Pedagogy of Chemistry and Man and Nature Education

Information Package

I. ANNOTATION

The specialty "Chemistry and Man and Nature" prepares highly qualified specialists with competencies for teaching natural sciences in the basic stage of school education. The program combines knowledge of chemistry, biology, physics and pedagogy, with an emphasis on the interdisciplinary approach and the application of STEM strategies in education. Graduates can successfully realize themselves as teachers in primary and secondary education, methodologists, experts, as well as continue their education in master's and doctoral programs.

II. QUALIFICATION STANDARD

II.1. Area and scope of knowledge

• basic knowledge in the field of chemistry, biology, physics and the environment;
• knowledge of the cognitive and social development of children;
• basics of pedagogy and teaching methodology in "Man and Nature" and "Chemistry";
• environmental and health aspects related to natural sciences.

II.2. Area and scope of skills
• developing and implementing lessons tailored to the age characteristics of students;
• implementing active learning methods, including experimental activities;
• using interactive technologies and learning resources;
• teamwork and effective communication with students and parents.

II.3. Competencies Personal competencies:
• high level of responsibility and pedagogical ethics;
• empathy and commitment to children's development;
• adaptability to changing educational policies.

Professional competencies:
• teaching "Man and Nature" in junior high school and "Chemistry" in high school;
• organizing educational projects and STEM activities;
• creating educational materials and conducting assessments;
• participating in pedagogical and methodological teams, projects and innovations.

CURRICULUM CONTENT

№	NAME OF THE COURSE	Evaluation		CREDITS	Auditory occupancy				Extracurricular activities /in hours /
		semester	form		total	lectures	seminarии	exercises	
	I. MANDATORY SUBJECTS								
1	Mathematics - Part I	I	exam	**5.0**	45	30	15		105
2	Introduction to inorganic chemistry	I	exam	**2.0**	30	30			30
3	General and Inorganic Chemistry Part I	I	exam	**11.0**	90	45		45	240
4	Mechanics	I	exam	**6.0**	75	30	15	30	105
5	Psychology	I	exam	**4.0**	60	30	30		60
6	Specialized foreign language - Part I	I	exam	**2.0**	30		30		30
7	Sports	I			15			15	45
	TOTAL :			**30.0**	**345**	**165**	**60**	**90**	**615**
8	Mathematics - Part II	II	exam	**4.0**	60	30	30		60
9	General and Inorganic Chemistry Part II	II	exam	**9.0**	75	30		45	195
10	Cytology, histology and embryology	II	exam	**4.0**	45	30		15	75
11	Molecular physics	II	exam	**6.0**	75	30	15	30	105
12	Anatomy and physiology	II	exam	**5.0**	75	45		30	75
13	Specialized foreign language - Part I	II	exam	**2.0**	30		30		30
	TOTAL :			**30.0**	**360**	**165**	**75**	**120**	**540**
14	Introduction to organic chemistry	III	exam	**2.0**	30	30			30
15	Organic Chemistry - Part I	III	exam	**9.0**	75	30		45	195
16	Physical Chemistry - Part I	III	exam	**5.0**	60	30		30	90
17	Electricity and magnetism	III	exam	**6.0**	75	30	15	30	105
18	Information and communication technologies in education and work in a digital environment	III	exam	**3.0**	30	15		15	60

19	Sports	III			15			15	45
20	Botany	III	exam	**5.0**	60	30		30	90
	TOTAL :			**30.0**	**345**	**165**	**15**	**165**	**615**
21	Organic Chemistry - Part II	IV	exam	**8.0**	90	45		45	150
22	Physical Chemistry - Part II	IV	exam	**5.0**	60	30		30	90
23	Optics	IV	exam	**6.0**	75	30	15	30	105
24	Zoology	IV	exam	**6.0**	60	30		30	120
25	Pedagogy	IV	exam	**5.0**	60	30	30		90
	TOTAL :			**30.0**	**345**	**165**	**45**	**135**	**555**
26	Analytical Chemistry - Part I	V	exam	**6.0**	60	30		30	120
27	Atomic physics	V	exam	**5.0**	45	30		15	105
28	Methodology of teaching about man and nature	V	exam	**7.0**	75	60	15		135
29	Visiting on Man and Nature	V	That.	**2.0**	30			30	30
30	Ecology	V	exam	**3.0**	45	30		15	45
31	Astronomy	V	exam	**3.0**	45	30	15		45
32	Sports	V			15			15	45
33	Elective course 1: Group III of chemical disciplines	V	exam	**4.0**	45	30		15	75
	TOTAL :			**30.0**	**360**	**210**	**30**	**120**	**600**
34	Analytical Chemistry - Part II	VI	exam	**6.0**	60	30		30	120
35	Chemistry Teaching Methodology - 1	VI	exam	**2.0**	45	30	15		30
36	Chemistry internship	VI	That.	**2.0**	30			30	30
37	Nuclear physics	VI	exam	**5.0**	45	30		15	90
38	Methodology and technique of the school experiment on man and nature	VI	That.	**3.0**	30			30	90
39	Chemistry problem solving methodology	VI	exam	**4.0**	45	30	15		45

40	Elective course 2: Group I	VI	exam	**3.0**	30	30			60
41	Elective course 3: Group I	VI	exam	**3.0**	30	30			60
42	Research practice	VI	That.	**2.0**	15				45
	TOTAL :			**30.0**	**330**	**180**	**30**	**105**	**570**
43	Chemistry Teaching Methodology - 2	VII	exam	**6.0**	45	30	15		135
44	Methodology and technique of the school chemistry experiment	VII	That.	**8.0**	60	30		30	180
45	General biology and fundamentals of biochemistry	VII	exam	**3.0**	30	30			60
46	Biodiversity Fieldwork	VII	That.	**1.0**	15			15	15
47	Current pedagogical practice in chemistry	VII	That.	**2.0**	30			30	30
48	Current pedagogical practice in man and nature	VII	That.	**2.0**	30			30	30
49	Sports	VII	т.о.		15			15	45
50	Elective course 4: Group II	VII	exam	**4.0**	45	30		15	75
51	Elective course 5: Group III	VII	exam	**4.0**	45	30		15	75
	TOTAL :			**30.0**	**315**	**150**	**15**	**150**	**645**
52	Chemistry internship	VIII	That.	**6.0**	45			45	135
53	Internship in Man and Nature	VIII	That.	**6.0**	45			45	135
54	Competency-based approach and innovation in education	VIII	exam	**4.0**	45	30		15	75
55	Inclusive education	VIII	exam	**4.0**	30	15		15	90
56	Graduation	VIII		**10.0**					**300**
	TOTAL :			**30.0**	**165**	**45**	**0**	**120**	**735**

	TOTAL (hours of compulsory and elective courses)	**240**	**2565**	**1245**	**300**	**975**	**4875**		

	II. ELECTIVE DISCIPLINES								
	GROUP 1								
	Pedagogical, psychological, educational-management and private-didactic disciplines								
1	Digital competence and digital creativity	VI	exam	**3.0**	30	30			60
2	Developing lessons for learning in an electronic environment	VI	exam	**3.0**	30	30			60
3	Pedagogical interaction in a multicultural environment	VI	exam	**3.0**	30	30			60
4	Management of educational institutions	VI	exam	**3.0**	30	30			60
5	Inclusive education for children and students with special educational needs	VI	exam	**3.0**	30	30			60
6	Communication skills in an educational environment	VI	exam	**3.0**	30	30			60
7	STEM educational technologies in science, mathematics and computer science education	VI	exam	**3.0**	30	30		15	60
	Total number of hours of the disciplines chosen by the group	**VI**		**6.0**	**60**	**60**			**120**
	GROUP 2								
	Interdisciplinary and applied-experimental disciplines and disciplines, the training in which provides upgrading of competencies related to the specifics of professional qualification								
1	Innovative STEM methods in science education	VII	exam	**4.0**	45	30		15	75
2	Basic concepts in chemistry	VII	exam	**4.0**	45	30		15	75
3	Control and assessment in science education	VII	exam	**4.0**	45	30		15	75

4	Models in science education	VII	exam	**4.0**	45	30		15	75
5	Hygiene of childhood and adolescence	VII	exam	**4.0**	45	30		15	75
	Total number of hours of the disciplines chosen by the group	**VII**		**4.0**	**45**	**30**		**15**	**75**
	GROUP 3								
	Chemical disciplines								
1	Bioorganic chemistry	V	exam	**4.0**	45	30		15	75
2	Bioelectrochemical systems	V	exam	**4.0**	45	30		15	75
3	Hazardous environmental pollutants	V	exam	**4.0**	45	30		15	75
4	Environmental chemistry	V	exam	**4.0**	45	30		15	75
5	Nutritional supplements	V	exam	**4.0**	45	30		15	75
6	Elements and compounds in plants and soils	V	exam	**4.0**	45	30		15	75
7	STEM technology tools in the chemistry lab	V	exam	**4.0**	45	30		15	75
	Total number of hours of the disciplines chosen by the group	**V**		**8.0**	**90**	**60**		**30**	**150.0**
	Total number of hours of the disciplines being chosen			**18.0**	**195**	**150**		**45**	**345**
	III. OPTIONAL DISCIPLINES								
1	Mathematical models in chemistry	I	exam	**1.0**	15	15			15
2	History and philosophy of natural sciences	VIII	exam	**1.0**	15	15			15
3	Physical methods in medicine	VII	exam	**1.0**	15	15			15
	OPTIONAL DISCIPLINES Each student may study, at their discretion, as an elective any discipline (required or elective) taught at the University, regardless of the faculty in which it is offered. The total number of hours of the selected elective disciplines is up to 130 hours.								

IV. GRADUATION

The training ends with:

1. State practical exam in chemistry (presentation and defense of a lesson);

2. State practical-applied exam on man and nature (presentation and defense of a lesson);

3. Written state exam in chemistry and man and nature or defense of a thesis.

MATHEMATICS – PART 1

Semester: 1st semester
Course Type: Lectures and seminars
Hours per week: 2 lecture hours and 1 hour seminars
ECTS credits: 5
Lecturer: Senior Assistant Professor Dr. Boyana Garkova
Department: Department of Mathematics and Physics, Faculty of Mathematics and Natural Sciences.
Course Status: Compulsory course

Short Description:

The course includes basic concepts in Linear algebra – matrices, determinants, systems linear equations and methods for their solving; Analytic geometry – vectors, vector calculus, equations of the line in a plane and equations of some curves; Mathematical analysis – functions of a real variable, limit of a function, and differential calculation of functions.

Course Aims:

The students have to obtain knowledge and skills to use fluently the basic mathematical concepts and apply them to solve real practical tasks in mathematics, chemistry and physics.
Teaching Methods: lectures, tutorials, homework, and problem solving tests.
Requirements/Prerequisites: The students should have basics knowledge from school course in mathematics.
Assessment: permanent control during the semester including homework and two written exams, and written exam in the semester's end on topics from tutorials and on topics from lectures.
Registration for the exam: coordinated with the lecturer and student Service Department

INTRODUCTION TO INORGANIC CHEMISTRY

Semester: 1st semester
Course Type: Lectures
Hours per week: 2 lecture hours
ECTS credits: 2
Lecturer: Assoc. Prof. Elitsa Chorbadzhiyska
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course status: Compulsory

Short Description:

The lecture material of the course "Introduction to Inorganic Chemistry" includes the modules: Structure of the atom, Chemical bonds, Solutions and electrolytes, Periodic table and Periodic law.

