

CHEMISTRY AND ECOLOGY

QUALIFICATION CHARACTERISTIC

SPECIALITY: CHEMISTRY

MASTER PROGRAMME: CHEMISTRY AND ECOLOGY

EDUCATIONAL-QUALIFICATION DEGREE: MASTER

PROFESSIONAL QUALIFICATION: CHEMIST-ECOLOGIST

PERIOD OF STUDY: 1 YEAR (TWO SEMESTERS)

The Master program "Chemistry and Ecology" has the goal to give the students a thorough knowledge of the fundamental laws and phenomena occurring in nature, and the impact of modern lifestyle, management activities for environmental protection. The interactions and interrelationships between organisms and their environment are studied, to understand how nature works and also for the development of appropriate measures which combat the effects of pollution and climate change that is due to human anthropogenic activities.

The program also highlights on the chemical sources of pollution, the ecological segregation, degradation, deposition and influence on living nature. Development and application of advanced analytical methods for the measurement of chemical contaminants is an important part of the chemistry of the environment. Toxicology environment itself is a multidisciplinary field that encompasses different aspects and assessment of biology, ecology and the risk.

Special attention is given to the modern alternative energy sources and their practical application, one of the important problems related to the reduction of harmful emissions. Additional knowledge will be acquired through the included elective courses related to the principles of green chemistry, environmental toxic-chemistry, emissions control, protection of biological objects and their conservation and the mathematical models application for statistical processing of the experimental results.

Graduates of master's degree of education will gain thorough theoretical training on natural, environmental and regulatory requirements for operations related to environmental protection. Masters of this program are prepared to assess of the quality valuation of ecosystems, to control and manage the environment, to know how to protect the environment from harmful effects and to predict negative changes in ecosystems.

Graduate students will receive systematized knowledge and information on the chemistry of the processes taking place in the nature and the world around us and the possibilities to influence them. This will enable them for success as professionals, environmental laboratories, RIOS, HEI, companies from the chemical and teachers in schools. They will also be able to work in the administration of municipalities and businesses, in relation to monitoring, control and protection of the environment.

In the Master's program "Chemistry and Ecology" will train specialists capable of solving environmental problems in the field of chemical technology and biotechnology industries, as at new energy sources. They can perform various tasks in the field of environmental protection in the development of programs projects and plans at national, regional and local level. To carried out the analysis and evaluation of the environment state, control the activities of the various sources of pollutants in the operation of various treatment facilities; Preparation of environmental investigations and assessments, in implementation of various management activities on the environment.

The Master's program is designed for graduates and school - qualified cation "bachelor" or "master" from the vocational Chemical Sciences or Earth Sciences (specialty ERE) and the related specialties of other professional fields where chemistry or ecology are essential component of the training. Given the interdisciplinary nature of the course it can apply graduates courses in the natural sciences, earth sciences, engineers in the field of chemical technology and others., which studied

70% of the main subjects for specialty chemicals and EEP (for example graduate bachelor of Agriculture , University of Food Technology and Chemical- technological University)

The training course is with duration two semesters . Students study 10 subjects, 8 of which mandatory and 2 optional. The training ends with the production of a thesis or state examination.

Curriculum of Master degree “Chemistry and Ecology”

First year			
First semester	ECTS credits	Second semester	ECTS credits
1. Ecological and Environmental Chemistry	7	1. Renewable Energy Sources	4
2. General ecology	6	2. Chemical Ecotoxicology	4
3. Instrumental methods for ecological monitoring	4	3. Environmental regulations and standards	3
4. Management of Wastes	4	4. Optional course - groupe 2	4
5. Conservation of Biological Resources	5	5. Graduation	15
6. Optional course - groupe 1	4		
Optional courses - groupe 1 (Students choose one module)		Optional courses - groupe 2 (Students choose one module)	
Groupe I		Groupe I	
1. Green chemistry	4	1. Geographic Information Systems	4
2. Photovoltaic systems as a source of eco-energy	4	2. Nature conservation	4
3. Eco-metrology	4	3. Biological monitoring	4
4. Fundamentals of Industrial Ecology and emission control	4	4. Biotechnology of the food industry waste and agricultural production	4
5. Modern electrochemical systems for receiving and storage of eco-energy	4	5. Agro-ecology	4
6. New foods additives	4	6. Chemistry of atmosphere and natural water	4

Total for both semesters: 60 credits

COURSE DESCRIPTION

Ecological and Environmental Chemistry

Course title: Ecological and Environmental Chemistry

Semester: 1th

Hours (per week): 3 hours lectures, 1 hour labs

Course Type: Lectures, labs.

