Pedagogy of Chemistry and Physics Education

I.ANNOTATION

Graduates of the Bachelor's program in "Pedagogy of Chemistry and Physics" receive in-depth theoretical training and practical skills, combining the main areas of chemistry and physics. The program prepares specialists with interdisciplinary knowledge, corresponding to modern European standards. Graduates can work as teachers of chemistry and physics, in research institutes, laboratories for analysis and control, industrial enterprises, as well as continue their studies in master's and doctoral programs in Bulgaria and abroad**.**

II. QUALIFICATION STANDARD

II.1. Field and scope of knowledge

Bachelors in "Chemistry and Physics" must possess general knowledge of: • the basics of higher mathematics and its application in the natural sciences; • the theoretical foundations of the main directions in chemistry: inorganic, organic, analytical, physical chemistry and biochemistry; • the basics of classical and modern physics - mechanics, electrodynamics, thermodynamics, quantum physics; • experimental and theoretical methods in chemistry and physics.

II.2. Area and scope of skills

• conducting laboratory experiments and measurements in the field of chemistry and physics;
• working with analytical, electronic and spectral equipment;
• interdisciplinary application of knowledge in an educational and research environment;
• working with scientific and educational literature, ICT, and preparing teaching materials.

II.3. Competencies

II.3.1.Personal competencies:

• motivation to work in the field of education and science;
• communication, teamwork and social adaptability;
• use of modern technologies in the educational process.

II.3.2.Professional competencies:

• teaching the subjects "Chemistry" and "Physics" in secondary education;

• applying methods for synthesis, analysis and measurement;

• conducting scientific research and interpreting results;

III. CURRICULUM CONTENT

№	NAME OF THE COURSE	Evaluation		CREDITS	Auditory occupancy				Extracurricular activities /in
		semester	form		total	lectures	seminar	exercises	
	I. MANDATORY DISCIPLINES								
1	Mathematics - Part I	I	exam	**5.0**	45	30	15		105
2	Introductory course in physics	I	exam	**2.0**	30	30			30
3	Introduction to inorganic chemistry	I	exam	**2.0**	30	30			30
4	General and Inorganic Chemistry Part I	I	exam	**9.0**	90	45		45	180
5	Mechanics	I	exam	**6.0**	75	30	15	30	105
6	Psychology	I	exam	**4.0**	60	30	30		60
7	Specialized foreign language - Part I	I	exam	**2.0**	30		30		30
8	Sports	I			15			15	45
	TOTAL :			**30.0**	**375**	**195**	**90**	**90**	**585**
9	Mathematics - Part II	II	exam	**7.0**	60	30	30		150
10	General and Inorganic Chemistry Part II	II	exam	**9.0**	75	30		45	195
11	Molecular physics	II	exam	**9.0**	75	30	15	30	195
12	Specialized foreign language - Part I	II	exam	**2.0**	30		30		30
13	Elective course 1: Group I	II	exam	**3.0**	30	30			60

	TOTAL :			**30.0**	**270**	**120**	**75**	**75**	**630**
14	Introduction to organic chemistry	III	exam	**2.0**	30	30			30
15	Organic Chemistry - Part I	III	exam	**10.0**	75	30		45	225
16	Physical Chemistry - Part I	III	exam	**7.0**	60	30		30	150
17	Electricity and magnetism	III	exam	**8.0**	75	30	15	30	165
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
	TOTAL :			**30.0**	**285**	**135**	**15**	**135**	**675**
20	Organic Chemistry - Part II	IV	exam	**8.0**	90	45		45	150
21	Physical Chemistry - Part II	IV	exam	**5.0**	60	30		30	90
22	Theoretical mechanics	IV	exam	**4.0**	45	30	15		75
23	Optics	IV	exam	**6.0**	75	30	15	30	105
24	Elective course 2: Group I	IV	exam	**3.0**	30	30			60
25	Pedagogy	IV	exam	**4.0**	60	30	30		60
	TOTAL :			**30.0**	**360**	**195**	**60**	**105**	**540**
26	Analytical Chemistry - Part I	V	exam	**6.0**	60	30		30	120
27	Electrodynamics	V	exam	**4.0**	45	30	15		75
28	Atomic physics	V	exam	**6.0**	60	30	15	15	120
29	Physics Teaching Methodology – 1	V	exam	**3.0**	45	30	15		45
30	Astronomy	V	exam	**3.0**	45	30	15		45
31	Physics internship	V	That.	**2.0**	30			30	30