Course Aims:

The aim of the introduction course is students to acquire basic theoretical knowledge in the field of general and inorganic chemistry through the use of modern teaching methods and tools.

Teaching Methods: lectures

Requirements/Prerequisites: The students should have basics knowledge from school course in chemistry.

Assessment: written exam

Registration for the exam: coordinated with the lecturer and student Service Department

GENERAL AND INORGANIC CHEMISTRY – PART 1

Semester: 1st semester

Hours per week: 3 hours lectures, 3 hour laboratory exercises

Course Type: Lectures and laboratory exercises

ECTS credits: 11

Lecturer: Assoc. Prof. Elitsa Chorbadzhiyska, Assistant Dr. Aleksandra Tencheva

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

Course status: Compulsory

Short Description:

The course “General and Inorganic Chemistry I” included lectures and laboratory exercises on the electronic structure of the atom, periodic low, structure of molecules and complex compounds, chemical bounds, chemical equilibrium, absorption, catalyze, solubility and solutions, electrochemical processes and corrosion of metals.

Course Aims:

The program is giving the basic of chemical knowledge and skills of students in the field of General Chemistry as a structure of matter, lows in the nature, skills in chemical experiment and individual work with chemical literature.

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

Requirements: Knowledge in General Chemistry, Physics, Mathematics and Informatics are obligatory

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

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

Final evaluation: FE = 0.7 x CC + 0.3 x WE

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

MECHANICS

Semester: 1st semester

Type of presentation: Lectures and Laboratory exercises

Hours per week: 2 Lecture hours, 2 Laboratory hours and 1 hour seminars

ECTS credits: 6

Lecturers: assoc. prof. Ralitsa Stanoeva, assist. Todor Cholakov

Department: Mathematics and Physics Department, Faculty of Mathematics and Natural Sciences.
Course Status: Compulsory course
Short Description: The general loading of the course is 75 hours (it includes 45 lecture hours, 30 hours laboratory exercises) and 220 out auditorium hours. Material is selected depending of the specificity of the speciality. In this course are considered the following main topics: Basic Concepts of Kinematics and Dynamics, Relative Physical Principals, Inertial and Non-inertial Co-ordinate Systems, Mechanics of Absolutely Solid State, Gravitation, Oscillations's Mechanics, Distortion in Solid State and Fluids's Mechanics.
Course Aims: Students acquire knowledge about objective fundamental natural laws, basic Physical methods of investigation and basic Physical concepts and relations.
Teaching Methods: Lectures are prepared on Power point. The contemporary technical equipment as multimedia, software, models, etc. is used for these lectures. Lectures are visualised by demonstrations and laboratory tasks performance during the laboratory classes.
Requirements / Prerequisites: Basic knowledge in General Physics and Mathematics.
Evaluation Method: The final rating is formed at the end of the course on the basis of the rating of a written test (WT) on all topics mentioned above and of the student's routine control (RC) in the following ratio: 0.4RC+0.6WT.
Final grade calculation is done by using a 6-point rating scale: the rating 6 equals level A on ECTS; the rating 5 equals level B on ECTS; the rating 4 equals level C on ECTS; the rating 3 equals level D on ECTS; the rating 2 equals level E on ECTS.
Inscribing for tuition: Not necessary.
Inscribing for exam: Agreement with the lecturer and the Students Service Department

PSYCHOLOGY

Semester: 1rd semester
ECTS credits: 4
Type of presentation: lectures and seminares
Weekly workload: 2 hours lectures, 2 hours seminars**.**
Form of Assessment: exam
Type of the exam: written
Lecturer: Ch. assistant Dr. Simona Nikolova
Department: Psychology.
Course Status: Compulsory course
Annotation:
The lecture course introduces students to the basic problems of psychology as a unique science. The emphasis is on the basic categories in psychology such as: "psyche", "consciousness"; the genesis and development of the main mental phenomena and their features at different ages are clarified; the psychological characteristics of age periods are made; the main factors of development are clarified.
Course content:
The content of the course is focused on the genesis and development of the main mental phenomena, and their features at different ages; the psychological characteristics of age periods are made; the main factors of development are clarified. Essential regularities and psychological conditions for the functioning of the personality psyche are revealed. The examination of cases from pedagogical practice aims to form professional skills for dealing with current problems in secondary school and acquiring competencies necessary for practicing the teaching profession in accordance with Decree No. 27/1.02. 2021 on amending and supplementing the Regulation on the state requirements for acquiring the professional

qualification "teacher". Through work in the Blackboard educational platform, the aim is to develop the ability for critical and creative thinking, as well as teamwork skills.
Teaching and assessment technology: The lecture course is conducted using modern technical means such as multimedia, software, models, as well as interactive methods. The assessment of the results achieved by students in the process of learning in various academic disciplines is carried out in accordance with the system for transfer and accumulation of credits. Current control includes attendance at lectures, participation in discussions, preparation of presentations, solving tasks, tests, control and coursework. Training in the discipline ends with a written exam on the educational material according to the syllabus. The grade is the arithmetic mean of the answers to the two questions. The final grade is the result of the assessment from current control during the semester and the assessment of the final exam, which are stored within the period specified by the Regulations for Educational Activities.

FOREIGN LANGUAGE -1

Semester: 1st and 2nd semesters
Type of the course: seminars
Hours per week : 2 hours
ECTS credits: 2
Lecturers: Assoc. Prof. Dr. Radoslav Chairov
Department: Department of Chemistry, Faculty of Mathematics and Natural Sciences.
Course Status: Compulsory course
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: 1st semester
Type of the course: exercises
Hours per week: 1 hour exercises
ECTS credits: 0
Department: Sport and Kinezitherapy, Faculty of Public Health and Sports.
Course Status: Compulsory course
Short Description:
Activities in the course "Sport" are designed for students in first and second year of bachelor specialty "Chemistry and Physics ". 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

MATHEMATICS – PART 2

Semester: 2nd semester
Course Type: Lectures and seminars
Hours per week: 2 lecture hours and 2 seminars hours
ECTS credits: 4
Lecturer: Senior Assistant Professor Dr. Boyana Garkova
Department: Mathematics and Physics, Faculty of Mathematics and Natural Sciences, tel. ++35973588532, e-mail: ilinka_dimitrova@swu.bg
Course Status: Compulsory course in the B.S. Curriculum of Chemistry and Physics.
Short Description: The course includes basic concepts of integral calculus, ordinary differential equations, probability theory and linear optimization.
Course Aims: The students have to obtain knowledge and skills to use fluently the basic mathematical concepts and apply them to solve real practical tasks in mathematics, chemistry and physics.
Teaching Methods: lectures, tutorials, homework, and problem solving tests.
Requirements/Prerequisites: The students should have basics knowledge from school course in mathematics and Mathematics I.
Assessment: permanent control during the semester including homework and two written exams, and written exam in the semester's end on topics from tutorials and on topics from lectures.
Registration for the exam: coordinated with the lecturer and student Service Department

GENERAL AND INORGANIC CHEMISTRY - PART 2

Semester: 2 nd semester
Hours per week: 2 hours lectures, 3 hours laboratory exercises
Course Type: Lectures and laboratory exercises

ECTS credits: 9
Lecturer: Assoc. Prof. Elitsa Chorbadzhiyska, Dr. Aleksandra Tencheva
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course status: Compulsory

Short Description:
The course "General and Inorganic Chemistry II" included lectures and laboratory exercises is discussing the elements and there compounds. The main topics of discussions are hydrogen, elements and compounds from A and B I-VIII groups of a periodical table. The chemical, physical properties and application of the elements and compounds are presented during the lectures. The laboratory work is focusing on preparation methods of a chemical compounds from the main and secondary groups of periodical table.
Course Aims:
The program is giving the basic of chemical knowledge and skills of students in the field of chemistry of elements and their compounds.
Teaching Methods: Lectures are presented by PowerPoint, video films, e-platform in Internet and graphical illustration on the white board.
Requirements: Knowledge in General Chemistry, Physics, Mathematics 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 x CC + 0.3 x WE
Registration for the exam: Coordination with lecturer and Students Service Department.

CYTOLOGY, HISTOLOGY AND EMBRYOLOGY

Semester: 2nd semester
Hours per week: 2 hours lectures, 1 hour laboratory exercises
Course Type: Lectures and laboratory exercises
ECTS credits: 4
Lecturer: Assistant Professor Emilia Tsankova, PhD
Department: Chemistry, PMF, Second Corps (UK 2)
Course status: Compulsory
Short Description:
The course "Cytology, Histology and Embryology" introduces students to the basics of cellular and tissue organization of living organisms, as well as the processes of individual development of animals and humans. The material is studied in three sections. The cytology section provides knowledge about the structure and physiology of cells, cell organelles, cell division and the cell life cycle. The histology section provides knowledge about the main types of tissues in animals - epithelial, connective, muscle and nervous, their morphology and functions. The embryology section traces the development of multicellular organisms from fertilization to the formation of the main organs and systems. Embryonic development in different groups of animals is studied in detail, as well as the stages of the fetal period in humans. The course includes lectures and laboratory exercises that build practical skills for microscopic analysis and interpretation of biological structures.

The course is intended for students of the Faculty of Humanities and Social Sciences and the Faculty of Humanities.
Program Objectives: The curriculum in Cytology, Histology and Embryology aims to familiarize students with the basic structural and functional characteristics of cells and tissues,

the microscopic structure of tissues and organs, as well as the main stages of the development of multicellular organisms. The course combines theoretical training with laboratory exercises that support the development of practical skills for the observation and analysis of tissue and embryonic specimens.

The main objectives of the training are:

1. Formation of basic knowledge about the structure of cells and tissues in animal organisms.
2. Formation of basic knowledge about the main stages in the individual development of animals.
3. Development of analytical thinking through understanding the complex interrelationships in the implementation of processes in the cell. 4
. Building practical skills for observing, collecting and analyzing information about the structure and functions of cells and tissues, as well as about the main stages of the development of animal organisms.
5. Awareness of the role of the proper functioning and interaction of cells for the normal development of the multicellular animal organism.

MOLECULAR PHYSICS

Semester: 2 nd semester
Hours per week: 2 hours lectures, 2 hours exercises and 1 hour seminars.
Course Type: Lectures, exercises and seminars
ECTS credits: 6
Lecturer: Assoc. Prof. Ralitsa Stanoeva, Ph.D.
Department: Mathematics and Physics, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory

Short Description: The main topics to be considered: Bases of equilibrium thermodynamics, Thermodynamic and statistical interpretation of basic thermodynamic quantities, Variation of physical condition, Surface tension, Elements of non-equilibrium thermodynamics. Transmission processes – diffusion, thermal conductivity and internal friction.
Specific Goals of the Course: The course aims to gives students a necessary minimum basic knowledge about the main macroscopic physical phenomena in the field of the thermodynamics and molecular physics. Some practical applications of this knowledge are an object of treatment in laboratory exercises and seminars.
Pedagogical Methods: lectures, individual student's work, test-papers.
Requirements/Prerequisites: basic knowledge in mechanics and mathematics
Subsidiary Materials: physics textbooks and manuals, handbooks, physics encyclopedic dictionaries
Assessment: written exam on the theoretical material from the lectures
Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ANATOMY AND PHYSIOLOGY

Semester: 2nd semester
Type of presentation: lectures, laboratory exercises
Hours per week: 3 hours lectures, 2 hours exercises
ECTS credits: 5
Lecturer: Assoc. Prof. Dr. Dimo Krastev

Department: Public health and sports.
Status of the Subject: Compulsory

Subject Description:
The course provides basic knowledge on the anatomical structure and functions of all organs and systems in the human body.