ECTS credits: 7.

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

Department: Chemistry, Faculty of Natural sciences and Mathematics.

Course status: Obligatory

Short Description: The study program of the discipline "Ecological and Environmental Chemistry" included lectures and exercises considering the chemistry of the basic process and regularities in connection with the environmental contamination and having direct attitude to their preservation.

Course Aims: The aim of the course is to give the students knowledge about the basic factories causing pollution of the nature and the bad results from this. The lab exercises should give students knowledge and skillfulness to carry out analysis.

Teaching Methods: Lectures are illustrated with examples for solving the problems related to contamination and preservation of the environmental and nature. For lectures presentation multimedia PC system are used.

Requirements: Knowledge in inorganic and organic chemistry, physics, biology.

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

GENERAL ECOLOGY

ECTS credits: 6

Form of knowledge evaluation:

Examination type:

Semester:

Methodological guidance:

Faculty:

Lecturers:

Statue of the subject:

Hours per week: 2l+1se+le+pe+p

Examination

Written

III - semester

Department: "Chemistry"

Mathematics and Natural Sciences

Dr. Lydia Sekelarieva : sakelarieva.lidia@abv.bg

Obligatory

ANNOTATION

Course "General Ecology " focuses on the core issues of ecology as an interdisciplinary science that combines biological, physical and social sciences and is closely related to environmental protection

In the course aims to familiarize students with the nature , objectives and methods of research in ecology, the main environmental factors - abiotic , biotic and anthropogenic , the concept of limited effect of environmental factors and adaptations of organisms to them with the formulation structure, development and productivity of biological macrosystems - populations , plant associations , ecosystems, with circulation of substances and energy flow in the macro system , the nature and organization of the biosphere.

PURPOSE AND OBJECTIVES

The main objectives of the course include:

1. Utilization of theoretical knowledge about the structure and functioning of living macrosystems ;
2. Acquisition of skills for research, analysis and assessment of populations , communities and ecosystems ;

3. Development of creative thinking and the ability to self- selection approaches in solving a problem. For successful learning process requires basic knowledge of botany , zoology , microbiology, soil science, general chemistry , organic chemistry , biochemistry, general physics . Knowledge and skills acquired during the course " General Ecology " will give students a good foundation for understanding and successful implementation of all basic and applied environmental disciplines.

Final assessment (CA) is formed only if the student has been assessed as the current control at least Medium 3.00 .

Final score :

$$FC = 0,4. CC_{\text{midl eval.}} + 0,6. WE$$

Instrumental methods for ecological monitoring

Course title: Instrumental methods for ecological monitoring

Semester: 1th

Hours (weekly): 2 hours lectures, 1 hour lab

Course Type: Lectures

ECTS credits: 4.

Lecturer: Assoc. Prof. Petko Mandjukov, PhD, pmandjukov@abv.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Obligatory

Short Description: Topics of the course: Main steps in analytical procedures using instrumental analytical methods. Relative and absolute methods, calibration, basic metrological characteristics of the instrumental analytical methods. Atomic spectral, electrochemical and chromatographic methods for analysis. Environmental sampling.

Course Aims: Students should obtain basic knowledge and practical skills in most commonly used instrumental methods for analysis of composition of the various objects. Physical basis, advantages and limitations of the studied analytical methods are also presented. Special attention is paid to the environmental sampling procedures and trace analysis.

