

ANNOTATION

Graduates in Chemistry have gained: profound theoretical knowledge in the field of chemistry; solid practical skills conforming to modern European standards and requirements; good opportunities for realization as experts in Bulgaria and abroad; opportunity for successful continuation of education in higher degrees (Master of Science and PhD) in Bulgaria and abroad. Graduates, received this Bachelor degree, have all the rights to work as chemists in chemical, pharmaceutical, biotechnological, food industries and laboratories.

QUALIFICATION CHARACTERIZATION OF MAJOR FIELD OF STUDY “CHEMISTRY” FOR “BACHELOR OF SCIENCE” DEGREE WITH PROFESSIONAL QUALIFICATION “CHEMIST”

I. Requirements to professional qualities and competences of students, completed this major field of study

Neofit Rilski South-Western University prepares qualified experts in Chemistry that can apply their knowledge and skills in the area of science, culture, education and economics in Bulgaria and abroad.

After completion of Bachelor of Science (BSc) degree in Chemistry, they can successfully realize themselves as: chemists in chemical, pharmaceutical, biotechnological, food industries and laboratories.

At completion of Bachelor of Science degree in Chemistry, students obtain:

- ✓ profound knowledge in the area of Chemistry;
- ✓ good theoretical knowledge in the area of Chemistry as well as solid practical skills conforming to modern European standards and requirements;
- ✓ good opportunities for realizing as experts in Bulgaria and abroad;
- ✓ opportunity for successful continuation of education in higher degrees (Master of Science and PhD) in Bulgaria and abroad.

II. Requirements to preparation of students completing this major field of study

Students completed BSc degree in Chemistry have to possess following knowledge, skills and competences:

- ✓ to use basic knowledge in chemistry;
- ✓ to possess practical skills in laboratory;
- ✓ to plan, organize and manage practical chemical tasks;
- ✓ to use chemical models and software packages for solving real practical problems;
- ✓ to plan, organize and carry out of forms of education that are held outside the school.

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

CURRICULUM

Field of Study: “Chemistry”, 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>	
Mathematics – part 1	6.5	General and Inorganic Chemistry – part 2	15.0
General and Inorganic Chemistry – part 1	15.0	Mathematics – part 2	6.0
Physics – part 1	6.0	Physics – part 2	6.5
Foreign language – part 1	2.5	Foreign language– part 2	2.5
Sport	0.0	Sport	0.0
	Total 30		Total 30
Second Year			
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
General and Inorganic Chemistry – part 3	7.0	Physical Chemistry – part 2	9.0
Organic chemistry – part 1	15.0	Organic chemistry – part 2	16.0
Physical Chemistry – part 1	8.0	Structure of matter	5.0
Sport	0.0	Sport	0.0
	Total 30		Total 30
Third Year			
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Analytical Chemistry – part 1	14.0	Analytical Chemistry – part 2	10.0
Bioorganic chemistry	5.0	Instrumental methods of analysis – part 1	7.0
Colloid Chemistry	6.0	Optional 2(group 2)	5.0
Optional 1 (group 1)	5.0	Optional 3(group 3)	5.0
		Practical course in science	3.0
<u>Optional Courses 1 (1 group)</u>		<u>Optional Courses 2 and 3</u>	
Electrochemistry		<u>Group 2</u>	
Biologically active substances such as food supplements		Applied electrochemistry	
Solid state chemistry		Organic analysis	
Computer aided simulations of molecular structure and properties		High molecular compounds	
		Chemometrics	
		Methods for sampling and sample preparation	
		Ecological chemistry	
		<u>Group 3</u>	
		Environmental chemistry	
		Hazardous chemicals and mixtures	
		Atomic emission spectrometry	
		Natural products chemistry	
		Kinetics and catalysis	
	Total 30		Total 30

Fourth Year			
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Biochemistry	9.0	Chemical Technologies	10.0
Instrumental methods of analysis – part 2	11.0	Optional 6 (group 4)	5.0
Optional 4(group 3)	5.0	Optional 7(group 4)	5.0
Optional 5 (group 3)	5.0	Preparation of Undergraduate Thesis or Preparation for State Exam	10.0
		<u>Optional Courses 6 and 7 (group 4)</u>	
		Steroids chemistry	
		Molecular spectral analysis	
		Chemistry of drugs	
		Basics of biotechnology	
		Writing and pronouncing culture	
	Total 30		Total 30

TOTAL FOR 4 ACADEMIC YEARS: 240 CREDITS

DESCRIPTIONS OF THE COURSES

M A T H E M A T I C S – P A R T 1

Semester: 1st semester

Type of the course: lectures and seminars

Hours per week /FS /SS*: 2 lecture hours and 2 seminars /FS/

ECTS credits: 6.5 credits

Lecturers: assoc. prof. Ilinka Dimitrova, PhD, assist. Boyana Gyarkova, PhD.

Department: Department of Mathematics, FNSM, SWU “Neophit Rilsky”, 073- 588 532

Course Status: Compulsory course in the B. S. curriculum in Chemistry.

Short Description: The course is an introduction into basic topics of mathematics necessary for learning of modern theories in chemistry. Topics related to sets theory, bases of linear algebra, analytical geometry, number sequences, differential calculus will be considered.

Course Aims:

The aim of the program is to acquire the basic knowledge mathematics.

Teaching Methods: lectures and seminars.

Requirements/Prerequisites: Basic knowledge of high school mathematics.

Assessment: written exam and current tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

G E N E R A L A N D I N O R G A N I C C H E M I S T R Y – P A R T I

Semester: 1st semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS/SS/: 3 lecture hours and 7 laboratory exercises /FS/

ECTS credits: 15 credits

Lecturers: assoc. prof. Mitko Stoev, PhD, assist. prof. Elitsa Chorbadzhiyska, PhD.

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073/831825

Course Status: Compulsory course in the B. S. curriculum in Chemistry.