Course Aim: To give knowledge on anatomical terminology and basic physiological processes; to give knowledge on the anatomical organization and physiological functions of the main sensory systems such as visual, auditory-equilibrium, somatosensory.

FOREIGN LANGUAGE

Semester: 1st and 2nd semesters
Type of the course: seminars
Hours per week : 2 hours
ECTS credits: 2
Lecturers: Assoc. Prof. Dr. Radoslav Chairov
Department: Department of Chemistry, Faculty of Mathematics and Natural Sciences.
Course Status: Compulsory course
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.

INTRODUCTION TO ORGANIC CHEMISTRY

Semester: 3rd semester
Type of course: lectures
Hours (weekly): 2 hours of lectures
Number of credits: 2 credits.
Lecturers: Assoc. Prof. Dr. Maya Chochkova, Ch. assistant Dr. Kiril Chuchkov
Department: Chemistry, Faculty of Natural Sciences, Second Building, 66 Ivan Mikhailov Street, Blagoevgrad.
Status of the discipline in the curriculum: Compulsory

Course description: The curriculum of the course "Introduction to Organic Chemistry" includes classes on basic concepts in organic chemistry, which are studied in the middle course, the classification and properties of basic classes and groups of organic compounds.

Aim of the course: Students are provided with knowledge of basic concepts and theories in Organic Chemistry, as well as specific knowledge of different types of organic compounds.
Teaching methods: lectures.
Prerequisites: basic knowledge of inorganic chemistry is required.
Assessment: written exam
Enrollment in the course: not required
Registration for the exam: agreed with the teacher and the training department

ORGANIC CHEMISTRY PART 1

ECTS credits: 9
Weekly classes : 2 hours lectures, 3 hours exercises
Form of Assessment: Exam
Type of exam: Written
Semester : 3rd semester
Methodological guide: Department of "Chemistry "
Faculty: Faculty of Mathematics and Natural Sciences
Lecturers: Assoc. Prof. Maya Chochkova, Ch. assistant Dr. Kiril Chuchkov
Status of course: Compulsory

DESCRIPTION:
In the course will be considered the general theoretical questions: modern conceptions of the chemical bond nature in the molecules of organic compounds, methods for establishing the composition, structure and organic molecules reactivity, types of organic reactions and their mechanisms, rate of chemical reactions, problems of the organic compounds stereochemistry and their practical application. The course includes the study of basic classes and groups of organic compounds such as alkanes, alkenes, alkynes, alkadienes, alicyclic compounds, aromatic hydrocarbons, halogenated derivatives of hydrocarbons, hydroxyl derivatives of hydrocarbons and including homologous order, names, nomenclature, physical and chemical properties and preparation. Will be considered the specific types of reactions for each class separately and dependencies associated with the reaction of their ability, the factors influence on the rate of reactions.
Aim of the course:
The course aims is to provide the students basic knowledges of the composition, structure, properties and methods of preparation of the most important classes of organic compounds. Practical workshops and seminar in practical form designed to help the students perception and understanding of the lecture material and build the habit of creative application of knowledge, to develop experimental skills, working in the field of organic chemistry.
Teaching methods: Lectures, laboratory work and seminars, problems decission, testing, out-of-class work.
Prerequisites: Basic knowledge of inorganic chemistry and physics. Teaching methods: lectures and exercises.
Evaluation : written exam
Registration for the course: not necessary
Registration for examination: agreement with the lecturer and academic department
Final assessment (FA) is formed only if the student has been assessed as the current control at least Medium 3.00.
Assessment: 2 tests; tutorial control, evaluation of lab work, written final exam

Rating: Running control carried out by the lecturer (2 combined tests, connected with the content of the Organic chemistry I part) D1, D2, D3 and D4. Evaluation of the work in the lab (K1, K2 и K3); Running control from the tutorial (E1 и E2). Written final exam (Exam) (2 theoretical questions and 2 practice tests) Final rating = 0,1 . (D1+D2)/2 + 0,2 .(K_1+K_2+K_3)/3 +0,7 (Exam)

PHYSICAL CHEMISTRY PART 1

Semester: 3rd semester
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 2 hours labs
ECTS Credits: 5
Lecturer: Prof. Dr. Boris Shivachev
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description:
The course in the Physical Chemistry I includes the principles of the Thermodynamics and their application on the main macroscopic objects: gases, liquids and solids. This material is distributed in three parts as follows: (i) Fundamentals of the thermodynamics; (ii) Thermodynamics of open systems; (iii) Thermodynamics of solutions.
The lectures are illustrated by computing and laboratory exercises, solving examples from the lecture and the laboratory material.
Course Aims:
The aims of the curriculum of the Physical Chemistry are to expand the professional horizons and culture of the students, building on knowledge obtained from previous chemical disciplines and adding new facts and methods. Students are expected to acquire skills for proper orientation associated with phenomena, effects and processes in macroscopic homogeneous systems. It is expected that students can solve problems based on the knowledge on fundamentals of thermodynamics for quantitative interpretation of experimental.
Teaching Methods: lectures and practical exercises.
Requirements/Prerequisites: The basic knowledge on General Chemistry and Mathematics.
Exam: final written exam
Assessment: 2 tests on the lecture material D1, D2; 2 tests on practical material K1, K2; written final exam
Rating: = 0,4 .(D_1+D_2)/2 + 0,2 .(K_1+K_2)/2 + 0,4 (Exam)
Registration for the exam: Coordinated with lecturer and Students Service Department

ELECTRICITY AND MAGNETISM

Semester: 3rd semester
Cours Type: lectures, seminars, laboratory exersises
Hours per week: 2 hours lecture, 2 hours exersises, 1 hours seminars
ECTS credits: 6
Lecturer: Assoc. Prof. Luben Mihov Ivanov, Ph.D.
Department: Physics, Faculty of Natural Sciences and Mathematics
Status of the Subject: Compulsory

Subject Description: The course considers the general laws of electrical and magnetic phenomena. The first part studies basic laws of electrical phenomena such as electromotive force, electric fields, electrical potential, Gauss law, dielectrics and metals in electrical field, conductors, and electrical current. The second part considers magnetic phenomena and includes field of moving charge, electrical dipole, magnetic forces, electromagnetic induction, and magnetic properties of mater. The third section concerns questions of movement of the electrical parts in electric and magnetic fields.
Specific Goals of the Subject: Students acquire knowledge about Electromagnetism, Optics, Quantum Mechanics, Modern Atomic and Nuclear Physics. Material is selected depending of the specificity of the specialty. For that reason some specific topics are presented in details. Parts of topics with practical importance are directed to the laboratory classes.
Pedagogical Methods: Lectures are visualized by demonstrations and laboratory tasks performance during the laboratory classes. From methods point of view teaching material is grouped in sections following logical consistency of the cause.
Preliminary Requirements: Basic knowledge in Physics and Mathematics.
Subsidiary Materials: Educational literature on General and Applied Physics and printed materials on the topics given by lecturer.
Evaluation Method: Final examination in written form and subsequent conversation with the lecturer. Some intermediate tests conduct through the semester.
Inscribing for tuition: Not necessary.
Inscribing for exam: Agreement with the lecturer.

INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION AND WORK IN DIGITAL ENVIRONMENT

Semester: 3rd semester
Type of the course: lectures and laboratory exercises
Hours per week: 1 hour lectures, 1 hour exercises
ECTS Credits: 3
Lecturer: : Prof. Daniela Tuparova, PhD
Department: Department of Informatics, Faculty of Mathematics and Natural Sciences.

Course Status: Compulsory course
Annotation: The curriculum is oriented towards mastering modern tools and technologies applicable in education. The main characteristics and applications of the software packages in the The focus is on the use of a variety of multimedia training software and the use of Internet technologies to search for and develop learning materials. The training is supported by teaching materials published in the e-learning system maintained by the Research Laboratory for e-learning at the Faculty of Natural Sciences and Mathematics: www.e-learning.swu.bg

Course content: Introduction; Main aspects of the use of information technologies in education - a tool for managing learning activities, a tool for management of learning activities, tools for visualise of learning content. Application of software packages in education. Multimedia. Application of multimedia technologies in education - video and animation. Multimedia presentation tools. Power Point - Basic principles. Design of educational software and basic requirements. Key features and capabilities of popular multimedia environments for the development of teaching and knowledge assessment tools. Educational computer games and gamification in the learning process. E-learning systems - basic functionalities. Cloud technologies in education

Course organization and assessment: Lectures and exercises are conducted in the classical way as students get acquainted with the material provided. The application of interactive teaching methods is envisaged, advocating mainly the discussion methods - discussion, discussion, discussion and situational methods. Lectures and exercises are illustrated with presentations, demonstrations of software used or videos. The study materials and assignments are published in the e-learning environment based on Moodle - www.e-learning.swu.bg. Students develop 5 homework assignments, the grades of which form the онгоинг control. The exam is held in a computer room. Students are provided with a set of resources with which to develop interactive multimedia learning materials on a given topic.

Only students whose grade from the current control is not lower than Average 3.00 are admitted to the exam.

The final grade is formed according to the formula КО = 0.5ТК + 0.5ИО (КО - final grade, ТК - grade from current control, ИО - grade from the computer test.)

SPORT

Semester: 3rd semester
Type of the course: exercises
Hours per week: 1 hour exercises
ECTS credits: 0
Department: Sport and Kinezitherapy, Faculty of Public Health and Sports.
Course Status: Compulsory course
Short Description:
Activities in the course "Sport" are designed for students in first and second year of bachelor specialty "Chemistry and Physics ". 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

BOTANY

Semester: 3rd semester
Type of course: lectures, exerceses
Hours pre week: 2 hours lectures, 2 hours exerceses
ECTS credits: 5
Lectur: Assistant Professor Emilia Tsankova, PhD
Department: "Geography, Ecology and Environmental Protection" Faculty of Mathematics and Natural Sciences
Status of the Subject: Compulsory
Annotation:
The Botany curriculum provides students with in-depth preparation for the diversity and classification of representatives of the kingdom Plants. The structural and species diversity of the main groups of plants – lower and higher, their structure, evolution, ecological role and importance for humans are examined.

The emphasis is on the study of individual representatives of the plant world. Topics related to the composition, structure and origin of the Bulgarian flora are covered, as well as measures for the conservation and protection of the genetic fund of rare and protected plant species. The course includes lectures and practical classes that develop skills in observation, analysis and work with plant material.
This curriculum is intended for students studying in the specialty Pedagogy of Chemistry Education and Man and Nature.
Objectives:
The aim of the course is an in-depth study of the features and importance of representatives of the animal kingdom.
The training includes:
• formation of basic knowledge about the structure, physiology, systematics and ecological significance of the representatives of the Plant Kingdom,
• principles of classification of the main taxonomic categories of plants;
• applied aspects of botany.