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

Requirements: Basic requirements for attending the master program

Registration for the course: A request by students at the end of the previous term

Exam: Test, course work and final written exam

Final evaluation: FE = 0.5 CC + 0.5 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

Management of Wastes

Course title: Management of Wastes

Semester: 1th

Hours (per week): 2 hours lectures, 1 hour labs

Course Type: Lectures, labs.

ECTS credits: 4.

Lecturer: Assoc. Prof. Dr. Eng. Stefka Cekova, teshe@abv.bg

Department: Chemistry, Faculty of Natural sciences and Mathematics.

Course status: Obligatory

Short Description: The discipline Management of Wastes is taught to students educating on the master program Ecology and Environment Protection. The stress is put on the stable development that demands environmentally friendly technologies with elements of minimization of wastes, their use, re-use and final making them harmless. The EU Directives, Regulations and Resolutions concerning waste management are discussed during the educational process.

Course Aims: The aim is to give students training specialists to run a pedagogical activity and control, to take part in developing plans and programmes in the area of waste management.

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Prerequisite: Knowledge in chemistry, physics, biology, mechanic, thermodynamic and ect.

Registration for the course: A request by students at the end of the previous term

Exam: Test, course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

Conservation of Biological Resources

Course title: Conservation of Biological Resources

Semester: 1th

Hours (weekly): 2 hours lectures, 1 hour labs

Course Type: Lectures, labs.

ECTS credits: 5

Lecturer: Accos. Prof. Konstantin Tufekchiev, PhD, konstantinat@abv.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Obligatory

Short Description: The course is included in the curriculum of the course "Chemistry and Ecology", and taught one semester. It is divided into three parts. The first one, consider environmental bases of biological productivity, goals and objectives in protecting the living resources. The second part covers the biological resources of the land and methods of conservation. In third part are discussed aquatic bioresources and the ways and methods of conservation. This knowledge will enable to students using an integrated approach in the protection of biological resources and to achieve the necessary powers to take appropriate decisions in modern management

Course Aims: The course "Conservation of Biological Resources" provides the necessary knowledge about what biological resources, their ability to produce biomass to meet the needs of people with organic products and ways and methods of conservation.

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Requirements: Knowledge in chemistry, biology, ecology, geography.

Registration for the course: A request by students at the end of the previous term

Exam: Test, course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

Renewable Energy Sources

Course title: Renewable Energy Sources

Semester: 2th

Hours (weekly): 2 hours lectures, 1 hour laboratory exercises

Course Type: Lectures and laboratory exercises

ECTS credits: 4

Lecturer: Assoc. Prof. Mitko Stoev, PhD, mstoev@mail.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Obligatory

Short Description: The course "Renewable Energy Sources" included lectures and laboratory exercises discussing the Chemistry and Ecology of energy from RES, ecology expertise of energy, RES EC standards and effective application of green energy.

Course Aims: The aim of the course is to give students theoretical and practical knowledge on chemical processes connected to RES energy production and its ecological expertise.

Teaching Methods: Lectures are presented by PowerPoint, video films, e-platform in Internet and graphical illustration on the white board.

Requirements: Knowledge in Chemistry, Physics and Informatics are obligatory

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: $FE = 0.7 \times CC + 0.3 \times WE$

Registration for the exam: Coordination with lecturer and Students Service Department.

Chemical Ecotoxicology

Course title: Chemical Ecotoxicology

Semester: 2th

Hours (weekly): 2 hours lectures, 1 hour laboratory exercises

Course Type: Lectures and laboratory exercises

ECTS credits: 4

Lecturer: Assoc. Prof. Milena Koleva, PhD, mrkoleva@abv.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Obligatory

Short Description: With increasing technological possibilities of human, effects on the environment becomes global character. Alarming pollution with various chemical compounds leads to climate change and to alteration of conditions of existens of many biological species, including human. Many of environmental pollutions are organic compounds. Some of them are foreign to the human body substances (xenobiotics). These are natural and synthetic drugs, pesticides, herbicides, industrial and domestic poisons, food supplements, cosmetics etc.