Short Description: The main topics to be considered: construction of the electronic shell; nucleus; periodic law and the periodic table of the elements, structure of molecules, coordination bonds and compounds, intermolecular bonds, chemical bond in solids, valences of the chemical elements, basic concepts in thermodynamics, chemical kinetics, chemical equilibrium, adsorption, catalysis, phase rule, chemical-physic analysis, the solubility of the substances, theory of the diluted solutions, electrolyte solutions, colloids and electrochemical processes of metal corrosion.

Laboratory exercises supports lectures by chemical experiment.

Course Aims:

The objectives of the program of General and Inorganic Chemistry Part I are:

1. Acquisition of chemical knowledge in general chemistry based on knowledge about the structure of matter, the laws and regularities in nature;
2. Acquisition of skill and ability to perform chemical experiments in chemical laboratory specialized itself in inorganic chemistry;
3. Developing chemical thinking and independent work with chemical literature.

Teaching Methods: lectures and exercises

Requirements/Prerequisites: Basic knowledge of high school chemistry, mathematics and physics.

Assessment: written exam and current tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

PHYSICS – PART I

Semester: 1st semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS /SS: 2 lecture hours and 1 laboratory exercises /FS/

ECTS credits: 6 credits

Lecturers: assoc. prof. Ljuben Ivanov, PhD, assist. Cholakov.

Department: Department of Physics, FNSM, SWU "Neophit Rilsky"

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

The material is selected in accordance with the current workload, specifics of specialty and within a reasonable compromise between the theoretical and applied material. The priority is given to the technical and applied side of issues. To this end, are considered some specific issues that are not included in the curricula "General Physics" for other disciplines. The mathematical apparatus is consistent with the level of preparation of students in the 1st semester. The lectures are divided into the following sections: kinematics and dynamics of a material point, relativistic physics, rigid body dynamics, oscillations and waves, fluid dynamics, fundamentals of thermodynamics and fundamentals of molecular-kinetic theory.

Course Aims:

To acquaint students with the fundamental natural laws governing the world, the causal links between them, the main research methods of physics (phenomenological and statistical) and basic physical concepts and ratios.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge of mathematical analysis.

Assessment: written exam and current tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ENGLISH – PART I

Semester: 1st semester

Type of the course: seminars

Hours per week /FS/SS: 2 hours /FS/

ECTS credits: 2.5 credits

Lecturers: assist. Radoslav Chairrov, PhD

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Training course includes the study of:

- specialized literature on Chemistry
- specialized literature on Environmental chemistry
- brief English grammar

Course Aims:

Students should become familiar with the specialized terminology in chemistry and related fields, acquire knowledge to work with specialized texts, be able to apply their knowledge and skills in project work where good language skills.

Teaching Methods: seminars.

Requirements/Prerequisites: Basic knowledge in chemistry, English grammar, computer skills.

Assessment: Three current test and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

SPORT

Semester: 1, 2 semester

Type of the course: exercises

Hours per week /FS/SS: 2 hours exercises /FS and SS/

ECTS credits: 0.0 credits

Department: Sport and Kinezitherapy, Faculty of Public Health and Sports.

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Activities in the course "Sport" are designed for students in first and second year of bachelor specialty "Chemistry". The program includes mainly issues related to the technique of the chosen sport, some individual and group tactical actions necessary for its application, competition rules and work to improve physical fitness.

Course Aims:

The proposed sports will improve the basic physical abilities, will improve respiratory and cardiac activity as well as the nervous system and the like. Will support the development of specific sport skills and habits. Not least, it should be borne in mind the large aesthetic impact of sports-related harmonious development of the body and the beauty of movement.

Teaching Methods: exersies.
Requirements/Prerequisites: no
Assessment: Current tests.

GENERAL AND INORGANIC CHEMISTRY –PART II

Semester: 2nd semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS /SS: 4 lecture hours and 6 laboratory exercises /SS/

ECTS credits: 15 credits

Lecturers: assoc. prof. Mitko Stoev, PhD, assist. prof. Elitsa Chorbadzhiyska, PhD.

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Curriculum discipline General and Inorganic Chemistry Part II includes

lectures and laboratory work in chemistry of the elements and their compounds.

Material is divided into sections: distribution of chemical elements, hydrogen, water, hydrogen peroxide, chemical elements and their compounds from the first to the eighth main group and respective subsets in the Periodic system. The second part deals with: location of chemical element in the Periodic system and regularities in structure and properties in the group and period, main characteristics of the chemical element, the compounds of the chemical elements, electronic properties of element, physical properties of the chemical element, crystallography of the chemical element and its compounds, nuclear properties of the chemical element and use.

Laboratory exercises illustrate lectures by chemical experiment and the properties of compounds, including: basic methods to obtain chemical substances and simple compounds in various groups of Periodic system.

Course Aims:

1. Receiving widespread knowledge in Inorganic Chemistry and Chemistry of elements.
2. Analytical thinking associated with regularities in the properties of the elements and their compounds, depending on their electronic structure and their place in the periodic system.
3. Acquiring specific knowledge about different elements and their compounds and their application.

Teaching Methods: lectures and exersises

Requirements/Prerequisites: Basic knowledge of high school chemistry, mathematics, physics and General and Inorganic Chemistry – Part I.

Assessment: written exam and tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

MATHEMATICS – PART II

Semester: 2nd semester

Type of the course: lectures and seminars

Hours per week /FS /SS: 2 lecture hours and 2 seminars /SS/

ECTS credits: 6 credits

Lecturers: assoc. prof. Ilinka Dimitrova, PhD, assist. Bojana Gyrkova, PhD.

Department: Department of Mathematics, FNSM, SWU “Neophit Rilsky”, 073/588 532.