ORGANIC CHEMISTRY – PART 2

Semester: 4th semester
Course Type: Lectures and exercises
Hours per week: 3 lecture hours, 3 exercises hours per week
ECTS credits: 8
Lecturer: Assoc. Prof. Maya Chochkova, Ch. assistant Dr. Kiril Chuchkov
Department: Chemistry, Faculty of Natural Sciences and Mathematics, telephone: 885381.
Course Status: Obligatory course
Short Description: The main object of the lectures in Organic Chemistry II part is: Study of properties and mechanism of chemical reactions of carbonyl compounds, carboxylic acids and their derivatives, N-containing compounds, heterocyclic compounds, important biologically active natural compounds: carbohydrates, amino acids, peptides, nucleotides, lipids, isoprenes, steroids and alkaloids.
Course Aims: The aim of the course in organic chemistry 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 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, laboratory work, individual student's work Requirements/Prerequisites: knowledge in inorganic chemistry and physics
Assessment: 2 tests; evaluation of lab work, written final exam
Rating: Running control carried out by the lecturer (2 combined tests, connected with the content of the Organic chemistry II part) D1, and D2. Evaluation of the work in the lab (K1, K2 и K3); Written final exam (Exam) (2 theoretical questions and 2 practice tests)

$$\text{Final rating} = 0{,}1 .(D1+D2)/2 + 0{,}2 .(\frac{K1+K2+K3}{3}) + 0{,}7 \text{ (Exam)}$$

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

PHYSICAL CHEMISTRY – PART II

Semester: 4th semester
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 2 hour exercises
ECTS Credits: 5
Lecturer: Prof. Dr. Boris Shivachev, Asst. V. Markova
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description:
The course in the Physical Chemistry II applies the Thermodynamic method for description of equilibrium and non-equilibrium chemical and electrochemical systems. The material is distributed in four parts as follows: (i) Chemical equilibrium; (ii) Chemical kinetics; (iii) Surface phenomena; (iv) Electrochemistry. The lectures are illustrated by computing and laboratory exercises, solving examples from the lecture and the laboratory material.
Course Aims: The aims of the curriculum of the Physical Chemistry-II are to apply the Thermodynamics and the Physical laws to examining the chemical and electrochemical processes. Students are expected to acquire skills for proper orientation associated with phenomena, effects and processes in chemical and electrochemical systems.
Teaching Methods: lectures and practical exercises.
Requirements/Prerequisites: The knowledge of thermodynamical principles and laws.
Exam: final written exam
Assessment: 2 tests on the lecture material D1, D2; 2 tests on practical material K1, K2; written final exam
Registration for the exam: Coordinated with lecturer and Students Service Department

OPTICS

Semester: 4th semester
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 2 hour exercises and 1 hours seminars
ECTS Credits: 6
Lecturer: prof. Ljuben Mihov, PhD
Department: Physics, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description:
The discipline "Optics" aims to provide basic training in the field of experimental physics and creates a foundation for mastering the material in the main physical disciplines in the above courses. The curriculum covers the study of the main phenomena related to the propagation of light in vacuum and dielectric media. Based on Maxwell's theory, the main properties of light as an electromagnetic wave and the peculiarities of light interference, diffraction and polarization phenomena are considered.
Course Aims: The aim of the course is for students to acquire lasting knowledge of the basic laws of physics describing the propagation of light in vacuum and dielectric media. Special emphasis is placed on the phenomena of interference and diffraction. The course seeks to form a way of thinking that perceives natural phenomena as interconnected and interdependent processes.

ZOOLOGY

Semester: 4th semester
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 2 hour labs
ECTS Credits: 6
Lecturer: Assistant Professor Emilia Tsankova, PhD
Department: "Geography, Ecology and Environmental Protection", Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course

Annotation:
The course in zoology provides basic knowledge about the structure, functions, classification, evolution and diversity of the animal kingdom. Within the framework of the training, students are introduced to the main types of invertebrates and vertebrates, their anatomy, physiology, development and adaptations to the environment. The course includes a lecture and practical part, with an emphasis on comparative morphology, ecology and the importance of animals for nature and man.
It is intended for students of biological and natural science specialties and creates a basis for further specialized training in the field of biology and ecology ….
Objectives:
The aim of the course is an in-depth study of the features and importance of representatives of the animal kingdom.
The training includes:
• formation of basic knowledge about the structure, physiology, systematics and ecological significance of representatives of the animal kingdom;
• principles of classification of the main taxonomic categories of animals;
• applied aspects of zoology.

PEDAGOGY

Semester: 4 th semester
Hours per week: 2 hours lectures, 2 hours seminars
ECTS credits: 5
Lecturer: Assoc. Dr. Snezhana Popova
Department: Pedagogy, Faculty of Pedagogy.
Assessment form: exam
Type of the exam: written
Cours Tipe: compulsory

Annotation:
The purpose of the preparation of this course is for students to master the scientific bases of institutional organized training. It is important to develop their theoretical thinking, their ability to penetrate into the essence of didactic phenomena and processes, to analyze the legitimate links between tradition and innovation in education, navigate the changing pedagogical reality. Their attention will be offered to current theoretical issues and concepts arising from practice, the system of organized and targeted training in Bulgaria and the world. By modern interpretation of the problems students will be able to master thoroughly the nature, regularities, technology and training.

Content of the course: Scientific status of pedagogy. Personal development - biological and social factors. Role and importance of education and self-education. Family as an educational factor. Educational process. Methods, forms and principles of education. Didactics in the system of scientific knowledge. Learning as a comprehensive educational system. Didactic research and innovations. Learning process. Problem - evolving learning and the formation of higher intellectual skills. Content of the training. Theory of textbooks and academic literature. Principles of training. Methods, approaches and techniques . Assessment and evaluation in education. Organizational systems and training forms. Today's lesson - structuring and typing. Individualisation and differentiation of training. Failure of students in learning and their overcoming.

Educational technology: The training uses, as traditionally established and interactive methods (multimedia presentations, case studies, etc.). Examination grade is based on the successful completion of the written examination and protection of training portfolio. Practical exercises thematically follow lectures. Continuous assessment during the semester grade is based on the fulfilled independent work by students and the verification tests in modules or tests. The share of current assessment is 60% in the final grade of the student.

ANALYTICAL CHEMISTRY - PART 1

Semester: 5th semester
Type of the course: Lectures and exercises
Hours per week: 2 hours lectures, 2 hours exercise per week
ECTS credits: 6
Lecturers: Assoc.prof. Petko Mandzhukov, Ph.D., Assoc.prof. Petranka Petrova Petrova, Ph.D.
University / Faculty / Department: SWU "N. Rilski", Blagoevgrad , bul "Ivan Mihailov " №66 Faculty of Mathematics and Natural Sciences , Department of " Chemistry " e-mail: himia@swu.bg
COURSE STATUS IN THE CURRICULUM: Compulsory
COURSE DESCRIPTION: Basic principles of analytical chemistry. Modeling equilibria in solutions and evaluation of parameters related to chemical analysis. Theory of classical qualitative analysis - systematic analysis in solutions. Basic methods of sampling and preparation of samples. Methods for detection , identification , separation and masking components of the analyzed sample. Basic principles of classical quantitative analysis . Gravimetric analysis. Volumetric analysis. Selecting a method for solving a particular analytical task, selecting indicators and conditions for the analysis. Evaluation of systematic and random errors caused by various factors including the accuracy of the overall analytical procedure.
COURSE AIM: The course aims to introduce students to the basics of classical analytical chemistry and approaches in modeling and evaluation of parameters in equilibrium systems. Provides the basic knowledge necessary for the processing of the classical methods for the quantitative analysis needed to operate main instrumental methods of analysis . Teaching methods: lectures, seminars , and individual work
Prerequisites: Basic knowledge of general chemistry, physical chemistry , and mathematics.
Assessment: Two tests K1 and K2; assessment of laboratory work L, final written exam E.
Final score: = 0.5 x [(K1 + K2) / 2] + 0.2 x [L] + 0.3 x [E]
Note: estimates K1 = K2 = K = Excellent (6) - the student is exempted from written examination and receives a final rating: Excellent (6)
Registration for examination: in agreement with the lecturer and academic department

ATOMIC PHYSICS

Semester: 5th semester
Type of presentation: lectures, exercises
Hours per week: 2 hours lectures, 1 hour exercises
ECTS credits: 5
Lecturer: Assoc.prof. Ralitsa Stanoeva, Ph.D, Ch. Assistant Dr. Krasimir Damov
University/Faculty/Department: SWU "Neofit Rilsky"-Blagoevgrad; 66, Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Mathematics and Physics
Status of the Subject: Compulsory

Subject Description: Introduction to Atomic and Molecular Physics. Structure and Models of the Atom. Hydrogen Atom. Interaction of Atoms with Electromagnetic Radiation, External Electric and Magnetic Fields. Zeeman Effect. Intermolecular Interactions. Basic concepts of Nuclear Physics. Nuclear structure. Nuclear Forces. Isotopic Spin. Parity Violation, Neutron-Proton diagrams. Radiation α, β and γ. Nuclear models. Nuclear reactions. Neutron Physics. Fission. Fusion. Nuclear reactors. Basic concepts of Radiation Safety. Elementary particles.
Specific Goals of the Subject: The students acquire basic knowledges required about Atomic and Nuclear Physics. Material is selected depending of the specificity of the speciality. For that reason some specific topics are presented which are not included in the Physics programme for non-physical students.
Pedagogical Methods: Lectures are visualised by demonstrations and laboratory tasks performance during the laboratory classes. From methods point of view teaching material is grouped in sections by logical consistency from Structure of Atoms and Atomic and Nuclear Models to Nuclear Physics. Practical topics are directed to the laboratory classes.
Preliminary Requirements: Basic knowledge in General Physics and Maths.
Subsidiary Materials: Educational literature on Atomic and Nuclear Physics and printed materials on the topics given by lecturer.
Evaluation Method: Written examination. Some intermediate tests conduct through the semester. **Inscribing for tuition:** Not necessary.
Inscribing for exam: Agreement with the lecturer.
Note: The lecture course is suitable for students of all natural and technical sciences.

METHODOLOGY OF MAN AND NATURE TEACHING

Semester: 5th semester
Type of presentation: lectures, seminars
Hours per week: 4 hours lectures, 1 seminars
ECTS credits: 7
Lecturers: Senior Assistant Professor Dr. Damiana Grancharova, Assistant Professor Dr. Alexandra Tencheva
Department: Chemistry. Faculty of Natural Sciences and Mathematics
Status of the Subject: Compulsory

Subject Description:

The course aims to prepare students for teaching activities in Man and Nature in primary and secondary schools, specialized high schools and others. The main place is

occupied by the acquisition of a system of theoretical and practical knowledge and the building of competencies in future teachers for organizing and carrying out the educational and cognitive activity of students. Particular attention is paid to the relationship between the subject and practice, as well as to the problems of environmental protection.

Students must have basic knowledge of physics, chemistry, biology, pedagogy, educational psychology and information and communication technologies in education, as well as to know the curriculum of the school course in Man and Nature. The mastering of the material provided in the course is the basis for the successful conduct of the hospice, current and pre-diploma pedagogical practice.

