecosystems before the implementation of investment intentions.

Course content:

The training includes study of all successive stages of the procedures for the development of the environmental impact assessment, including assessment of the need for implementation, development of a report with proposals for alternatives and relevant precautions and measures, and discussion/defence with the authorized institutions and the public.

Technology training and assessment:

The course is conducted on the basis of advance planning of each lecture, that includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on power point and is presented with a video projector.

The practical exercises are held in subgroups in a laboratory, where students are introduced to specific reports developed for planned investment proposals in various sectors of the economy. The condition of the components of the environment is analyzed, before the realization of specific investment proposals, etc. the "zero hypothesis" and the potential impacts on air, water, soil, biota, and human health as a result of the construction and operation of the proposed intent.

The evaluation procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

ENVIRONMENTAL REQUIREMENTS AND NORMS

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Emilia Varadinova, PhD,
emilia.varadinova@swu.bg

Hours per week: 2l+2pe

Examination type: written

Semester: VIII

Annotation:

The regulated ecological requirements and the introduction of norms with a view to limiting the pollution of the components of the environment is one of the most dynamically developing directions in the Bulgarian legislation. Its harmonization with European priorities and requirements marked the beginning of a new legal framework through the development of specialized laws and regulations defining the priorities, strategies and responsibilities of citizens and institutions.

The course "Environmental Requirements and Norms" introduces students to the objectives of environmental policy based on the requirements of European directives and principles, as a scientific basis for the preparation of environmental norms and standards, balance of the responsibility between central and local authorities and public participation in environmental management.

Course content:

The training includes the study of national environmental legislation on the components of the environment (air, water, soil, biodiversity), noise, radioactivity and waste management. The sanctions for exceeding the maximum permissible concentrations of pollutants are studied, as well as the applied incentives for limiting emissions and introduction of environmentally friendly technologies.

Technology training and assessment

The course is conducted on the basis of advance planning of each lecture, that includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lectures are visualized through a power point, illustrated with key documents of the European and national legislation, the examples of good world practices in environmental protection are analyzed and various ecological situations are assessed.

The practical exercises are carried out after each lecture in order to consolidate the theoretical material. Each student develops a course project on one of the questions set in the syllabus. Extracurricular training of students is mainly related to work in the library and on the Internet, individual and group consultations with the teacher. During the training course, current control is performed for assessment of knowledge - development and defense of course work, assessment of knowledge from control work and such from each practical exercise.

The evaluation procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

INCENTIVES AND SANCTIONS IN ENVIRONMENTAL PROTECTION

ECTS credits: 4,5

Hours per week: 21+2pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VIII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Emilia Varadinova, PhD,

emilia.varadinova@swu.bg

Annotation:

The course "Incentives and sanctions in environmental protection" studies the basic provisions of the environmental legislation, methods and approaches to motivate environmentally friendly activities aimed to protect environmental components. In parallel, students gain knowledge about the ways of sanctioning violations in the result of which negative impacts on the environment are caused. The application of coercive administrative and penal measures in search of ecological responsibility is studied.

Course content:

Students study terminological statements and regulations in environmental legislation, aimed at procedures of environmental incentives and responsibilities. The lecture material includes acquaintance with the best available practices, approaches for stimulating environmentally friendly approaches and activities related to environmental protection. Comprehensive knowledge is acquired about the normative possibilities in the application of administrative-penal liability and the ways for sanctioning illegal actions or inactions causing negative impacts on the environment.

Technology training and assessment

The course is conducted on the basis of advance planning of each lecture, that includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on power point and is presented with a video projector.

The practical exercise are held in subgroups in a laboratory, where students receive practical guidance, get acquainted with specific cases related to the application of incentives of best available practices and environmentally friendly activities, as well as the sanctioning of illegal actions or inactions causing negative impacts on the environmental factors.

Students present a project dedicated to a specific ecological problem that causes negative impacts on the components of the environment. The preparation and work of students during the exercises are evaluated. The share of the current control from the total assessment is 40%, as it gives equal weight to the ecological project assessments and the work during the exercises.