Course Aims: The course aim is to study the general principles of the toxicology of xenobiotics, mechanisms of their toxic and carcinogenic action, free-radicals processes, induced by xenobiotics, cell antioxidant protective mechanisms, hepatotoxic metabolites and liver damages, induced xenobiotics etc.

Teaching Methods: Lectures are presented by PowerPoint, video films, e-platform in Internet and graphical illustration on the white board.

Requirements: Knowledge in Chemistry, Physics and Informatics are obligatory

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: $FE = 0.7 \times CC + 0.3 \times WE$

Registration for the exam: Coordination with lecturer and Students Service Department.

Environmental regulations and standards

Course title: Environmental regulations and standards

Semester: 2th

Hours (weekly): 2 hours lectures, 1 hour lab

Course Type: Lectures

ECTS credits: 4.

Lecturer: Assoc. Prof. Stefka Cekova, teshe@abv.bg, teshe@swu.bg

Department: Geography and Ecology, Faculty of Natural Sciences and Mathematics.

Course status: Obligatory

Short Description: Environmental requirements and the introduction of regulations to limit pollution of the environmental protection is one of the fastest growing areas in the Bulgarian legislation. With the entry into force of the Framework Law on Environmental Protection in 1991 launched the new legislation through the development of specialized laws and regulations defining objectives, priorities, strategies, responsibility of individuals and institutions.

Course Aims: Course "Environmental regulation and standards" introduces students to the new environmental policy based on the requirements of the European directives and principles: scientific basis for the development of environmental norms and standards, balance the powers of central and local government and public participation in environmental management.

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

Requirements: Basic knowledge in chemistry and ecology.

Registration for the course: A request by students at the end of the previous term

Exam: Test, course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

Green Chemistry

Course title: Green Chemistry

Semester: 1th

Hours (weekly): 2 hours lectures, 1 hour labs

Course Type: Lectures, labs.

ECTS credits: 4

Lecturer: Prof. DSc Ivan Petkov, ipetkov@chem.uni-sofia.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Optional

Short Description: The course curriculum includes Green Chemistry lectures and exercises involving basic theoretical principles related to green chemistry processes occurring in the atmosphere, land, water bodies and living nature. Applications of solar energy, biomass, biofuels, conversion of carbon dioxide to requirements for preservation of the environment according to national and European standards are discussed.

Course Aims: The course aims to provide students with basic theoretical and practical knowledge of the fundamental principles and physical laws of green chemistry for use in the field of renewable energy and green energy impact on the environment

Practical courses aim to equip students with relevant skills that help them creative thinking and application of the material.

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Requirements: Knowledge in chemistry, physics, biology, mechanic, thermodynamic and other.

Registration for the course: A request by students at the end of the previous term

Exam: Test, course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

Photovoltaic systems as a source of eco-energy

Course title: Photovoltaic systems as a source of eco-energy

Semester: 2th

Hours (weekly): 2 hours lectures, 1 hour laboratory exercises

Course Type: Lectures and laboratory exercises

ECTS credits: 4

Lecturer: Assoc. Prof. Mitko Stoev, PhD, mstoev@mail.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Optinal

Short Description:

The course "Photovoltaic systems as a source of eco-energy" included lectures and laboratory exercises discussing the structure photovoltaic systems, types of PV systems, eco-energy production, ecology expertise of energy from PV systems and PV EC standards.

Course Aims:

The aim of the course is to give students theoretical and practical knowledge on PV systems and eco-energy and energy efficiency.

Teaching Methods: Lectures are presented by PowerPoint, video films, e-platform in Internet and graphical illustration on the white board.

Requirements: Knowledge in Chemistry, Physics and Informatics are obligatory

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: $FE = 0.7 \times CC + 0.3 \times WE$

Registration for the exam: Coordination with lecturer and Students Service Department.

Eco-metrology

Course title: Eco-metrology

Semester: 1th

Hours (weekly): 2 hours lectures, 1hour lab exercises

Course Type: Lectures.

ECTS credits: 4.

Lecturer: Assoc. Prof. P. Mandjukov, PhD, pmandjukov@abv.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Optional

Short Description: Course curriculum includes Eko-metrology lectures and exercises in a computer class, referring to some of the main methods of applied mathematics used in processing and summarizing experimental data.