CLASSROOM OBSERVATION OF MAN AND NATURE

Semester: 5th semester
Type of presentation: Exercises
Hours per week: 2 hours exercises
ECTS credits: 2
Lecturers: Assistant Dr. Alexandra Tencheva
Department: Chemistry, Faculty of Mathematics and Natural Sciences
Status of the Subject: Compulsory

Course Description:

The course "Classroom observation of man and nature" is included as mandatory in the curriculum for the specialty "Pedagogy in Chemistry and Man and Nature teaching". It is held in parallel with the lectures on the Methodology of chemistry teaching and meets the requirements for the practical training of students receiving the qualification "teacher". The full implementation of the course provides the basis for successful implementation of both current and undergraduate pedagogical practice in chemistry. Students must have basic knowledge of chemistry, pedagogy, pedagogical psychology, methodology of teaching chemistry and information technology in education, as well as knowledge of the content of the school course in Man and Nature (chemistry module) for 5th and 6th grade and Chemistry and environmental protection 7-12 grade.

Course Aim:
The main goal is to give students basic knowledge about the practical implementation of school activities.
To build skills for observation and analysis of chemistry lessons, to form skills for planning, organization and management of students' cognitive activity.

ECOLOGY

Semester: 5th semester
Type of presentation: lectures, exercises
Hours per week: 2 hours lectures, 1hour exercises
ECTS credits: 3
Lecturer: Assistant Professor Emilia Tsankova, PhD
Department: “Geography, Ecology and Environmental Protection” Faculty of Mathematics and Natural Sciences
Status of the Subject: Compulsory
Course Description:

The academic discipline "Ecology and Environmental Protection" provides fundamental theoretical knowledge about the levels of organization of living matter with a focus on the basic principles, laws and concepts in ecology as a science of the relationships between organisms and their environment. The program focuses on understanding ecological processes at different levels of organization of the macrosystem - from population to biosphere. Topics related to the structure and functioning of ecosystems, biogeochemical cycles, population dynamics and biodiversity, as well as the impact of human activity on the natural environment are included. Special attention is paid to environmental factors and the degree of their impact on organisms. Issues related to the impact of climate change on the organismal world are addressed. Global environmental problems and the protection of biological diversity are considered. The discipline combines theoretical knowledge with practical skills for monitoring, analysis and assessment of environmental problems and offers a basis for sustainable use of natural resources and environmental protection.

Course Objectives:

The course "Ecology and Environmental Protection" aims to familiarize students with the basic ecological principles, the structure and functioning of ecosystems, the interaction between living organisms and the environment, the adaptation of organisms to the environment, as well as contemporary environmental problems caused by human activity in accordance with modern educational requirements for the acquisition of knowledge, skills and competencies.
The main objectives of the training are:
1. Formation of in-depth theoretical and factual knowledge of the ecological principles and laws that govern life and the interaction between organisms and their environment.
2. Development of analytical thinking through understanding the complex interrelationships in natural systems and the ability to interpret ecological data.
3. Awareness of the role of man in ecosystems and acquisition of an ecological culture aimed at responsible and sustainable behavior.
4. Building practical skills for observing, collecting and analyzing information from the environment through laboratory exercises and field studies.

ASTRONOMY

Semester: 5th semester
Type of the course: lectures and seminars
Hours per week: 2 hours lectures, 1 hour seminars
ECTS Credits: 3
Lecturer: Assoc. Prof. Ralitsa Stanoeva
Department: Physiscs, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course

Short Description : The course in Astronomy gives concept for our Universe, for the astrophysical objects and the processes going in it and creates grounding for acquaintance with the newest achievements of the modern science, in which the processes in the micro and macro space determine and overlay each other temporarily, being at the same time a subject of studding in new scientific branches, closely related with the modern all-wavelengths astronomy and astrophysics in exceptionally wide energetic range: from 1eV to 20 10 eV. Special attention is paid to the structure of our Galaxy, its place in the Universe and its relationship with other astronomical objects. The visual positions and movements of the

celestial objects, including the Sun, the planets and their satellites are examined. An accent is taken on the Solar system and the modern cosmic methods for its examination. A subject of explanation in details is the connection between the observed characteristics of the stars, their inner structure and the respective methods for observation and examination.
Course Aims : The course in Astronomy has the task to acquaint the students with the basic methods and concepts of the classic astronomy and also with the modern ideas for the internal structure if the stars, their evolution, and the related with it observational characteristics.
Teaching Methods : lectures, tutorials, individual student's work
Requirements/Prerequisites : knowledge in common physics, nuclear physics.
Assessment : Written exam after the end of the lecture course.
Registration for the Course : Not necessary
Registration for the Exam : Coordinated with the lecturer

SPORT

Semester: 5st semester
Type of the course: exercises
Hours per week: 1 hour exercises
ECTS credits: 0
Department: Sport and Kinezitherapy, Faculty of Public Health and Sports.
Course Status: Compulsory course
Short Description:
Activities in the course "Sport" are designed for students in first and second year of bachelor specialty "Chemistry and Physics ". 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

ANALYTICAL CHEMISTRY - II part

Semester: 6th semester
Type of the course: Lectures and exercises
Hours per week: 2 hours lectures, 2 hours exercises
Number of credits: 6 credits
Lecturers: assoc.prof. Petko Mandzhukov, Ph.D., assoc.prof. Petranka Petrova, Ph.D.
University / Faculty / Department: SWU " N. Rilski", Blagoevgrad , bul "Ivan Mihailov " № 66 Faculty of Mathematics and Natural Sciences , Department of " Chemistry"
Course status in the curriculum: Compulsory
Course description: General stages of the analysis using instrumental methods. Absolute and relative methods, calibration and basic metrological characteristics of instrumental analytical methods. Potentiometry and spectrophotometry. Principles of atomic spectral , electrochemical magnitohimichnite, chromatographic and radiochemical methods.
Course aim: The course aims to familiarize students with the basic principles of the most commonly used instrumental methods for determination of various analytes in different

samples. The physical basis, the advantages and limitations of the commonly used analytical methods are discussed. The aim is to equip students with the knowledge necessary to select the appropriate analytical method for solving a particular analytical task. Special attention is paid to the specifics of the analysis of trace elements.
Teaching methods: lectures, seminars, and individual work
Prerequisites: Basic knowledge of general chemistry, physical chemistry , and mathematics course completion Analytical Chemistry Part I .
Assessment: Project K; assessment of laboratory work L , written final exam E Final score: = 0.5 x [K] + 0.2 x [L] + 0.3 x [E] Registration for examination: in agreement with the lecturer and academic department regulations.

METHODOLOGY OF CHEMISTRY TEACHING -1

Semester: 6th semester
Type of the course: lectures and seminars
Hours per week: 2 hours lectures, 1 hour seminar
ECTS Credits: 2.5
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturers: Senior Assistant Professor Dr. Damiana Grancharova, Assistant Professor Dr. Alexandra Tencheva
Course Status: Compulsory course

Short Description: General Didactics in Teaching Chemistry includes: didactics in teaching chemistry, methods of scientific pedagogical researches in general didactics, aims, contents, forms and means of chemistry education and environmental protection; educational chemical experiment. Special methods of didactics in teaching chemistry includes: national educational requirements for the school content, school programs in 5-10 the grade, classical ideas on matter structure, theory of electrolytic dissociation, valence and oxidation state, inductive study on chemical elements – alkali metals and halogens, periodical law and periodical system, deductive learning of chemical elements, as well as organic chemistry.
Course Aims: The course aims to prepare students for their future teaching activities at the primary and secondary schools. A general place takes system an acquiring of theoretical and practical knowledge, formulation of contemporary intellectual, personal and social competences. Special attention has to be laid on the connection between chemistry and practice, as well as the problems of the environmental protection.
Teaching Methods: Presentations of lectures and seminars are by mans of slides, CD - multimedia, school experiments.
Requirements/Prerequisites: The basic knowledge on Chemistry, Pedagogy, Pedagogic Psychology and Audiovisual and Information Technology in education.
Exam: final written exam
Assessment: 3 homework D1,D2,D3; 2 tests K1, K2 (project); written final exam
Rating: = $0{,}2.(\frac{\mathbf{D}1+\mathbf{D}2+\mathbf{D}3}{3}) + 0{,}5.(\frac{\mathbf{K}1+\mathbf{K}2}{2}) + 0{,}3$ (Exam)
Registration for the exam: Coordinated with lecturer and Students Service Department

CLASSROOM OBSERVATION OF CHEMISTRY

Semester: 6th semester

Type of the course: exercises
Hours per week: 1 hour exercises
ECTS Credits: 2
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturers: Assistant Professor Dr. Alexandra Tencheva
Course Status: Compulsory course
Short Description: The course is held parallel to the course " Methodology in Chemistry" according to requirements of the students practical preparation. This course provides the basic of successful leading of current and pre diploma pedagogical practices in chemistry. Basic knowledges of Psychology, Pedagogy, Pedagogy Psychology, Didactics in Teaching Chemistry and Audiovisual and information technologies in teaching, as well as a school course of Chemistry and environment protection (for the 6-12 grades) are required.
Course Aims: The aim of the course classroom observation in school is to prepare students for their teaching practice in chemistry. Main focus of the course is the observation and lessons analyses in chemistry in order to help students to acquire a model of theoretical knowledge and practical know-how. This will help them to build contemporary intellectual, personal and social competencies in organizing and leading teaching activities for their future realization
Requirements: The base knowledge on chemistry, physics and biology from secondary school is requested, as well as the knowledge on university courses on psychology, pedagogy and didactics in chemistry and physics teaching.
Assessment: current control

NUCLEAR PHYSICS

Semester: 6th semester
Type of presentation: lectures and exercises
Hours per week: 2 hours lectures and 1 hour exercises
ECTS credits: 4.5
Lecturer: Assoc. Prof. Dr. Ralitsa Stanoeva; Senior Assoc. Prof. Dr. Krasimir Damov
University/Faculty/Department: SWU "Neofit Rilsky"-Blagoevgrad; 66, Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Mathematics and Physics
Status of the Subject: Compulsory
Subject Description: Introduction to Nuclear Physics. Structure and Models of the Atom. Hydrogen Atom. Interaction of Atoms with Electromagnetic Radiation, External Electric and Magnetic Fields. Zeeman Effect. Intermolecular Interactions. Basic concepts of Nuclear Physics. Nuclear structure. Nuclear Forces. Isotopic Spin. Parity Violation, Neutron-Proton diagrams. Radiation α, β and γ . Nuclear models. Nuclear reactions. Neutron Physics. Fission. Fusion. Nuclear reactors. Basic concepts of Radiation Safety. Elementary particles.
Specific Goals of the Subject: The students acquire basic knowledges required about Nuclear Physics. Material is selected depending of the specificity of the speciality. For that reason some specific topics are presented which are not included in the Physics programme for non-physical students.
Pedagogical Methods: Lectures are visualised by demonstrations and laboratory tasks performance during the laboratory classes. From methods point of view teaching material is grouped in sections by logical consistency from Structure of Atoms and Atomic and Nuclear Models to Nuclear Physics. Practical topics are directed to the laboratory classes.
Preliminary Requirements: Basic knowledge in General Physics and Maths.