The evaluation procedure includes a written examination on two topics from the content of the course from a previously distributed syllabus. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

MANAGEMENT OF ECOLOGICAL PROJECTS

ECTS credits: 4,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. Prof. Emilia Varadinova, PhD,
emilia.varadinova@swu.bg

Hours per week: 2l+2pe

Examination type: written

Semester: VIII

Annotation:

Current problems in the field of environmental protection increasingly necessitate the search for and creation of applicable models of innovative practices in order to find environmentally friendly solutions that lead to improved approaches in efforts to preserve air, water, soil, waste management.

One of the ways is the development and implementation of project proposals, which in their essence are an initiative to create a unique product, service or achieve a specific result. A key element in the process is the management of environmental projects, which is the subject of the discipline "Management of ecological project". The competent coordination and management of the project development is a guarantee for quality realization of the project product.

Course content:

Education includes studying the principles of development and management of environmental projects in the field of pollution and protection of the air, water, soil, biodiversity and waste management. The mechanisms of application, the structuring of the technical and financial project proposal, as well as the approaches for realization and successful finalization of the projects are examined.

Technology training and assessment

The course is conducted on the basis of advance planning of each lecture, that includes: topic, connections between the previous and the new lecture, connections with other disciplinary areas, introduction, plan, presentation, discussion and summary. The lecture material is developed on power point and is presented with a video projector.

The practical exercises are held in subgroups in a laboratory, where students receive practical guidance, get acquainted with specific, successfully implemented project developments, funded by various financial mechanisms of national and European programs.

The evaluation procedure includes a written examination on two topics from the content of the course curriculum. The final grade is formed with a relative weight of 40% practical classes and 60% of the exam.

ECOLOGICAL BASIS OF FOREST ECOSYSTEMS MANAGEMENT

ECTS credits: 6,5

Form of assessment: on-going control and examination

Methodological guidance:

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Konstantin Tyufekchiev, PhD,
konstantinat@swu.bg

Hours per week: 2l+2pe

Examination type: written

Semester: VIII

Annotation:

The course "Ecological bases of forest ecosystem management" is studied by students majoring in "EOS" in order to gain the necessary knowledge about the exclusive role of forest ecosystems on a global and regional scale, the types of economic activities carried out in them and the ecological approach in their implementation. . It provides a historical overview of the ways and degree of development of forests in different periods of their use and assessment of their recent condition. Modern ecological approaches in solving problems related to the degree of load on forest ecosystems, infrastructure, timber extraction, timber exports, protection of soil cover, undergrowth and remaining trees and side uses in forests are considered in depth.

Discipline content:

The course is divided into two parts. The first part is general and it examines the importance of forest ecosystems, the degree of their load in different historical periods and today and the types of anthropogenic impact on them. The second part covers the ecological approach in the use of modern methods and technologies related to the degree of load on forest ecosystems, infrastructure, timber extraction, timber exports, soil protection, undergrowth and remaining trees and forest use.

Technology of education and grading:

The course of study in the discipline includes theoretical preparation on the basis of a lecture course on main topics of the curriculum, combined with discussed independent preparation of students on important topics of the course and practical exercises to specify students' knowledge at a practical level. During the exercises we work with real objects, models and research data, samples of research methods, using interactive teaching methods. Some of the topics are developed outside the classroom - in a natural environment.

During the semester, periodic control is performed by assigning homework (D), term papers (K), and / or essays (R), and / or by conducting tests (T). The final grade is formed by 40% of the grade of the periodical control and 60% of the grade of the semester exam, according to the system for control and assessment of students' knowledge developed and accepted in the GEOOS department.

During the semester, students visit certain forest holdings, on the territory of which economic activity is carried out for the exploitation of mountain and plain forest ecosystems. Participate in the planning and preparation of technological plans for forestry activities. They are present during the activities for production of planting material, afforestation, cultivation of forest crops, felling and export of timber. They are involved in the design of forest infrastructure and measures for control of side uses. Each student develops a paper on a specific economic activity in the use of forest ecosystems and defends it to other students. The other students also take part in its assessment, and the assessment is taken into account in the final assessment of the student during the examination session. A control inspection is also carried out.

The exam is written and includes two questions - one of the first part (importance of forest ecosystems, the degree of their load in different historical) and one of the second part (ecological approach in the use of modern methods and technologies related to forest ecosystems). Upon receiving grades above very good, students are released from the second part of the exam at the end of the semester.