Course Aims: The course aims to equip students with knowledge and skills necessary for the processing and interpretation of analytical results, and further processing of the results to obtain more complete information about the object or system.

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Requirements: Knowledge of mathematics, chemistry and ecology

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: $FE = 0.4 \times CC + 0.6 \times WE$

Registration for the exam: Coordination with lecturer and Students Service Department.

Fundamentals of Industrial Ecology and emission control

Course title: Fundamentals of Industrial Ecology and emission control

Semester: 1th

Hours (weekly): 2 hours lectures, 1hour lab exercises

Course Type: Lectures.

ECTS credits: 4.

Lecturer: Prof. Dragomir Yankov, PhD, yanpe@bas.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Optional

Short Description: The course on "Fundamentals of Industrial Ecology and control of emissions " introduces students to the major industrial sources of contamination of soil , water and air. The basic methods and apparatus for measurement and control of various process parameters and possible contaminants. Based on specific chemical production presents the basic processes and apparatus for purification of process water and gases of different nature pollutants

Course Aims: The main objective of the course is to provide the necessary theoretical and less practical training of students on the basics of industrial ecology and control emissions from industrial processes. Discusses possible changes in traditional processes and technologies in order to reduce

emissions at the expense of installing additional purification installations. The basic principles of creating waste-free process diagrams .

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Requirements: Knowledge of mathematics, chemistry and ecology

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

Modern electrochemical systems for receiving and storage of eco-energy

Course title: Modern electrochemical systems for receiving and storage of eco-energy

Semester: 1th

Hours (weekly): 2 hours lectures, 1hour lab exercises

Course Type: Lectures.

ECTS credits: 4.

Lecturer: Prof. Mario Mitov, PhD, mitovmario@mail.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Optional

Short Description: The course " Modern electrochemical systems for receiving and storage of eco-energy" includes lectures and seminars presenting traditional and innovative technologies to transform and store energy on the basis of electrochemical systems. The course addresses both traditionally used systems and innovative technologies , which are currently the subject of intense research. In view of the expected changes in the energy system enshrined in the concept of a hydrogen economy, the main goal of the course is focused on technologies for producing and using hydrogen as a clean fuel - electrolytic and fuel cells, including microbiology .

Course Aims: The main objective of the course "Modern electrochemical conversion and storage of energy" is to acquaint students with the fundamental principles of electrochemical systems and their most important applications as technologies related to the generation and storage of energy.

Teaching Methods: Lectures are illustrated with various examples of electrochemical conversion technologies and energy conservation and are presented using multimedia system .

Requirements: Basic knowledge of general chemistry, electrochemistry, analytical chemistry, general biology and ecology.

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

New food additives

Course title: New food additives

Semester: 1th

Hours (weekly): 2 hours lectures, 1hour seminar

Form of Assessment: exam

Type of exam: written

Course Type: Lectures.

ECTS credits: 4.

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

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Optional

Short Description: The course on " New food additives " aims to introduce students to the use of substances that are necessary for a balanced and healthy diet . In the last decade, the world has been totally change your eating habits , which are increasingly moving away from the principles of a balanced diet , which leads to a lack of biologically active substances , vitamins and minerals.

Training course includes the study of :

- * Food additives authorized for use in the food industry;
- * Food as energy ;
- * Vitamins and minerals ;
- * Amino acids, antioxidants.

Course Aims: Aim of the course: The course aims to introduce students to the use of substances that are necessary for a balanced and healthy diet . Students will gain a modern and objective view of some features of biologically active substances : needs vitamins and minerals to the body , improving efficiency and helping to adapt to the environment and provide for the growth and development of children .

Teaching Methods: The lectures are illustrated with various examples of the substances, which are necessary for balance diet and healthy. They are presented using multimedia system and PC.

Requirements: Basic knowledge of general chemistry, organic chemistry, analytical chemistry, general biology.

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: FE = 0.4 CC + 0.6 WE

Registration for the exam: Coordination with lecturer and Students Service Department.