Subsidiary Materials: Educational literature on Atomic and Nuclear Physics and printed materials on the topics given by lecturer.
Evaluation Method: Written examination. Some intermediate tests conduct through the semester.
Inscribing for tuition: Not necessary.
Inscribing for exam: Agreement with the lecturer.
Note: The lecture course is suitable for students of all natural and technical sciences

METHODS AND TECHNIQUE OF SCHOOL EXPERIMENT OF MAN AND NATURE

Semester: 6th semester
Type of the course: exercises
Hours per week: 2 hours exercises
ECTS Credits: 4
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturer: Assistant Professor Dr. Alexandra Tencheva
Course Status: Compulsory course

Short Description
Discipline is an essential link in the training of future teachers of Man and Nature. Its study is aimed at mastering the methodology and technique of the teaching experiment in high school. The program allows a close connection between the theoretical knowledge of students about specific physical and chemical phenomena and processes and the practical implementation of the selected, in accordance with them, a variety of laboratory tasks. Their development is precisely in line with the curriculum of Man and Nature in high school. Some of them can also be used in primary school.
Course Aims:The main goal of the course is for students - future teachers to acquire professional skills for complex development and practical implementation of lessons on the content of the subject "Man and Nature" in 5th - 6th grade.

Teaching methods: practical exercises, discussion and individual work.
Prerequisites: Basic knowledge of Man and nature and Methodology of Man and nature teaching.

METHODOLOGY OF CHEMISTRY PROBLEMS SOLVING

Semester: 6th semester
Type of the course: lectures and seminars
Hours per week: 2 hour lectures and 1 hour seminars
ECTS Credits: 3
Department: Chemistry, FMNS.
Lecturers: Senior Assistant Professor Dr. Damiana Grancharova, Assistant Professor Dr. Alexandra Tencheva
Course Status: Compulsory course
Short Description:
The training in the discipline includes consideration of the mode of resolving problems used in the teaching of Chemistry and Environmental Protection in secondary school. The basic concepts and regularities used in the calculations are studied. The different types of problems,

the different approaches for solving them, as well as their use in the learning process are considered. An overview of more complex problems used in student competitions is made.

Course Aims:

The aim of the course is to prepare students for the practical use of problems in teaching chemistry and environmental protection and the implementation of a modern learning process. The possibilities for using the problems in consolidating the knowledge in chemistry, for the creation of interdisciplinary connections, in the control, self-control and assessment of the students are considered. In this way, this course will increase the quality of chemistry teacher training.

Teaching methods: lectures and practical implementation of the studied topics on specific examples.

Prerequisites: Good knowledge of the school course in chemistry and the courses in Inorganic Chemistry, Analytical Chemistry and Physical Chemistry.

Evaluation: Development and defense of a project to develop a problem that meets certain conditions.

Registration for the exam: agreed with the teacher and the department

METHODOLOGY OF CHEMISTRY TEACHING -2

Semester: 7 semester

Type of course: lectures, seminars

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

Number of credits: 6 credits

Department: Chemistry, UK-2, PMF, 66 Ivan Mikhailov Str., Tel. 073 83 18 25

Discipline status: Mandatory

Lecturers: Senior Assistant Professor Dr. Damiana Grancharova, Assistant Professor Dr. Alexandra Tencheva

Description of the course:

The course is basic for the training of future teachers and allows acquaintance with modern requirements for teaching curriculum in Chemistry and Environmental Protection in 7th-12th grade of the Bulgarian school in accordance with state educational requirements.

The mastering of the material provided in the course is the basis for the successful implementation of the hospice, current and undergraduate pedagogical practice.

Aim of the course:

The course aims is to prepare students for teaching chemistry in primary and secondary schools. The main place is occupied by the acquisition of a system of theoretical and practical knowledge, the building of modern intellectual, personal and social competencies in future teachers for organizing and carrying out the educational and cognitive activities of students in chemistry. Particular attention is paid to the connection of chemistry with practice, as well as the problems of environmental protection.

Teaching methods: lectures, discussions, interactive methods

Prerequisites: Students must have basic knowledge of chemistry, pedagogy, educational psychology and audiovisual and information technology in education, as well as know the curriculum of the school course in Man and Nature and Chemistry and Environmental Protection.

Registration for the exam: agreed with the teacher and the training department

METHODOLOGY AND TECHNIQUE OF THE SCHOOL EXPERIMENT IN CHEMISTRY

Semester: 7 semester
Type of course: lectures, exercises
Hours (weekly): 2 hours lectures, 2 hours exercises
Number of credits: 8 credits
Department: Chemistry, FMNS, 66 Ivan Mihailov Str., Tel. 073 83 18 25
Lecturers: Senior Assistant Professor Dr. Damiana Grancharova, Assistant Professor Dr. Alexandra Tencheva
Status of the discipline in the curriculum: mandatory
Description of the course:
The course is intended after the course "Methodology of chemistry teaching" and simultaneously with the Current pedagogical practice"". Students should be acquainted not only with the various technical requirements for performing chemical experiments, but also with their role in the organization of the cognitive process in chemistry in high school.

Aim of the course: Mastering basic experimental techniques, as well as discussing methodological ideas about the role, place and importance of chemical experiment in the process of chemistry teaching in middle school. The exercises allow to acquire skills and abilities for efficient and safe performance of chemical experiments in primary and secondary school.

Teaching methods: lectures, discussions, interactive methods
Prerequisites: Students must have basic knowledge of psychology, didactics and methodology of chemistry teaching, as well as to know the content of the school course in chemistry and environmental protection 6-12 grade.

Assessment: Each student must prepare two homeworks (D1 and D2) related to the study content. In the course of the semester there is a current control (CC), and at the end - a final control (FC). They are related to individual demonstration and methodological justification of experiments on a predetermined topic. The final assessment is based on homework and controls.
Final grade = 0.3 (D1 + D2) / 2 + 0.7 (CC + FC) / 2
Each student is admitted to the final control after the completion of 90% of the exercises and receiving an overall grade from homework and current control over the average (3.00).
Enrollment for training in the discipline:
Registration for the exam: agreed with the teacher and the training department

GENERAL BIOLOGY AND BASIS OF BIOCHEMISTRY

Semester: 7 th semester
Course Type: lectures
Hours (weekly): 2 hours lectures
ECTS Credits: 3
Lecturer: Prof. Ivanka Stankova PhD
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory

Short Description: Study the structure of the cells, structure and function of cell's membrane, the different cell's components, the different cell-divisions, chemistry processes and general metabolic chains in the alive organisms; the enzymes, their mechanisms of action; the biological oxidation.
Course Aims: The aim of the course in Biochemistry is to give the students knowledge about main biochemistry processes in the organisms, biological oxidation and transformation of energy in the cells. The students get an idea about regulating, monitoring and integrating of biochemical processes in the organisms.
Teaching Methods: Lectures with demonstration of schemes and figures, regular tests.
Assessment: Two tests T1 и T2 and Final exam
Rating: 0,4 [(T1+ T2):2] + 0,6 (Exam)
Requirements: Knowledge in Chemistry, Biochemistry and Biology.
Exam: final exam

FIELD PRACTICE IN BIODIVERSITY

Semester: 7th semester
Type of course: exercises.
Hours (weekly): 1 hour of exercises
Number of credits: 1 credit
Teachers: Senior Asst. Prof. Dr. Vesselina Dalgacheva, dalgacheva@swu.bg
Department: GEOES, PMF, UK-4, Blagoevgrad
Course status: Compulsory

Course description:
The course is of practical focus, aiming to introduce students to topics related to the nature and importance of biodiversity at the species, genetic, ecosystem level.
Course objective:
The course objective is for students to acquire good theoretical and practical preparation for the nature, features and conservation of biological diversity in Bulgaria.

SCHOOL-BASED TEACHING PRACTICUM OF CHEMISTRY

Semester: 7 th semester
Type of the course: exercises
Hours per week: 2 hours exercises
ECTS Credits: 2
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturers: Assistant Professor Dr. Alexandra Tencheva
Course Status: Compulsory course
Short Description: The course is led according to the lectures of the courses "Didactics and techniques of chemistry experiment in school" and "Classroom observation" and the requirements for practical preparation of the students who will receive "teacher" qualification. This course assures the basics of successful leading of pre-diploma pedagogical practice in chemistry. The current pedagogical practice in chemistry can be led only on condition that the student is covered successfully exams in general and inorganic chemistry, physical chemistry, analytical and organic chemistry.
Course Aims: The aim of the course is to give students abilities for planning, preparation and realization of the lessons for "Human and nature" (5th and 6 th grade) and "Chemistry and environment protection" (7th, 8th and 9 th grade). Each student should prepare and present at

least two lessons for different grades. Other students from the group prepare individually a planscenario of the lesson, observe their colleagues and take part in the discussion after the lesson. Thus, the students have the opportunity to compare planned and realized lessons, to defende of proposed plans and new ideas.
Requirements: The base knowledge on chemistry, physics and biology from secondary school is requested, as well as the knowledge on university courses on psychology, pedagogy and didactics in chemistry and physics teaching.
Assessment: current control

SCHOOL-BASED TEACHING PRACTICUM OF MAN AND NATURE

Semester: 7 th semester
Type of the course: exercises
Hours per week: 2 hours exercises
ECTS Credits: 2
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturers: Assistant Professor Dr. Alexandra Tencheva
Course Status: Compulsory course
Short Description:
The course is included as mandatory in the curriculum for the specialty "Chemistry and man and nature". It is held after the lectures on “Didactics and techniques of chemistry experiment in school” and “Classroom observation” and meets the requirements for the practical training of students receiving the qualification "teacher". The full implementation of the current practice provides the basis for successful implementation of the undergraduate pedagogical practice in Man and Nature. The course can be conducted only under the condition that the student has successfully passed the exams in general and inorganic chemistry, physical chemistry, analytical chemistry and organic chemistry.
Course Aims:
The main goal of the course is for the student to acquire skills for planning, preparation and implementation of a lesson on Man and Nature 5th and 6th grade in a specific learning environment. Each student must prepare and deliver a minimum of 2 lessons for different classes. The other students in the group prepare a lesson plan-scenario independently, observe its implementation by the colleague and participate in the discussion.
Thus, there is an opportunity to compare the planned and implemented lessons, defend the proposed developments and generate new ideas.
Teaching methods: discussion, individual work.
Enrollment for training in the discipline: the discipline is mandatory, no special enrollment is required.
Registration for the exam: agreed with the teacher and the study department

SPORT

Semester: 7st semester
Type of the course: exercises
Hours per week: 1 hour exercises
ECTS credits: 0
Department: Sport and Kinezitherapy, Faculty of Public Health and Sports.
Course Status: Compulsory course
Short Description:
Activities in the course "Sport" are designed for students in first and second year of bachelor specialty "Chemistry and Physics ". 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

TRAINEE PRACTICE OF CHEMISTRY

Semester: 8 th semester
Type of the course: exercises
Hours per week: 3 hours exercises
ECTS Credits: 6
Department: Department of Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturers: Assistant Professor Dr. Aleksandra Tencheva
Course Status: Compulsory course
Short Description: The course is led after a “Classroom observations” and a “School-based teaching practicum” and is implemented according to the requirements for students practical preparation for receiving “teacher” qualification. The course ansures successful professional preparation of the future teacher.
Course Aims: The aim of the course is to help students to acquire competencies and skills for preparation and organization of effective teaching process in “Human and nature” (module chemistry) and “Chemistry and environment protection”. During the course the students provide almost all chemistry teacher activities .This helps them both to lead a certain number of lessons and to be aware of teaching documentation, and also to take part in class activities of the students. The trainee practice period ends up with practical examination (lesson leading) in front of a commission, appointed with rector order.
Requirements: The base knowledge on chemistry, physics and biology from secondary school is requested, as well as the knowledge on university courses on psychology, pedagogy and didactics in chemistry and physics teaching.
Assessment: current control