32	Elective course 3: Group II (1 subgroup) – methodological chemical disciplines	V	exam	**4.0**	45	30		15	75
33	Elective course 4: Group II (2 subgroup) - methodological physical disciplines	V	exam	**2.0**	30	30			30
34	Sports	V			15			15	45
	TOTAL :			**30.0**	**375**	**210**	**60**	**105**	**585**
35	Analytical Chemistry - Part II	VI	exam	**6.0**	60	30		30	120
36	Physics Teaching Methodology – 2	VI	exam	**3.0**	45	30	15		45
37	Chemistry Teaching Methodology – 1	VI	exam	**3.0**	45	30	15		45
38	Chemistry internship	VI	That.	**2.0**	30			30	30
39	Nuclear physics	VI	exam	**5.0**	60	30	15	15	90
40	Methodology and technique of the school physics experiment	VI	That.	**2.0**	30			30	30
41	Quantum mechanics	VI	exam	**3.0**	45	30	15		45
42	Chemistry problem solving methodology	VI	exam	**4.0**	45	30	15		75
43	Research practice	VI	That.	**2.0**	15			15	45
	TODATL :			**30.0**	**375**	**180**	**75**	**120**	**525**
44	Chemistry Teaching Methodology – 2	VII	exam	**4.0**	45	30	15		75
45	Methodology and technique of the school chemistry experiment	VII	That.	**6.0**	60	30		30	120

46	Methodology for solving physics problems	VII	exam	**5.0**	60	30	30		90
47	Elective course 5: Group III of chemical disciplines	VII	exam	**4.0**	45	30		15	75
48	Elective subject 6: Group IV physical disciplines	VII	exam	**4.0**	45	30		15	75
49	General biology and fundamentals of biochemistry	VII	exam	**3.0**	30	30			60
50	Current pedagogical practice in chemistry	VII	That.	**2.0**	30			30	30
51	Current pedagogical practice in physics	VII	That.	**2.0**	30			30	30
52	Sports	VII	That.		15			15	45
	TOTAL :			**30.0**	**360**	**180**	**45**	**135**	**600**
53	Chemistry internship	VIII	That.	**6.0**	45			45	135
54	Internship in Physics	VIII	That.	**6.0**	45			45	135
55	Inclusive education	VIII	exam	**4.0**	30	15		15	90
56	Компетентностен подход и иновации в образованието	VIII	exam	**4.0**	45	30	15		75
57	Graduation	VIII		**10.0**					**300**
	TOTAL :			**30.0**	**165**	**45**	**15**	**105**	**735**
	TOTAL (hours of compulsory and elective courses)			**240**	**2565**	**1260**	**435**	**870**	**4875**
	II. ELECTIVE DISCIPLINES								
	GROUP 1								
	Pedagogical, psychological, educational-management and private-didactic disciplines								
1	Digital competence and digital creativity	II/IV	exam	**3.0**	30	30			60

2	Developing lessons for learning in an electronic environment	II/IV	exam	**3.0**	30	30			60
3	Pedagogical interaction in a multicultural environment	II/IV	exam	**3.0**	30	30			60
4	Management of educational institutions	II/IV	exam	**3.0**	30	30			60
5	Inclusive education for children and students with special educational needs	II/IV	exam	**3.0**	30	30			60
6	Communication skills in an educational environment	II/IV	exam	**3.0**	30	30			60
7	STEM educational technologies in science, mathematics and computer science education	II/IV	exam	**3.0**	30	15		15	60
	Total number of hours of the disciplines chosen by the group	**II/IV**		**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								
	First subgroup								
1	Innovative STEM methods in science education	V	Exam	**4.0**	45	30		15	75
2	Basic concepts in chemistry	V	Exam	**4.0**	45	30		15	75
3	Control and assessment in science education	V	exam	**4.0**	45	30		15	75
4	Models in science education	V	exam	**4.0**	45	30		15	75