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Training course includes the study of:

- integral calculus (indefinite and definite integral of a function of one variable) and applications in the natural sciences;
- ordinary differential equations and applications;
- elements of probability theory and applications.

Course Aims:

Students should acquire basic knowledge in Mathematics - part 2 using integral calculus, some of ordinary differential equations and elements of probability theory to solve problems in the relevant sections and fields and their applications, as well as an idea of the modern PC models software training these guidelines.

Teaching Methods: lectures and seminars.

Requirements/Prerequisites: Basic knowledge and skills in Mathematical analysis - part I, linear algebra and analytical geometry.

Assessment: written exam and tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

PHYSICS – PART II

Semester: 2nd semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS/SS: 2 lecture hours and 2 laboratory exercises /SS/

ECTS credits: 6.5 credits.

Lecturers: assoc. prof. Ljuben Ivanov, PhD, assist. Krasimir Damov, PhD.

Department: Department of Physics, FNSM, SWU “Neophit Rilsky”,

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Physics - part II has a total workload 30 hours of lectures and 30 hours laboratory exercises and is mandatory for students from the specialization Chemistry. The material is selected in accordance with the current workload and specifics of specialty, and within a reasonable compromise between the theoretical and applied material. The priority is given to technical and applied side of issues. The lectures are divided into the following sections: electrostatics, steady electromagnetic field variable electromagnetic field, electromagnetic phenomena in substance, oscillations and waves and wave optics.

Practical sessions in the program allow students to acquire knowledge and experimental skills in modern physics laboratory.

Course Aims:

To give basic knowledge in the field of electromagnetic and optical phenomena and to deepen and specify the knowledge of students for them.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge of mathematical analysis.

Assessment: written exam and tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ENGLISH – PART II

Semester: 2nd semester

Type of the course: seminars

Hours per week /FS/SS: 2 hours /SS/

ECTS credits: 2.5 credits

Lecturers: assist. Radoslav Chairov, PhD

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Training course includes the study of:

- Chemistry lessons in English;
- Specialized computer testing;
- Audio Visual System.

Course Aims:

Students enrich their knowledge from the first semester to work with the specialized literature.

Teaching Methods: seminars.

Requirements/Prerequisites: Basic knowledge in chemistry, English grammar, computer skills.

Assessment: Three current test and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

GENERAL AND INORGANIC CHEMISTRY – PART III

Semester: 3th semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS /SS: 3 lecture hours and 2 laboratory exercises /FS/

ECTS credits: 7 credits

Lecturers: assoc. prof. Mitko Stoev, PhD, assist. prof. Elitsa Chorbadzhiyska, PhD.

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

General and Inorganic Chemistry Part III includes lectures and laboratory exercises in Inorganic synthesis, Chemistry of elements and their compounds.

Program is a continuation of the program in General and Inorganic Chemistry - part II, with a stress on the chemical elements with different purity and inorganic synthesis of their compounds. Material is divided into sections: technique of inorganic synthesis, electrolytic hydrogen and hydrogen from water, gas, fluorine and synthesis of fluorine compounds. Synthetic methods for the preparation of chlorine, bromine, iodine, sulfur, selenium, tellurium, nitrogen, phosphorus, arsenic, antimony, bismuth, carbon, silicon, germanies, tin, lead, boron, aluminum, gallium, indium, beryllium, magnesium, calcium, strontium, barium, silver, hall, copper, zinc and cadmium compounds.

Laboratory classes are an extension of the theoretical lectures in inorganic synthesis laboratory.

Course Aims:

1. Receiving widespread knowledge in inorganic chemistry directed towards inorganic synthesis for the bachelor level in specialty "Chemistry";
2. Entering in the foundations of the inorganic substances synthesis;
3. Acquisition of knowledge in inorganic compounds with varying purity.

Teaching Methods: lectures and exercises

Requirements/Prerequisites: Basic knowledge of high school chemistry, mathematics, physics and General and Inorganic Chemistry – Part I and Part II.

Assessment: written exam and tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ORGANIC CHEMISTRY – PART I

Semester: 3th semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS /SS: 5 lecture hours and 7 laboratory exercises /FS/

ECTS credits: 15 credits

Lecturers: assoc. prof. Zhivko Velkov, assoc. prof. Atanas Chapkanova, assist. prof. Maq Chochkova, PhD

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

The basic course in Organic chemistry deals with the structure, properties and composition of the organic molecules. In the first part of the course are included the main theoretical approaches for the relation between structure and properties of the organic molecules, the principals of stereochemistry, as far as the properties of different types of hydrocarbons, alcohols, ethers and organometallic compounds.

Course Aims:

The aim of the course is to give the students thorough knowledge about the compositions, structure, properties and methods for preparation of the most important organic compounds.

The practical exercises (labs + tutorials) seek to help the student by understanding and giving a meaning of the lectures, to acquire a habit of constructive application of knowledge, to build up skills in the field of organic chemistry.

Teaching Methods: lectures and exercises

Requirements/Prerequisites: Basic knowledge in Inorganic chemistry and Physics.

Assessment: written exam and current tests.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

PHYSICAL CHEMISTRY – PART I

Semester: 3th semester

Type of the course: Lectures, seminars and laboratory exercises

Hours per week /FS /SS: 3 lecture hours and 3 seminars or laboratory exercises /FS/

ECTS credits: 8 credits

Lecturers: Prof. Mario Mitov, PhD, assist. Ivo Bardarov.

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073/831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Training course includes the study of:

- Thermodynamic principles and their application on the ideal gas;
- Phase equilibria and solutions, state diagram;
- Chemical kinetics and equilibrium.

Course Aims:

Introduction to the thermodynamic approaches to describe the macro-systems. Application of thermodynamic methods on different systems, qualitative interpretation of certain phenomena and quantitative assessments of important thermodynamic parameters.