TRAINEE PRACTICE OF MAN AND NATURE

Semester: 8th semester

Type of the course: exercises
Hours per week: 3 hours
ECTS Credits: 6
Department: Department of Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturers: Assistant Professor Dr. Aleksandra Tencheva
Course Status: Compulsory course
Short Description: The cours “Trainee practice of man and nature” is included as mandatory in the curriculum for the specialty "Chemistry and Man and Nature". It is held after the hospitalization and the current pedagogical practice and meets the requirements for the practical training of students receiving the qualification "teacher". The full implementation of the course provides successful professional training of the future chemistry teacher.
Aim of the course: The main goal of the undergraduate pedagogical practice in chemistry is the acquisition of competencies for preparation and organization of full and effective training in Man and Nature. During the internship pedagogical practice, students perform almost all of the activities of the teacher. This allows, in addition to deliver a certain number of lessons, to get acquainted with the educational documentation and to get involved in various extracurricular activities of students. The internship in man and nature ends with a practical-applied exam (teaching a lesson) in front of a commission appointed by the Rector.
Teaching methods: exercises.
Assessment: written exam
Enrollment in the course: it is necessary to submit an application to the academic department at the end of the current semester

COMPETENCE APPROACH AND INNOVATIONS IN EDUCATION

INCLUSIVE EDUCATION

Semester: 8th semester
Type of the course: lectures and seminars
Hours per week: 1 hour lectures and 1 hour seminars
ECTS Credits: 4
Lecturer: Prof. Dr. Pelagia Terziyska
Department: Pedagogy, Faculty of Pedagogy.
Course Status: Compulsory course
Short Description: The course "Inclusive Education" expands and enriches the pedagogical training of students for the major problems in the development of pupils with special educational needs and the specifics of their education depending on their capabilities and needs.
Course Aims:
The main goal of the course is students to acquire sufficient competence for the main characteristics of pupils with special educational needs, for the ways and means, for the forms and methods of correctional-pedagogical interaction with them, for their socio-pedagogical problems and for the conditions that expand opportunities of these students for active participation in the educational process.

DEVELOPMENT OF LESSONS FOR ONLINE TRAINING

ECTS credits: 3
Weekly hours: 2 hours of lectures, 2 hour of seminars
Assessment form: exam
Course status: elective Semester: 6 semester

Lecturers: Assoc. Prof. Dr. Radoslava Kraleva

Abstract: In the 21st century, teachers are expected to have not only in-depth pedagogical knowledge, but also high digital literacy. They must be able to integrate the learning process into a digital environment. This is not always an easy task, as the market is crowded with software products that provide similar capabilities, but often require different levels of computer literacy from the user. On the other hand, the learning resources that can be found on the Internet are not always free, or reliable, or appropriate for the respective age group of students. Therefore, teachers must be able to select the appropriate software products through which to create their own learning resources intended for e-learning.

The course ends with author's development of course projects for each individual topic. Extracurricular activities in the discipline include library work, Internet work, and development of course assignments.

Pedagogical Interaction in a Multicultural Environment

Semester: 6th semester

Type of course: lectures

Hours (weekly): 2 hours of lectures, 2 seminars

Number of credits: 3 credits

Teacher: Senior Asst. Prof. Dr. Mirela Kyuchukova

Department: Pedagogy;

Status of the co Abstract: The course clarifies the essence, characteristics and features of pedagogical interaction in a multicultural environment. The issues of cultural difference in the aspect of their manifestations in the school environment are problematized. The importance of intercultural education for harmonizing cultural differences in the educational space and the intercultural upbringing of adolescents is argued. Specific problems in the process of educational integration of children and students from minority ethnocultural groups are discussed and on this basis pedagogical strategies, approaches and methods for implementing effective pedagogical interaction in a multicultural environment are outlined. Attention is paid to the development of competence for working in a multicultural and inclusive environment.urse in the curriculum: Elective

MANAGEMENT OF EDUCATIONAL INSTITUTIONS

Semester: 6 semester

Type of course: lectures

Hours (weekly): 2 hours of lectures

Number of credits: 3 credits

Teacher: Assoc. Prof. Dr. Blaga Djorova

Department: Pedagogy, FP, MC 1

Status of the course in the curriculum: Elective

Course description: The course allows students to increase their professional competence by enriching their administrative and legal literacy. During the training process, problems related to the structure, organization and philosophy of education are presented and discussed.

Course objective: To familiarize students with the management of educational institutions and develop competencies in terms of knowledge and skills.

Teaching methods: lectures

Assessment: written exam
Registration for training in the course: not necessary
Registration for the exam: agreed with the teacher and the academic department

COMMUNICATION SKILLS IN EDUCATIONAL ENVIRONMENT

Semester: 6 semester
Type of course: lectures
Hours (weekly): 2 hours of lectures
Number of credits: 3 credits
Teacher: Prof. Dr. Gergana Dyankova
Department: Pedagogy, FP, MC 1
Status of the course in the curriculum: Elective

Description of the course: The proposed course clarifies and analyzes the communicative competence of the teacher as a primary resource for implementing effective pedagogical interaction. Specific tools from the field of communicative behavior that optimize pedagogical communication are emphasized.
Course objective: The main objective of the course is to familiarize students with the theoretical foundations, characteristics and functions of communication and to form skills for application in pedagogical practice with a view to optimizing the educational environment.
Teaching methods: lectures
Assessment: written exam
Registration for training in the discipline: not necessary
Registration for exam: agreed with the teacher and academic department

INCLUSIVE EDUCATION FOR CHILDREN AND STUDENTS WITH SPECIAL EDUCATIONAL NEEDS

Semester: 6 semester
Type of course: lectures
Hours (weekly): 2 hours of lectures
Number of credits: 3 credits
Teachers: Prof. Dr. Pelagia Terziyska
Department: Pedagogy, FP, MC 1
Status of the course: Compulsory

Description of the course:
The course expands and enriches the pedagogical preparation of students for the main problems of the development of students with special educational needs (SEN) and the specifics of their education.
Objective of the course: The main objective is for students to acquire sufficient competence in the main characteristics of SEN, in the ways and means of correctional and pedagogical interaction with them.
Teaching methods: lectures and seminars.
Assessment: written exam
Registration for training in the discipline: not necessary
Registration for exam: agreed with the teacher and academic department

STEM EDUCATIONAL TECHNOLOGIES IN TEACHING NATURAL SCIENCES, MATHEMATICS, AND INFORMATICS

Semester: 6th semester
Course type: Lectures and Laboratory Exercises
Hours (weekly): 1 lecture hour, 1 laboratory hour
Credits: 3.0 ECTS
Department: Department of Mathematics, Faculty of Natural Sciences and Mathematics, South-West University "Neofit Rilski" – Blagoevgrad,
Status in the curriculum: A compulsory course in the curriculum of the specialty "Pedagogy of Teaching Mathematics, Informatics, and Information Technologies."

Course description:

The course introduces students to an educational environment – a STEM center – that enables visualization of various aspects of the curriculum through the implementation of innovative technologies and software solutions. It is aimed at future mathematics teachers to enrich the teaching process and bring real-world relevance to the classroom.

Course objective:

The goal of the course is to familiarize students with the STEM environment, helping them develop creativity when working with students and prepare them for successful future careers in diverse fields. It aims to enhance their logical thinking, problem-solving skills, digital literacy, and emotional intelligence.

Teaching methods:

- STEM modeling methods
- Use of experiments and augmented reality in STEM education
- Blending of virtual data (audiovisual and multimedia content)
- STEM research approach
- Practical work and internet-based simulations
- STEM methods for hands-on activities using situational methods
- Simulating real-world problems
- Integration of traditional/standard teaching methods with STEM approaches

Assessment:

The primary form of student knowledge assessment is a written exam. Knowledge and skills are graded using the Bulgarian six-point grading system:

- Excellent (6)
- Very Good (5)
- Good (4)
- Satisfactory (3)
- Poor (2)

Assessment procedures applied during the course include: ongoing assessment, continuous evaluation, and the final exam.

If a student receives a failing grade (“Poor”) from the ongoing assessment, they must meet additional criteria to achieve at least a “Satisfactory” grade before being allowed to take the final exam.

Course enrollment: Automatically enrolled (compulsory course)

Exam enrollment: Coordinated with the instructor and Academic Office

INNOVATIVE STEM METHODS IN NATURAL SCIENCE TEACHING

Semester: **7th** semester
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 2 hours of exercises
Number of credits: 4
Department: Chemistry, UK-2, 66 Ivan Mihaylov Str., tel. 073 83 18 25
Teachers: Senior Asst. Prof. Dr. Damyana Grancharova
Status of the course in the curriculum: elective Description of the course: Course Description: The program is structured in two modules: "STEM Teaching Methods in Natural Sciences" and "Innovative Techniques in Green STEM Education". Topics include the nature of natural sciences, sustainable observation methodologies, modeling of ecological systems, experiments involving augmented reality, and other modern methods.
Purpose of the course: The main objectives of the program are:

1. Exploring Contemporary Approaches to Teaching in Natural Sciences: Students will gain insight into contemporary teaching methodologies specifically designed for natural sciences education.

2. Establishing Skills for Innovative Teaching Approaches: Building fundamental knowledge of new and inventive teaching techniques related to green STEM.

3. Analyzing Different Innovative Approaches: Examining and evaluating different green STEM innovative pedagogical methods that are essential for understanding and engaging with natural sciences.

Course Objective: This course aims to equip students with fundamental pedagogical knowledge, while using modern teaching tools and methodologies. Active student participation is encouraged to facilitate a deeper understanding of the concepts of STEM technologies and Green STEM.

Assessment: The main form of testing and assessing students' knowledge is the written exam. Students' knowledge and skills are assessed using a six-point system, which includes: Excellent 6, Very good 5, Good 4, Average 3, Weak

Teaching methods: lectures and practical exercises.