ECOLOGICAL REQUIREMENTS TO FORESTRY

ECTS credits: 6,5

Hours per week: 21+2pe

Form of assessment: on-going control and examination

Examination type: written

Methodological guidance:

Semester: VIII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Assoc. prof. Konstantin Tyufekchiev, PhD,

konstantinat@swu.bg

Annotation:

The course "Environmental requirements for forestry" provides the necessary knowledge about the important role of forest ecosystems, their territorial distribution and productivity, the types of economic activities carried out in them and the ecological requirements for their implementation. The tasks set before it include ecological assessment of forest management activities in Bulgaria, such as ecological assessment and approach in the analysis of the recent state of forests, planning the degree of load on forest ecosystems, infrastructure construction, logging and timber export. , the implementation of forestry activities and side uses in forests, game management and recreational exploitation of ecosystems. It includes appropriate principles and knowledge of basic sciences, such as biology, ecology, forestry, taxation, forest crops, mechanization of forestry, forest legislation and others.

Discipline content:

It is divided into two parts. The first part is general and it examines the importance of forest ecosystems, the types of anthropogenic impact on them and the theoretical foundations of the ecological approach in determining the degree of load. The second part covers the ecological requirements for economic activities carried out in forests - the construction of infrastructure, logging and export of timber, the implementation of forestry activities and side uses in forests, game management and recreational activities of ecosystems. This knowledge will expand the expert training of students majoring in the control of economic activity in forests and will allow the use of an in-depth approach in the analysis and forecasting of the effect of this activity on forest ecosystems.

Technology of education and grading:

The course of study in the discipline includes theoretical preparation on the basis of a lecture course on main topics of the curriculum, combined with discussed independent preparation of students on important topics of the course and practical exercises to specify students' knowledge at a practical level. During the exercises we work with real objects, models and research data, samples of research methods, using interactive teaching methods.

During the semester, periodic control is performed by assigning homework (D), term papers (K), and / or essays (R), and / or by conducting tests (T). The final grade is formed by 40% of the grade of the periodical control and 60% of the grade of the semester exam, according to the system for control and assessment of students' knowledge developed and accepted in the GEOOS department.

During the semester, students visit certain forest holdings, on the territory of which economic activity is carried out for the exploitation of mountain and plain forest ecosystems. Participate in the planning and preparation of technological plans for forestry activities. They are present during the activities for production of planting material, afforestation, cultivation

of forest crops, felling and export of timber. They are involved in the design of forest infrastructure and measures for control of side uses. Each student develops a paper on a specific economic activity in the use of forest ecosystems and defends it to other students. The other students also take part in its assessment, and the assessment is taken into account in the final assessment of the student during the examination session. A control inspection is also carried out.

The exam is written and includes two questions - one of the first part (importance of forest ecosystems, the degree of their load in different historical) and one of the second part (ecological approach in the use of modern methods and technologies related to forest ecosystems). Upon receiving grades above very good, students are released from the second part of the exam at the end of the semester.

PRACTICE (ECOMONITORING)

ECTS credits: 6,5

Hours per week: 2l+2pe

Form of assessment: on-going control

Examination type: current assessment

Methodological guidance:

Semester: VIII

Department "Geography, Ecology and Environmental Protection"

Faculty of Mathematics and Natural Sciences:

Lecturer:

Chief Assist. Prof. Veselina Dalgacheva, dalgacheva@swu.bg

Annotation:

The purpose of conducting a practice of Ecomonitoring is to strengthen the theoretical knowledge of students and to provide them with the necessary practical training in conducting environmental monitoring. The course includes field measurements, observations, site visits, preparation of own analysis of the collected information, as well as preparation of forecasts regarding possible changes of the individual components and environmental factors at local and national level.

Course content:

The training is entirely practical and related to the application of the accumulated knowledge in the field of protection of air, water, soil, biodiversity and waste treatment. The emphasis is on studying the conditions in a real practical environment, by visiting various institutions and manufacturing companies.

Technology training and assessment:

The practical exercises are held in subgroups in the laboratory, in the field and in specialized institutions and enterprises. Students keep a diary, based on which they prepare protocols and analyze specific ecological cases. In the process of training the activity is observed and the knowledge and the ecological approach of the students are evaluated. Credits are awarded only if the final score is equal to or higher than Average 3.