Teaching Methods: lectures, seminars and exercises

Requirements/Prerequisites: Basic knowledge in Inorganic chemistry, Stoichiometry and Elementary algebra.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

PHYSICAL CHEMISTRY – PART II

Semester: 4th semester

Type of the course: Lectures, seminars and laboratory exercises

Hours per week /FS /SS: 3 lecture hours and 3 seminars/laboratory exercises /SS/

ECTS credits: 9 credits

Lecturers: Prof. Mario Mitov, assist. Ivo Bardarov

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Training course includes the study of:

- Electrochemistry: conductance of the electrolytes, galvanic cells;
- Kinetic theory of gases;
- Real gas equation of van der Waals;
- Elements of statistical thermodynamics.

Course Aims:

Introduction to electrical properties of electrolytes: conduction, elementary notions of the anti-ionic atmosphere, elements of the equilibrium electrochemistry, the Nernst equation. Kinetic theory of gases; expansion of the ideal gas model - model of van der Waals for real gases. Elements of statistical thermodynamics, equilibrium and law of distribution.

Teaching Methods: lectures, seminars and exercises

Requirements/Prerequisites: physics of electricity and probability theory.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ORGANIC CHEMISTRY – PART II

Semester: 4th semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS /SS: 5 lecture hours and 7 laboratory exercises /SS/

ECTS credits: 16 credits

Lecturers: assoc. prof. Zhivko Velkov, assoc. prof. Atanas Chapkanova, assist. prof. Maq Chochkova

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

In Organic chemistry – part II are included knowledge for the carbonyl compounds, carboxylic acids, nitrogen containing compounds, heterocyclic compounds and different types of natural compounds.

Course Aims:

The aim of the course is to give the students thorough knowledge about the composition, structure, properties and methods for preparation of the most important organic compounds. The practical exercises (labs + tutorials) seek to help the student by understanding and giving a meaning of the lectures, to acquire a habit of constructive application of knowledge, to build up skills in the field of organic chemistry.

Teaching Methods: lectures and exercises

Requirements/Prerequisites: Basic knowledge in Organic chemistry – part I, Inorganic chemistry and Physics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

STRUCTURE OF MATTER

Semester: 4th semester

Type of the course: Lectures and seminars.

Hours per week /FS /SS: 2 lecture hours and 1 hour seminar /SS/

ECTS credits: 5.0 credits

Lecturers: assoc. prof. Zhivko Velkov, PhD

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

The course gives the microscopic aspect of the education in Physical Chemistry. It offers a brief review and extension of the basic quantum mechanical concepts and demonstrates their application to chemical objects. The major objective of the course is to provide fundamental and practice-oriented knowledge allowing design of molecular characteristics and interpretation of the molecular behavior of real systems.

Course Aims:

Students should understand the fundamental aspects of the quantum theory of atoms, molecules and different types of chemical bonds, and the mechanism of interaction between matter and electromagnetic radiation.

Teaching Methods: lectures and seminars.

Requirements/Prerequisites: Basic knowledge in chemistry, mathematics and physics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ANALYTICAL CHEMISTRY – PART I

Semester: 5th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 3 lecture hours and 6 laboratory exercises /FS/

ECTS credits: 14 credits

Lecturers: assoc. prof. Petko Mandjukov, PhD, assist. prof. Petranka Petrova, PhD

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Basic principles of analytical chemistry. Approaches in modeling equilibria in solutions and evaluation of parameters related to the chemical analysis. Basic theoretical concepts of

equilibria in solutions: acid-base equilibria; processes of complexation; formation and dissolution of low soluble compounds; oxidation - reduction processes. Methods to assess the impact of various external factors on the considered equilibrium processes. Theory of classical qualitative analysis - wet analysis. Basic methods of sampling and preparation of samples. Methods for detection, identification, separation and masking components of the analyzed object.

Course Aims:

The course aims to introduce students to the basics of analytical chemistry and approaches in modeling and evaluation of parameters in equilibrium systems. Provides basic knowledge necessary for the processing of the classical methods of quantitative analysis and fundamental instrumental methods of analysis.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in chemistry and mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

BIOORGANIC CHEMISTRY

Semester: 5th semester.

Type of the course: lecture and laboratory exercises

Hours per week /FS /SS: 2 hours lecture and 2 hour exercises and seminars /SS/.

ECTS credits: 5 credits.

Lecturers: assist. prof. Maq Chochkova, PhD

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry

Short Description:

The course is connected to that of Biochemistry and serves as an introduction to biochemistry, as the main content of bioorganic chemistry to any substantial extent the old notion 'static' Biochemistry.

Course Aims:

To provide basic information on the problems and prospects of this modern science.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

COLLOID CHEMISTRY

Semester: 5th semester

Type of the course: Lectures and laboratory exercises

Hours per week /FS /SS: 2 lecture hours and 2 laboratory exercises /FS/

ECTS credits: 6 credits

Lecturers: Prof. Borian Radoev, assist. Ivo Bardarov

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Training course includes the study of:

- Capillary properties and phenomena;
- Adsorption;
- Electrical properties of colloidal systems.

Course Aims:

Understanding the properties of surfaces and in particular with the capillary properties (liquid surface), capillary pressure, wetting phenomena. Models of adsorption equilibrium; concept of surfactants (surface active agents), electrical properties of colloidal systems, electrokinetic phenomena, stability of hydrophobic colloids.

Teaching Methods: lectures, seminars and exercises

Requirements/Prerequisites: Basic knowledge in Physical chemistry.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ANALYTICAL CHEMISTRY – PART II

Semester: 6th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 3 lecture hours and 6 laboratory exercises /SS/

ECTS credits: 10 credits

Lecturers: assoc. prof. Petko Mandjukov, PhD , assist. prof. Petranka Petrova, PhD

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Basic principles of classical quantitative analysis. Weight analysis. Volumetric analysis: protonometry, complexometry, redoximetry, residual volumetric analysis.