BASIC CONCEPTS IN CHEMISTRY

Semester: 7th semester
Type of the course: lectures and exerceses

Hours per week: 2 hour lectures and 1 hour exerceses
ECTS Credits: 4
Department: Chemistry, Faculty of Mathematics and Natural Sciences.
Lecturers: Senior Assistant Professor Dr. Damiana Grancharova, Dr. Aleksandra Tencheva
Course Status: Elective course
Short Description:
The course "Basic concepts in chemistry" discusses the basic ideas and concepts in chemistry in connection with their introduction and study in the subjects Man and Nature and Chemistry and Environmental Protection in high school. Attention is paid to the scientific content of the concepts and inaccuracies that accompany their introduction in school. The concepts are introduced consistently in accordance with the curricula and the State educational requirements.
Course Aims:
The aim of the course is for students to acquire practical knowledge and skills in introducing the basic concepts of Chemistry and Environmental Protection and Man and Nature in school courses. An important element of the training is for the students to be able to continue learning new concepts and introducing them when changing the curriculum and curricula.
Teaching methods: lectures and practical exercises.
Prerequisites: Good knowledge of the school course in chemistry and the courses in Inorganic Chemistry, Analytical Chemistry and Physical Chemistry.
Assessment: Written exam.
Registration for the exam: agreed with the teacher and the department

CONTROL AND EVALUATION IN THE SCIENCE EDUCATION

Semester: 7th semester
Course Type: lectuures and exercesses
Hours (weekly): 2 hours lectures and 1 hour exercesses
ECTS Credits: 4
Department: Chemistry, Faculty of Mathematics and Natural Sciences.
Lecturers: Senior Assistant Professor Dr. Damiana Grancharova
Course Status: Elective
Short Description:
The course aims to prepare students for performing systematic and objective control in the teaching of Chemistry and Environmental protection. They must acquire theoretical and practical training for selection, application and analysis of a system of modern methods, forms and means of control and self-control, assessment and self-assessment of students' learning achievements. To prepare a set of tasks for written control, to analyze the results and evaluate their qualities. To apply appropriate scales for assessing performance. To know the requirements of the normative documents related to the control and assessment in the training.

Teaching methods: lectures and exercises.
Assessment: written exam
Enrollment for the course: not required
Registration for the exam: agreed with the teacher and the study department

MODELS IN NATURAL SCIENCES EDUCATION

Semester: 7 semester

Type of course: lectures, exercises.
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Lecturer: Assoc. Prof. Dr. Zhivko Velkov
Department:"Chemistry", Faculty of Mathematics and Natural Sciences, UK 2
Status of the discipline in the curriculum: Elective

Course description: The course introduces students to various computer-visualized models that can be used in teaching chemistry.
Aim of the course: Students to get acquainted with different approaches in modeling the chemical structure, reactivity, transition states and related concepts.
Teaching methods: lectures and exercises.
Assessment: written exam
Enrollment for the discipline: not required
Registration for the exam: agreed with the teacher and the training department

HYGIENE OF CHILDREN AND ADOLESCENT AGE

Semester: 7th semester
Course Type: lectuures and exercesses
Hours (weekly): 2 hours lectures and 1 hour exercesses
ECTS Credits: 4
Lecturer: prof. Vaska Stancheva-Popkostadinova
Department: Public health and sports..
Course Status: Elective
Short Description:
Hygiene of children and adolescents has an interdisciplinary nature with a predominantly prophylactic focus. It is aimed at studying the complex interactions of the growing and developing child and adolescent organism with the factors of the living environment; timely application of adequate activities for health promotion, disease prevention, strengthening of psychophysical development, reduction of morbidity and thus increasing and expanding the opportunities for children and adolescents for successful learning and life realization.
Course Aims:
The aim of the course is students to gain theoretical and practical knowledge in the field of hygiene, age morphology, physiology, psychology, pedagogy and clinical pathology and to acquire practical skills in research and opportunities for optimal adaptation of children and adolescents to the educational process; stimulating adequate health motivation and attitude, increasing knowledge and forming health habits and healthy lifestyle.
Teaching methods: lectures, exercises, coursework development

Course Description: The program is structured in two modules: "Methods of Teaching STEM in Natural Sciences" and "Innovative Techniques in Green STEM Technology EducationSTEM Technology Tools in the Chemistry Laboratory

BIOORGANIC CHEMISTRY

Semester: 5th semester
Type of the course: lectures and laboratory exercises.
Hours per week : 2 lecture hours and 1 hours laboratory exercises
ECTS credits: 4 credits.
Lecturers: Assoc. Prof. Maya Chochkova, PhD

Department: Department of Chemistry, Faculty of Mathematics and Natural Sciences. , SWU "Neofit Rilski", 073-831825
Course Status: Elective course.
Short Description: The structures and biological activities of the universally employed biopolymers by living systems (proteins and peptides, nucleic acids, polysaccharides, lipids, mixed type biopolymers - glycoproteins, nucleoproteins, lipoproteins, glycolipids) will be studied in this course. Moreover, the low molecular weight bioregulators (alkaloids, steroids, vitamins, etc.) will be also discussed. The course Bioorganic chemistry also describes the types of structural variation that have led to the elaboration of effective antimetabolites; the applications of these analogues in the practice, especially in medicine.
Course Aims: The aim of this course is to provide students with skills to allow for the evaluation of a range of methods towards the adoption of an appropriate design decision. The special attention will be paid to structure-activity relationship stuides
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.

BIOELECTROCHEMISTRY

Semester: 5 semester
Type of course: lectures and exerceses
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Lecturer: Assoc. Prof. Dr. Elitsa Chorbadzhiyska
Department: Chemistry, Faculty of Mathematics and Natural Sciences., UK 2
Status of the discipline in the curriculum: Elective

Course description: The curriculum of the discipline Bioelectrochemistry includes lectures and laboratory exercises in theoretical electrochemistry, extended with examples with practical orientation. The course expands and deepens basic knowledge on problems of electrochemistry, introduced in the mandatory courses in "General and Inorganic Chemistry" - Part I and "Physical Chemistry" - Part II.
The lecture material is divided into two modules: "Basic concepts and functions in electrochemical thermodynamics" and "Electrochemical kinetics and important for the practice electrode processes." Unlike other courses in electrochemistry, the proposed course does not include issues related to electrolyte dissociation and transport processes in electrolyte solutions, as these issues are discussed in detail in the abovementioned courses "General and Inorganic Chemistry" - Part I and Physical Chemistry "- Part II.
The laboratory exercises illustrate and supplement the lecture material, giving to students the opportunity to get acquainted with basic electrochemical methods and equipment for their application.
Aim of the course: The aim of the elective course is the students to acquire basic theoretical knowledge and practical skills in the field of electrochemistry through the use of modern teaching methods and tools and their active participation in the learning process.
Teaching methods: lectures and exercises
Assessment: written exam
Enrollment for the discipline: not required
Registration for the exam: agreed with the teacher and the training department

HAZARDOUS ENVIRONMENTAL POLLUTANTS

Semester: 5th semester
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Senior Asst. Prof. Dr. Vesselina Dalgacheva, dalgacheva@swu.bg
Department: GEOES, Faculty of Environmental Sciences, University of Applied Sciences-4, Blagoevgrad
Status of the course in the curriculum: Elective
Description of the course: The main objective of the course is to familiarize students with some of the main sources and substances posing a risk to the environment. Sources and substances posing a risk to human health and the quality of the environment, emitted into the air, water, and soil, are examined and discussed.
Objective of the course: The main objective of the course is to provide theoretical and practical training to students on environmental protection. Basic concepts and terms, regulatory requirements, MPC, pollution prevention measures are considered.
Teaching methods: lectures, exercises, development of course work
Registration for training in the discipline: it is necessary to submit an application to the academic department at the end of the current semester
Registration for the exam: agreed with the teacher and academic department

ECOLOGICAL CHEMISTRY

Semester: 5th semester
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Senior Asst. Prof. Dr. Vesselina Dalgacheva, dalgacheva@swu.bg
Department: GEOES, Faculty of Mathematics and Natural Sciences. , UK-4, Blagoevgrad
Status of the course in the curriculum: Elective
Description of the course: The course introduces students to the basic concepts and laws related to the chemical composition of some of the main pollutants of air, water and soil.
Aim of the course: The course provides theoretical and practical training to students on the problems and challenges of environmental protection.
Teaching methods: lectures and exercises
Assessment: written exam
Registration for the course: not necessary
Registration for the exam: agreed with the teacher and the academic department

FOOD ADDITIVES

Semester: 5th semester.
Type of the course: lectures and laboratory exercises.
Hours per week: 2 hours lecture and 1 hour exercises
ECTS credits: 4 credits.
Lecturers: Prof. Ivanka Stoyneva
Department: Department of Chemistry, Faculty of Mathematics and Natural Sciences. , SWU “Neofit Rilski”, 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 of 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.

STEM TECHNOLOGY TOOLS IN THE CHEMICAL LABORATORY

Semester: 5th semester
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Senior Asst. Prof. Dr. Damyana Grancharova
Department: Department of Chemistry, Faculty of Mathematics and Natural Sciences, Second Building (Building 2**)**
Course Status in the Curriculum: Elective
Course Description: Green Chemistry as a whole aims to promote environmentally friendly behaviour, a change that is essential for sustainable development. In integrating the Sustainable Development Goals (SDGs) into Green Chemistry Education (GCE), an interdisciplinary framework should be considered to explore how cognitive, social and emotional factors interact to promote understanding of environmental issues and problems, and that systems thinking can be used to connect green principles to SGD.

Course Objective: This course aims to equip students with fundamental chemical knowledge while using modern teaching tools and methodologies. Active student participation is encouraged to facilitate a deeper understanding of the concepts of STEM technologies and Green STEM. Updating science education with laboratory experimental work optimized from a green chemistry perspective provides a safer approach to teaching chemistry topics and ensures a safer learning environment by minimizing exposure to potentially hazardous chemicals and reducing waste generated.

Teaching methods: lectures and tutorials
Assessment: written exam
Registration for course training: not required
Registration for exam: agreed with the teacher and the teaching department

PHYSICS OF CONDENSED MATTER

Semester: 6 semester
Type of course: seminars
Hours (weekly): 1 hour seminars
Number of credits: 1 credit
Lecturer: Assoc. Prof. Dr. Mihaela Koleva
Department: Mathematics and physics, Faculty of Mathematics and Natural Sciences;
Status of the discipline in the curriculum: Facultative

Course description: The course " Physics of Condensed Matter " is included as facultative subject. The course has a total workload of 15 hours, of which 15 hours are seminars. Extracurricular activities are 15 hours.
Ongoing control of students' academic achievements is carried out during the semester during the seminars.
The training in the discipline "Physics of condensed matter" ends with a written exam on the content.
Aim of the course: The main aim of the course is the students to acquire knowledge in the field of condensed matter physics, the nature of chemical bonds in condensed matter, the structure of solids and soft condensed matter, elastic, dielectric, magnetic and optical properties of condensed matter.
Teaching methods: seminars.
Assessment: written exam
Enrollment in the course: it is necessary to submit an application to the academic department at the end of the current semester.

PHYSICAL METHODS IN MEDICINE

Semester: 7 semester
Type of course: seminars
Hours (weekly): 1 hour seminars
Number of credits: 1 credit
Lecturer: Assoc. Prof. Dr. Svetoslav Kolev
Department: Mathematics and Physics, Faculty of Mathematics and Natural Sciences, UK1, 66 Ivan Mikhailov Str., Blagoevgrad.
Status of the discipline in the curriculum: Facultative

Course description: The course "Physical methods in medicine" introduces students to the basics of physical methods and their practical use in biology and medicine. The principles and applications of basic diagnostic and therapeutic techniques are considered. The diverse application of physical knowledge, methods and equipment in medicine is shown.
Aim of the course: The aim of the course is for students to acquire lasting knowledge of the basic principles on which modern medical devices operate, their capabilities for diagnosis and treatment. The course demonstrates the direct practical application of the laws of physics in medicine and biology and shows the relationship between theory and practice.
Teaching methods: seminars.
Assessment: written exam
Enrollment in the course: it is necessary to submit an application to the academic department at the end of the current semester.