5	Hygiene of childhood and adolescence	V	exam	**4.0**	45	30		15	75
	Total number of hours of the disciplines chosen by the subgroup	**V**		**4.0**	**45**	**30**		**15**	**75**
	Second subgroup								
1	Diagnostics of academic achievements in physics	V	exam	**2.0**	30	15	15		30
2	Modern educational technologies in physics teaching	V	exam	**2.0**	30	30			30
3	Teaching methodology for "Man and Nature" (physics module)	V	exam	**2.0**	30	15		15	30
4	History of physics	V	exam	**2.0**	30	30			30
	Total number of hours of the disciplines chosen by the subgroup	**V**		**2.0**	**30**				30
	GROUP 3								
	Chemical disciplines								
1	Bioorganic chemistry	VII	exam	**4.0**	45	30		15	75
2	Bioelectrochemical systems	VII	exam	**4.0**	45	30		15	75
3	Hazardous environmental pollutants	VII	exam	**4.0**	45	30		15	75
4	Environmental chemistry	VII	exam	**4.0**	45	30		15	75
5	STEM technology tools in the chemistry lab	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 4								
	Physical disciplines								
1	Laser technology	VII	exam	**4.0**	45	30		15	75
2	General metrology	VII	exam	**4.0**	45	30	15		75
3	Radiophysics Total number of hours of the disciplines chosen by the group	VII	exam	**4.0**	45	30		15	75
4	Total number of hours of the disciplines chosen by the group	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**
	Total number of hours of the disciplines being chosen	**VII**		**20.0**	**225**	**180**			**375**
	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	Condensed matter physics	VI	exam	**1.0**	15	15			15
4	Physical methods in medicine	VII	exam	**1.0**	15	15			15
	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 exam in physics (presentation and defense of a lesson); 3. Written state exam in chemistry and physics or defense of a diploma thesis.

Mathematics – part I

Semester: I
Course Type: Lectures and tutorials
Hours per week /FS/SS: 2 lecture hours and 1 tutorial hours /FS
ECTS credits: 5,0
Lecturer: Senior Assist. Prof. Boyana Garkova, PhD
Department: Department of Mathematics and Physics, Faculty of Mathematics and Natural Sciences;
Course Status: Compulsory course in the B.S. Curriculum of Chemistry and Physics.
Short Description: The course includes basic concepts in Linear algebra – matrices, determinants, systems linear equations and Phmethods 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.
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.

INTRODUCTION TO PHYSICS

Semester: I
ECTS credits: 2,0
Weekly workload: 2 + 0 + 0
Form of assessment: Written exam
Statute of the course: Compulsory
Departments: Department of Mathematics and Physics, Faculty of Mathematics and Natural Sciences;
Lecturer: Assoc. Prof. Ralitsa Stanoeva, PhD

Annotation: The course „Introduction to Physics“ is included as a compulsory course in the specialty curriculum „Pedagogy of Teaching Chemistry and Physics“. It is studied from students studying at educational and qualification degree „Bachelor“.

The course „Introduction to Physics“ is with total workload 30 hours lectures. The students’ self-study is 30 hours.

Teaching on the course ends with a written exam.

Course content:

1. Mechanics.
2. Thermal phenomena.
3. Constant electric current.
4. Mechanical oscillations and waves.
5. Electrostatics.
6. Magnetism.
7. Variable electrical current.
8. Electromagnetic waves.
9. Light.
10. Atomic and nuclear physics.
11. Astronomy.

Teaching methods and evaluation:

Lectures are held in a lecture hall, that is equipped with the necessary technique – computer and multimedia projector, using the computer presentations, which are developed in accordance with the educational content of the lectures.

Current control of the students' educational achievements is carried out during the semester. The evaluation of the current control is formed on the basis of the presentation and of the defense of self-developed course assignment from each student. Certification of the semester get students who have received an evaluation of the current control at least „Satisfied 3“ (D).

Teaching on the course ends with a written exam on the educational content. Final evaluation is formed only if the student has received an evaluation of the written exam at least „Satisfied 3“ (D). In forming of the final evaluation are reported the evaluations from the written exam (60 %) and from the current control (40 %).