Titration curves. Selecting a method for solving a particular analytical task, selection of indicators and conditions for the analysis. Evaluation of systematic and random errors caused by various factors including the accuracy of the overall analytical procedure. Basic instrumental analytical methods - potentiometry and spectrophotometry. Registration of end-point with instrumental methods.

Course Aims:

The course aims to acquaint students with the variety of tools and methods of analytical chemistry applicable to the objectives of the analysis, the characteristics of the object and the possibilities of the analytical laboratory, the place of the classical methods of analysis in modern analytical chemistry.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in chemistry and mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

INSTRUMENTAL METHODS OF ANALYSIS – PART I

Semester: 6th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 3 lecture hours and 2 hours laboratory exercises /SS/

ECTS credits: 7 credits

Lecturers: assoc. prof. Petko Mandjukov, PhD, assist. prof. Petranka Petrova, PhD

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Main stages of the analysis using instrumental methods. Absolute and relative methods, calibration and main metrological characteristics of instrumental methods. Principles of atomic spectral, electrochemical and radiochemical methods.

Course Aims:

The course aims to introduce the students to the fundamental principles of most commonly used instrumental methods of analysis of the elemental composition of different objects.

The physical basis, the advantages and limitations of the basic instrumental analytical methods are discussed. The aim is to supply students with the information necessary to select the appropriate analytical method for solving a particular analytical task. Special attention is paid the specificity of the analysis of trace elements.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in chemistry and mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

BIOCHEMISTRY

Semester: 7th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 2 lecture hours and 2 hours laboratory exercises /FS/

ECTS credits: 9 credits

Lecturers: assoc. prof. Ivanka Stankova, PhD, assist. Radoslav Chairrov, PhD

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

In the course is considered the complex organization of living matter, chemical processes and key metabolic pathway that occur in living organisms. Enzymes, their chemical nature and their mechanisms of action. Biological oxidation and energy conversion in the cells.

Course Aims:

The course aims to provide students with knowledge of basic biochemical processes that underlie the metabolism, biological oxidation and the related conversion of energy.

Knowledge about the regulation, control and integration of biochemical processes in organisms.

Teaching Methods: Illustrated lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry and Physical chemistry.

Assessment: Current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ISTRUMENTAL METHODS OF ANALYSIS – PART II

Semester: 7th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 3 lecture hours and 3 hours laboratory exercises /FS/

ECTS credits: 11 credits

Lecturers: assoc. prof. Petko Mandjukov, PhD, assist. prof. Petranka Petrova, PhD

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Basic methods of molecular spectroscopy - UV and visible, fluorescent, infrared and Raman spectroscopy. Magnetic chemical methods of analysis - mass spectrometry, nuclear magnetic resonance and electron paramagnetic resonance.

Chromatographic methods for the separation and determination.

Course Aims:

The course aims to familiarize students with fundamental methods in molecular spectroscopy. Particularly attention is paid to the metrological aspects of the instrumental analysis – data treatment, metrological characteristics evaluation, validation, traceability etc.

The aim is to equip students with the knowledge necessary to select the appropriate analytical method to solve specific analytical task and evaluate the analytical results.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry, Physical chemistry and Mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

CHEMICAL TECHNOLOGIES

Semester: 8-th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 2 lecture hours and 1 hour laboratory exercises /FS/

ECTS credits: 10 credits.

Lecturers: Prof. Dragomir Yankov, PhD.

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Compulsory course in the B. S. curriculum of Chemistry.

Short Description:

Students learn the processes and equipment which are the foundation of chemical technologies. Students learn the basic principles of fluid flow, heat transfer and processes of diffusion as well as the structures and facilities in which they occur. This course covers the principles of construction of chemical production in connection with the modern requirements. The application of these principles is illustrated by examples of inorganic and organic technologies which are well developed in the our country.

Course Aims:

To acquaint students with the theoretical foundations of the most widely used processes in the chemical technology and their application in the selection and definition of the facilities for their use.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry, Inorganic chemistry, Analytical chemistry, Physical chemistry and Mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

DESCRIPTIONS OF THE ELECTIVE COURSES

ELECTROCHEMISTRY

Semester: 5th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS/SS/: 2 lecture hours and 1 hours laboratory exercises /SS/

ECTS credits: 5 credits.

Lecturers: Prof. Mario Mitov.

Department: Department of Chemistry, FMNS, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course.

Short Description:

The curriculum of the course ELECTROCHEMISTRY includes lectures and laboratory exercises on theoretical electrochemistry, illustrated with examples having practical impact. The course broadens and deepens the basic knowledge of electrochemical problems introduced in the compulsory courses of General and Inorganic Chemistry - Part I and Physicochemistry. The lecture material is divided into the sections "Introduction to electrochemistry", "Basic concepts and functions in electrochemical thermodynamics", "More important laws in electrochemical kinetics" and "Practical electrode processes".

Course Aims:

The aim of the elective course in "Electrochemistry" is the students to acquire basic theoretical knowledge and practical skills in the field of electrochemistry by using modern methods of teaching and their active participation in the training process.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge on General and Inorganic Chemistry, Physical Chemistry and Mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

BIOLOGICALLY ACTIVE SUBSTANCES SUCH AS FOOD SUPPLEMENTS

Semester: 5th semester.

Type of the course: lecture and laboratory exercises.

Hours per week /FS /SS: 2 hours lecture and 1 hour exercises and seminars /SS/.

ECTS credits: 5 credits.

Lecturers: Assoc. Prof. Ivanka Stankova.

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course

Short Description:

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:

The course aims to introduce students to the use of substances that are needed for balanced and healthy diet. Students will gain a modern and objective view on certain features of the biologically active substances:

- Needs vitamins and minerals to the body;
- Improve performance and facilitate adaptation to the environment;
- Ensure the growth and development of children.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry and Instrumental methods of analysis.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

CHEMISTRY OF SOLIDS

Semester: 5th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 2 lecture hours and 1 hours laboratory exercises /FS/

ECTS credits: 5 credits

Lecturers: assoc. prof. Mitko Stoev.