Geographic Information Systems

Course title: Geographic Information Systems

Semester: 2th

Course Type: Lectures, practice.

Hours (per week): lectures - 2 hours, practice - 1 hour

ECTS credits: 4.

Lecturer: Assoc Prof. Penka Kastreva, PhD, penkakastreva@swu.bg, Assistant Eng. Galina Bezinska

Department: Chemistry, Faculty of Natural sciences and Mathematics.

Course status: Optional

Short Description: The subject "Geographic Information Systems" includes lectures and practical exercises. The theoretical course explains basic concepts for building GIS. Practical exercises include basic guidelines for using map layers and attribute data, performing geographic analysis, visualization and printing a map.

Course Aims: The aim of the course is the students to gain knowledge and skills to work with GIS in planning, management and environmental protection.

Teaching Methods: The lecture material is illustrated with: computers, videos, specialized software (ArcGIS) and additional materials (tables, diagrams and maps), some of which have been developed from students for different projects.

The practical exercises take place in a multimedia computer lab. In order to be more convenient the students are divided into groups and each student has a computer. The purpose of the exercises is every student to learn how to use GIS systems for plotting cartographic content and how to use interpolation algorithms when making cartographic generalization and other cartographic research, analysis and procedures.

Prerequisites: Basic knowledge in cartography is needed.

Registration for the course: A request from the student before the end of the previous term

Exam: The mid-term results are based on a test and a presentation of a project. The final result is 40% of the mid-term result and 60% of the final examination.

Registration for the exam: Please contact the lecturer and Students Service Department.

Nature conservation

Course title: Nature conservation

Semester: 2th

Hours (weekly): 2 hours lectures, 1 hour laboratory exercises

Course Type: Lectures and exercises

ECTS credits: 4

Lecturer: Prof. G. Georgiev, PhD, ggeorgiev@abv.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: An optional

Short Description: Biodiversity constitutes an important resource for the tourism development. Its preservation underlies the implementation of the concept for sustainable tourism. Special importance in this regard plays the system of protected areas. These areas are reviewed as subject of national and universal heritage; as a specific form of environmental protection, which facilitates the cultural and scientific development and the welfare of society. At the same time, biodiversity protection is of crucial importance for the implementation of the concept for sustainable tourism.

Course Aims:

The goal and objective of this course is to teach crucial knowledge about the nature and importance of the biodiversity as a resource for tourism development.

The expected results: To cultivate working skills related to the various types of protected areas and the building elements of the biodiversity.

Teaching Methods: Lectures are presented by PowerPoint, video films, e-platform in Internet and graphical illustration on the white board.

Requirements: Knowledge in Biology, Ecology, Geography,

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: $FE = 0.4 \times CC + 0.6 \times WE$

Registration for the exam: Coordination with lecturer and Students Service Department.

Biological monitoring

Course title: Biological monitoring

Semester: II

Course Type: Lectures and exercises

Hours (weekly): 2l + 1e

ECTS credits: 4

Lecturer: Assist. Prof. Lidia Sakelarieva, PhD, sakelarieva.lidia@swu.bg

Department: Geography, ecology and environmental protection, Faculty of Mathematics and Natural Sciences, e-mail:

Course status: Optional

Course short Description: The course goes into the essence and characteristics of the biological monitoring of the environment as a part of the ecological monitoring. The essence, principals, ecological basis, different levels, and the fields of application of the biological indications are considered. Species, groups of species, communities, used as bioindicators for the state and quality assessment of air, soils, waters, ecosystems are introduced, as well as different methods, standards, and parameters for biological assessment and monitoring, adopted in Bulgaria and the other European countries.

Course Aims: The aim of the course is to give good theoretical and practical training for the application of knowledge in the quality and state assessment of the air, soil, and water on the basis of the biological control and biological monitoring.

Requirements: Knowledge in botany, zoology, microbiology, soil science, general ecology, general chemistry.