INTRODUCTION TO INORGANIC CHEMISTRY

Semester: I
Type of course: lectures, laboratory exercises.
Hours (weekly) /3C/: 3 hours of lectures per week, 3 hours of exercises
Number of credits: 9 credits
Teachers: Assoc. Prof. Dr. Elitsa Chorbadzhiyska, Asst. Prof. Dr. Aleksandra Tencheva
Department: Department of Chemistry, Faculty of Mathematics and Natural Sciences;, Second Building (UK2)
Status of the course in the curriculum:
Compulsory course in the curriculum of the specialty “Pedagogy of Education”
in Chemistry and Physics.
Course Description:
The lecture course discusses issues of general chemistry such as: structure of the electron shell, atomic nucleus, periodic law and periodic table of elements, structure of molecules, structure of complex compounds, intermolecular interactions, chemical bonding in

solids, valence of chemical elements, basic concepts in thermodynamics, chemical kinetics, chemical equilibrium, adsorption, catalysis, phase rule, physicochemical analysis, solubility of substances, theory of dilute solutions, electrolyte solutions, colloidal solutions, electrochemical processes and corrosion of metals.
Course Objectives:
The objectives of the General and Inorganic Chemistry Part I program are:
1. Acquisition of chemical knowledge in general chemistry, based on knowledge related to the structure of matter, laws and regularities in nature.
2. Acquisition of dexterity and skills for conducting chemical experiments in a specialized chemical laboratory in inorganic chemistry
3. Development of chemical thinking and independent work with chemical literature
Teaching methods: lectures and exercises.
Assessment: written exam
Registration for training in the discipline: not necessary
Registration for the exam: agreed with the teacher and the academic department

MECHANICS

Semester: I
ECTS credits: 6.0
Weekly hours: 2 l./ 1 s. / 2 l.
Form of assessment: written exam
Status of the course: mandatory
Methodological supervision: Department of Mathematics and Physics, Faculty of Natural Sciences;
Lecturers: Assoc. Prof. Dr. Ralitsa Stanoeva
Annotation: The course “Mechanics” aims to provide basic knowledge and concepts in the field of mechanical phenomena, which are the foundation of physical science.
Course content: The course examines the issues of kinematics and dynamics of a material point in inertial and non-inertial reference systems. The laws of conservation of energy and momentum, mechanics of an absolutely rigid body, mechanical oscillations and waves are discussed. The course also includes issues of fluid mechanics and the theory of relativity.
Teaching and assessment methods: Lectures illustrated with demonstrations of optical phenomena, seminar exercises with solving problems in mechanics.

PSYCHOLOGY

Semester: 1 semester
Type of course: lectures, seminars
Hours (weekly): 2 hours of lectures, 2 hours of seminars
Number of credits: 4 credits
Lecturers: Senior Asst. Prof. Dr. Simona Nikolova
Department: Department of Psychology, Faculty of Philosophy
Status of the course in the curriculum: Compulsory

Annotation: The lecture course introduces students to the main 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 course content 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 exercising 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 learning process in various academic disciplines is carried out according to the credit transfer and accumulation system. Current control includes attendance at lectures, participation in discussions, preparation of presentations, solving tasks, tests, control and coursework. The training in the discipline ends with a written exam on the study 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.

GENERAL AND INORGANIC CHEMISTRY – PART 1

Semester: I

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

Course Type: Lectures and laboratory exercises

ECTS credits: 9

Lecturer: Assoc. Prof. Elitsa Chorbadzhiyska, PhD, Assistant Professor Aleksandra Tencheva, PhD

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.

Exam: Test, current control (lectures and labs), course work and final written exam Final evaluation: FE = 0.7 x CC + 0.3 x WE

MECHANICS

Semester: I
ECTS credits 6,0
Hours per week: 2 Lec./ 1 Sem./ 2 Lab.
Evaluation Method: Written examination. Some intermediate tests conduct through the semester.
Status of the Subject: Compulsory
University: SWU "Neofit Rilski"- Blagoevgrad; 66, Ivan Mihailov Blvd**.**
Faculty: Natural Sciences & Mathematics, Department: Mathematics and Physics
Lecturer: Assoc. Prof. Dr. Ralitsa Stanoeva
Annotation: The discipline "Mechanics" aims to provide basic knowledge and concepts in the field of mechanical phenomena, which appear as the foundation of physical science.
Subject Description: The course deals with the issues of kinematics and dynamics of a material point in inertial and non-inertial reference systems. The laws of conservation of energy and momentum, solid state mechanics, mechanical oscillations and waves are discussed. The course also includes questions on fluid mechanics and the theory of relativity**.**
Pedagogical Methods: Lectures are visualized by demonstrations. During the seminar classes students solve varied problems on optics. Parts of topics with practical importance are directed to the laboratory classes**.**
Evaluation Method: Written examination and some intermediate tests conduct through the semester.