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course.

Short Description:

Elective curriculum "Chemistry of Solids" includes lectures and laboratory exercises dealing with contemporary issues of inorganic materials science. The program focuses on modern inorganic materials and clarify the dependence synthesis/structure/property. Lectures and laboratory exercises are oriented towards students majoring in Chemistry having knowledge of Inorganic chemistry - parts I-III , but also in other mandatory courses in chemistry.

The material is divided into sections: a loop material preparative methods for the preparation of the solids, the direct reactions with crystals, solid-phase synthesis of material, transport through the gas phase reaction, physical and chemical methods of preparing thin layers, new forms of carbon molecular metals, metal-phthalocyanine polymers, organic and inorganic conductive polymers poly thiazyl polyacetylene - batteries.

Laboratory work associated with the input of inorganic salts from aqueous or nonaqueous solutions, chemical methods for the preparation of thin films by chemical vapor deposition in solutions, pyrolysis, hot air deposition and the like.

Course Aims:

1. Receiving widespread knowledge of chemistry students in the field of inorganic materials science by studying the elective course on "Solid State Chemistry" in the Bachelor degree course in Chemistry.
2. The fundamental methods, to obtain solids and rationalization dependence synthesis/structure/property.
3. Orientation of chemists from the bachelor level towards the master degree programs in materials science.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Inorganic chemistry, Physical chemistry.
Assessment: current tests and written exam.
Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

COMPUTER AIDED SIMULATIONS OF MOLECULAR STRUCTURE AND PROPERTIES

Semester: 5th semester

Type of the course: Lectures and seminars.

Hours per week /FS /SS: 2 lecture hours and 1 hour seminar /FS/.

ECTS credits: 5 credits

Lecturers: assoc. prof. Zhivko Velkov,

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description: The course is adapted for the students in bachelor level in "Chemistry" and "Pedagogy of Education in Chemistry and Physics". The students will get acquainted with the most important methods of quantum-chemistry and molecular mechanic, hybrid methods as far as Molecular Dynamic, Newton, Laugevin, Car-Parrinella and Monte Carlo methods.

Besides the students will get acquainted with the conformational analysis, the influence of the solvent over the molecular structure.

The second part of the course is devoted on the transition state theory, QSAR and the third on the modelling of electronic, vibrational and NMR spectra.

Course Aims: The students must be familiar to the terms and methods of computational chemistry.

Teaching Methods: lectures and seminars.

Requirements/Prerequisites: Basic knowledge in Organic chemistry, Biochemistry, Mathematic, Physical Chemistry.

Assessment: current tests and project defence.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

CHEMISTRY OF SOLAR CELLS

Semester: 5th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 2 lecture hours and 1 hours laboratory exercises /FS/

ECTS credits: 5 credits

Lecturers: assoc. prof. Mitko Stoev.

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course.

Short Description: Elective curriculum "Chemistry of solar cells" is consists of lectures and laboratory exercises. The program is aimed at forming a knowledges for the advanced materials for energy, based on the use of renewable energy sources. Here is considered the utilization of solar energy through photovoltaic converting system into electrical energy through solar cells. Students opted this program have knowledge in Inorganic chemistry - parts I, II and III, Physics, Physical chemistry, Instrumental methods etc. subjects.

In the material are considered problems such as the sun as a renewable source of energy, properties of light and a semiconductor photovoltaic effect, methods for the preparation of

solar cells from silicon and gallium arsenid, thin-film solar cells based on cadmium sulphide and cadmium telluride, the chemistry of conductive pads, chemical methods for the preparation of advanced solar cells and their characterization by instrumental methods. The course was created in the frame of SOCRATES program of the European Union and a part of the lectures are delivered each year in English by the Technological Educational Institute of Patras, Greece, in summer school.

(<http://solar-net.teipat.gr>).

Course Aims: Program objectives in "Chemistry of solar cells" are:

1. Receiving widespread knowledge of students in materials used for making solar cells.
2. Acquiring knowledge of the chemical methods for the preparation of solar cells in the form of silicon wafer and thin film of chemical elements.
3. Focus of chemists bachelors to specialized graduate programs in materials science of semiconductor materials for solar cells.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Inorganic chemistry, Organic chemistry and Biochemistry.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

APPLIED ELECTROCHEMISTRY

Semester: 6th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS/SS/: 2 lecture hours and 1 hours laboratory exercises /SS/

ECTS credits: 5 credits.

Lecturer: Prof. Mario Mitov.

Department: Department of Chemistry, FMNS, SWU "Neofit Rilski", 073-831825

Course Status: Elective course in the B.S. curriculum of Chemistry.

Short Description:

The curriculum of the subject Applied Electrochemistry includes lectures and laboratory exercises, covering the main areas of application of modern electrochemistry. The lecture course begins with a brief introduction to electrochemistry, where, along with the formulation of the subject, the content and the main fields of application of this science, the basic concepts and laws of electrochemical thermodynamics and kinetics are introduced, necessary for a more complete understanding of the material in the following sections. The main lecture material is divided into the sections "Electrochemical current sources", "Industrial applications based on electrolytic processes", "Corrosion and corrosion protection" and "Electroanalytical methods". Laboratory exercises illustrate and complement the lecture material, giving students the opportunity to get acquainted with basic electrochemical methods and equipment for their application.

Course Aims:

The aim of the elective course "Applied Electrochemistry" is the students to acquire basic knowledge and practical skills related to the modern applied electrochemical directions using modern methods and means of teaching and active participation of the students in the training process.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge on General and Inorganic Chemistry, Physical Chemistry and Mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ORGANIC ANALYSIS

Semester: 6th

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

Course Type: Lectures, labs.