Registration for the course: A request by the students at the end of the previous semester

Exam: Current control (CC) and written exam (WE)

Final evaluation: $FE = 0.4CC + 0.6WE$

Registration for the exam: After an agreement with the lecturer and the Students Service Department.

Biotechnology of the food industry waste and agricultural production

Course title: Biotechnology of waste from the food industry and agricultural production

Semester: 2th

Hours (weekly): 2 hours lectures, 1 hour labs

Course Type: Lectures, labs.

ECTS credits: 4

Lecturer: Prof.DSc B. Chorbanov, tchorban@orgchm.bas.bg

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Optional

Short Description: Description of the course content of the curriculum is to teach students the basics and acquire theoretical and practical knowledge of the size, type and composition of the waste from the food and beverage industry, as well as agricultural production and the possibilities for their use in biotechnology. .

Course Aim: The main aim of eliminating the harmful effects of waste on the environment and achieve effective removal. The content of the program covers key industries important to the Republic of Bulgaria, subject entered national and European standards. Special attention is paid to such effective use of waste, which includes a closed production cycle with minor amounts of waste and minimizing transport and energy costs.

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Requirements: Knowledge in chemistry, chemical technology, biology,

Registration for the course: A request by students at the end of the previous term

Exam: Test, course work and final written exam

Final evaluation: $FE = 0.4 CC + 0.6 WE$

Registration for the exam: Coordination with lecturer and Students Service Department.

Agroecology

Course title: Agroecology

Semester: II semester

Hours (weekly): 2 hours lectures, 1 hour labs

ECTS credits: 4.

Lecturer: Assoc. Prof. Yanka Voynova, PhD, voynova.yana@swu.bg.

Department: Tourism, Economic Faculty, e-mail

Course status in the curriculum: Optional

Description of the discipline: The program for the discipline Agroecology includes lectures and seminar exercises, concerning the main ecological. Edaphic and biotic factors in agroecology. The bio-agriculture and bio-cattle breeding are included, combined successfully with the attributable activities for integrated development of the rural areas as agroforestry, ecological and rural tourism of local craftsmanship.

Course Aims: The aims of the course is to provide to the students knowledge and competences regarding various aspects of biological agriculture, as they will have the opportunity to practice the lectures with practical visits in biological farms in the Agricultural center to AU –Plovdiv. The visits will be supplemented with seminar discussions regarding the technologies of biological production and the state requirements in that respect.

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Requirements: Knowledge in chemistry, physics, biology, mechanic, thermodynamic and etc

Registration for the course: A request by students at the end of the previous term

Exam: Test, current control (lectures and labs), course work and final written exam

Final evaluation: $FE = 0.5 CC + 0.5 WE$

Registration for the exam: Coordination with lecturer and Students Service Department.

Chemistry of atmosphere and natural water

Course title: Chemistry of atmosphere and natural water

Semester: 2th

Hours (weekly): 2 hours lectures, 1 hour labs

Course Type: Lectures, labs.

ECTS credits: 4

Lecturer: Assoc. Prof. M. Mihajlov, PhD, mam@enwp.com

Department: Geography and Ecology, Faculty of Natural Sciences and Mathematics.

Course status: An optional

Short Description: allows for obtaining and knowledge required to organize systems for monitoring of natural waters for the preparation of forecasts for changes in quality, management of different activities use and protection of natural waters, including and development of programs to protect them from negative impacts.

Course Aims: Introduced the students with the basic characteristics and factors influencing on the formation of chemical composition in natural waters and assessment of pollutants self-purification capacity and others.

Acquisition of systematic knowledge and skills related to monitoring of natural waters and the management of the use and conservation.

Practical courses aim to equip students with skills that help them creative thinking and application of material taught.

Teaching Methods: Lectures are illustrated with examples for solving problems related to analysis of complicated samples. For lectures presentation multimedia PC system are used.

Requirements: Knowledge in chemistry, ecology, biology, thechnology.

Registration for the course: A request by students at the end of the previous term

Exam: Test, course work and final written exam

Final evaluation: $FE = 0.4 CC + 0.6 WE$

Registration for the exam: Coordination with lecturer and Students Service Department.