ECTS credits: 5.

Lecturer: Assoc. Prof. Atanas Chapkanov, PhD.

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Elective course in the B.S. curriculum of Chemistry.

Short Description: The students will obtain basic knowledge on methods for description of various organic compounds and functional groups. Application of instrumental analytical methods for qualitative and quantitative analysis is given for various organic compounds.

Course Aims: The aim of the course is to give students knowledge on methods and approaches to separation and identification of various organic compounds. The lab exercises should give students knowledge and skillfulness to carry out analysis.

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 organic chemistry, instrumental methods in chemistry.

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

Exam: Test, course work and final written exam

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

HIGH MOLECULAR COMPOUNDS

Semester: 8th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS/SS/: 2 lecture hours and 5 hours x 3 weeks laboratory exercises /SS/

ECTS credits: 5 credits.

Lecturers: Assist. Prof. Maya Chochkova, PhD

Department: Department of Chemistry, FMNS, SWU "Neofit Rilski", 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description: The current course is devoted to give students a deeper understanding of polymers- some basic definitions, classification of synthetic and natural polymers, structure and properties of polymers, the general methods for their preparation, structure characterization, as well as to determine type's polymerization and polycondensation reactions.

Course Aims: Focus is placed on the classification and systematics of synthetic polymers and biopolymers, properties and methods for their synthesis and analysis. The types of polymerization and polycondensation to be distinguished.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry and Bioorganic chemistry

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

CHEMOMETRICS

Semester: 6 semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 2 lecture hours and 1 hours laboratory exercises /SS/

ECTS credits: 5 credits

Lecturers: assoc. prof. Petko Mandjukov.

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description: Statistical processing of the analytical results. Basic statistical criteria used to test the hypotheses in analytical chemistry. Regression analysis, multiple linear regression, non-linear calibration. ANOVA.

Classification and pattern recognition - cluster analysis. Criteria for similarity, agglomerative procedures. Optimization functions - methods of direct search of extremum. Applications in analytical chemistry, and processing of experimental data. Idea of mathematical neural networks.

Course Aims: The course aims to introduce students to some basic mathematical methods used for optimization of parameters and processing experimental data. It provides information on the current metrological requirements for presentation of the results of chemical analyzes, as well as methods for further processing of data, allowing you to get more information about the object or system.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Mathematics, Analytic chemistry and Instrumental analysis.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

METHODS FOR SAMPLING AND SAMPLE PREPARATION

Semester: 6 th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS/SS/: 2 lecture hours and 1 hours laboratory exercises /SS/

ECTS credits: 5 credits.

Lecturers: Assist. Prof. Petranka Petrova.

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Eligible course in the B. S. curriculum of Chemistry.

Short Description:

The course covers basic concepts related to sampling, the main principles of sample processing before instrumental determination, the methods for analyte extraction and the ways of its concentration are discussed.

Course Aims:

Students are expected to deepen their knowledge of analytical chemistry, to acquire the theoretical and practical skills they will need in their professional realization.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites:

Basic knowledge in Inorganic chemistry, Analytical chemistry, Physical chemistry and Mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ECOLOGICAL CHEMISTRY

Semester: 2th

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

Course Type: Lectures, labs.

ECTS credits: 4

Lecturer: Assoc. Prof. U. Radenkova-Saeva

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Obligatory

Short Description: 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. Will be study the most common acute medicated, industrial, domestic and agricultural poisoning and the application of appropriate antidotes.

Course Aims: The course of Chemical Ecotoxicology is based on the knowledge of the students from other disciplines as inorganic and organic chemistry, biochemistry, physical chemistry etc. and prepares the students for the advanced methods of production in the chemistry and pharmacy and in the technology for the protection of 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 = 0.6 CC + 0.6 WE

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

ENVIRONMENTAL CHEMISTRY

Semester: 6th

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

Course Type: Lectures, labs.

ECTS credits: 5.

Lecturer: Assoc. Prof. Atanas Chapkanov, PhD.

Department: Chemistry, Faculty of Natural sciences and Mathematics.

Course status: Elective course in the B. S. curriculum of Chemistry.

Short Description: The study program of the discipline "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 student 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.

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

Exam: Test, course work and final written exam

$KO = 0.6 TK + 0.4\Pi$

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

HAZARDOUS CHEMICALS AND MIXTURES

Semester: 7th

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

Course Type: Lectures, labs.

ECTS credits: 5.

Lecturer: Assoc. Prof. Atanas Chapkanov, PhD.

Department: Chemistry, Faculty of Natural sciences and Mathematics.

Course status: Elective course

Short Description: The curriculum of the course Hazardous Chemicals and Mixtures includes lectures and exercises concerning the types of HCM, their harmful impact on living organisms and the requirements of the European Chemicals Agency on their storage and destruction.

Course Aims: The aim of the course is to give the student 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.

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

Exam: Test, course work and final written exam: $FE = 0.6CC + 0.4 EE$

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

ATOMIC EMISSION SPECTROMETRY

Semester: 7th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS/SS/: 2 lecture hours and 1 hours laboratory exercises /SS/

ECTS credits: 5 credits.

Lecturers: assist. prof. Petranka Petrova

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Eligible course in the B. S. curriculum of Chemistry.

Short Description:

The course deals with basic concepts and principles in atomic emission spectrometry - spectra excitation sources, principle scheme and types of spectrometers, intensity of spectral lines, spectral

and non-spectral interferences in atomic emission spectrometry as well as statistical processing of analytical results.

Course Aims:

The course aims to acquaint students with the fundamentals of atomic spectrometry, as well as with the place of the method between other instrumental analytical methods.

The issue of interferences, spectral and non-spectral, and the methods for their correction are considered.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Instrumental methods for analysis, Inorganic chemistry, Analytical chemistry, Physical chemistry and Mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

NATURAL PRODUCTS CHEMISTRY

Semester: 7th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS/SS/: 2 lecture hours and 5 hours x 3 weeks laboratory exercises /FS/

ECTS credits: 5 credits.

Lecturers: Chief Assist. Prof. Maya Chochkova, PhD

Department: Department of Chemistry, FMNS, SWU “Neofit Rilski”, 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description:

The course of *Natural products chemistry* covers a wide range of different aspects concerning the importance of chemistry of polyfunctional organic derivatives in living systems. In the current course some of the most important classes natural compounds such as: carbohydrates, nucleic acids, proteins, steroids and phenolic compounds will be discussed. Additional attention will be paid to their classification; structures, chemical properties, the role that they play in the living systems; the structure-activity relationship and unusually broad application areas will be shown.

Course Aims:

The aim of the course is to prepare specialists, possessing the basic understanding of natural products chemistry, necessary for successful dissolving of the chemical tasks.

At the end of the course it is expected that students are conversant with the following main aspects of discipline:

- to classify the natural compounds;
- to have good knowledge of the structural peculiarities of natural compounds and their basic chemical transformation *in vivo* and *in vitro*;
- to be familiar with the methods of isolation, purification and also with their synthetic methods;
- To have an idea of the effects of natural compounds in living organisms and their participation metabolism.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry and Bioorganic chemistry

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

KINETICS AND CATALYSIS

Semester: 7th semester

Type of the course: Lectures and exercises.

Hours per week /FS /SS: 2 lecture hours and 1 hour seminar /SS/.

ECTS credits: 5 credits

Lecturers: assist. prof. E. Chorbadzhiyska, PhD.

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course.

Short Description: The course stress on the factors affecting the rate of chemical processes, the main types of catalytic processes with their special advantages and disadvantages in the use of catalysts; formal kinetics of heterogeneous catalytic processes, methods for the preparation of the catalysts, study their properties and the influence of the conditions on the kinetics of the process and the composition of the catalysts.

Course Aims: The course aims to equip students with knowledges, competencies and skills for working with modern methods for preparation of various substances, to study chemical processes and selecting optimal reaction conditions. Knowledge and skills obtained in the course can be successfully used both in industrial and in scientific projects, kinetics and catalysis. The course provides the opportunities for further self study in this area.

Teaching Methods: lectures.

Requirements/Prerequisites: Basic knowledge in Inorganic chemistry, Physical chemistry, and Physics.

Assessment: current tests and project defence.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

STEROID CHEMISTRY

Semester: 8th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS/SS/: 2 lecture hours and 5 hours x 3 weeks laboratory exercises /SS/

ECTS credits: 5 credits.

Lecturers: Chief Assist. Prof. Maya Chochkova, PhD

Department: Department of Chemistry, FMNS, SWU "Neofit Rilski", 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description:

The course *Steroid chemistry* comprises the structure, classification, methods for isolation of steroids-derived from natural sources or produced by total synthesis. Moreover, the course is devoted to the analysis of steroids. The special attention is paid to the wide area of application of steroids in medicine.

Course Aims:

After studying the current course, the students will be familiar with how to isolate and characterize steroid metabolites of different origin (plant, fungal, and insect), either with their biological properties.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry and Bioorganic chemistry, Biochemistry

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

MOLECULAR SPECTRAL ANALYSIS

Semester: 8th semester.

Type of the course: lecture and laboratory exercises.

Hours per week /FS /SS: 2 hours lecture and 1 hour exercises and seminars /SS/.

ECTS credits: 5 credits.

Lecturers: Assoc. Prof. Atanas Chapkanova

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description: The curriculum of the course "Molecular spectral analysis" includes lectures and laboratory work relating to some of the main instrumental methods (molecular spectroscopy) for the characterization of the organics. In the course are examined the main characteristic bands of different classes of organic compounds. This permits the use of the studied processes for the characterization of organics and solving specific problems and tasks.

Course Aims: The course aims to equip the students with systematic knowledge and skills to identify and characterize the test compounds by the methods of molecular spectroscopy (UV, IR, Raman) and correct interpretation of results.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry and Instrumental methods of analysis.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

CHEMISTRY OF DRUGS

Semester: 8th semester.

Type of the course: lecture and laboratory exercises.

Hours per week /FS /SS: 2 hours lecture and 1 hour exercise and seminars /SS/.

ECTS credits: 5 credits.

Lecturers: Assoc. Prof. Ivanka Stankova.

Department: Department of Chemistry, FNSM, SWU "Neophit Rilsky", 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description: Training course includes the study of:

- * Principles of creation of new medicines essential;
- * Main drug classes and methods for obtaining them;
- * Relation structure/biological activity.

Course Aims: Students should acquire knowledge about the main groups of organic drugs. The administration of the drugs in modern medical practice, with particular emphasis on the mechanism of their activity and creation of new drugs.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

BASICS OF BIOTECHNOLOGY

Semester: 8-th semester

Type of the course: Lectures and laboratory exercises.

Hours per week /FS /SS: 2 lecture hours and 1 hour laboratory exercises /FS/

ECTS credits: 5 credits.

Lecturers: Prof. Iv. Stoineva

Department: Department of Chemistry, FNSM, SWU “Neophit Rilsky”, 073-831825

Course Status: Elective course in the B. S. curriculum of Chemistry.

Short Description: Students learn the processes and equipment which are the foundation of biotechnologies.. This course covers the principles of construction of biochemical production in connection with the modern requirements. The application of these principles is illustrated by examples of inorganic and organic biotechnologies which are well developed in the our country.

Course Aims: To acquaint students with the theoretical foundations of the most widely used processes in the biotechnology and their application in the selection and definition of the facilities for their use.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge in Organic chemistry, Inorganic chemistry, Analytical chemistry, Physical chemistry and Mathematics.

Assessment: current tests and written exam.

Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.