PSYCHOLOGY

Semester: I
ECTS credits: 4
Weekly hours: 2 teaspoons + 2 teaspoons.
Form of assessment: exam
Discipline status: Mandatory
Methodical guide: Department of Psychology, Faculty of Philosophy
Lecturers: Ch. Assistant Professor Simona Nikolova, Ph.D
Annotation: The discipline Psychology has a total workload of 45 hours, of which 30 hours of lectures, 15 hours of seminars and 45 hours of extracurricular activities. It introduces students primarily to the essence of the main directions in psychology, their importance for pedagogical systems; cognitive mental functions and their role in learning; the socio-psychological characteristics of the age periods and the professional position of the pedagogue. Enables students to master a system of theoretical knowledge in the field of Psychology, to make sense of them according to modern requirements of pedagogical practice, to acquire skills for their application in specific situations according to age, to form a positive stereotype of pedagogical activity with psychological determination .
Course content:
The lecture material in the discipline of Psychology is divided into the following

three modules:
First module - Theoretical-historical and introductory problems of psychology, which introduces students to the process of differentiation of psychology as an independent science, the main theoretical and methodological issues developed in it and mental functions.
Second module - Theoretical and applied problems of age psychology, presents to students the main theoretical statements about the psychogenesis of man, the need for its periodization; acquaintance with the mental peculiarities of each age period and their importance in the process of education and training.
Third module - Current issues of pedagogical psychology, dedicated to the assimilation of information about the nature of the main and leading activities, their importance in each age group, the role of the teacher in the implementation of systematic training.
Training and assessment technology:
Teaching methods: lecture (introductory, traditional, summarizing, selective) discussion, examination training. Valuation methods: the total value of 3 credits is converted into 30 conditional units. 15 conditional units are recruited from classroom employment, and 15 conditional units are obtained from independent work. The score from the test for current control is calculated by the formula: 2+ (5 * number of solved topics in the test total number of topics in the test). When evaluated by a test for current control average (3), 2 conditions are given. units; good (4) 3 services are given. units; many good (5) 4 services are given. units; excellent (6) 5 services are given. units. For the evaluation of the theoretical and scientific-practical developments the students are given Instructions for the development of theoretical topics in psychology and Instructions for the development of scientific-practical topics in psychology. 20 conditional units are required for admission to the exam. All assessments are based on written works, which are stored within the period specified by the Regulations for educational activities. They are subject to control by the relevant authorities.

ENGLISH – PART I

Semester: I
Type of the course: seminars
Hours per week /FS/SS: 2 hours /FS/
ECTS credits: 2
Lecturers: Assoc. Prof. Radoslav Chairov, PhD
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.

SPORT

Semester: I, III, V, VII

Type of the course: exersises
Hours per week: /FS/SS: 4 hours exercises /FS and SS/
ECTS credits: 0.0
Department: Sport and Kinezitherapy, Faculty of Public Health and Sports. Course Status: Compulsory course in the B. S. curriculum of Chemistry.
Short Description: Activities in the course "Sport" are designed for students in first and second year of bachelor specialty "Chemistry 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.
Assessment: Current tests.

MATHEMATICS – PART 2

Semester: II
Course Type: Lectures and tutorials
Hours per week: /FS/SS: 2 lecture hours and 2 tutorial hours /FS
ECTS credits: 7,0
Lecturer: Senior Assist. Prof. Boyana Garkova, PhD
Department: Department of Mathematics and Physics, Faculty of Mathematics and Natural Sciences,
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.
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.

GENERAL AND INORGANIC CHEMISTRY – PART 2

Semester: II
Hours per week: 2 hours lectures, 3 hour laboratory exercises
Course Type: Lectures and laboratory exercises
ECTS credits: 9
Lecturer: Assoc. Prof. Elitsa Chorbadzhiyska, PhD, Assistant Professor Aleksandra Tencheva, PhD
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.
Exam: Test, current control (lectures and labs), course work and final written exam. Final evaluation: FE = 0.7 x CC + 0.3 x WE

MOLECULAR PHYSICS

Semester: II
Cours Tipe: Lectures, seminars exercises
Hours per week/FS/SS: 2 lecture hours, 1 seminar hour, 2 laboratory hours per week/SS
ECTS credits: 9 credits
Lecturer: Assoc. Prof. Ralitsa Stanoeva, PhD
University/Faculty/Department: SWU "Neofit Rilski"-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Mathematics and Physics
Status of the Subject: Eligible course
Subject Description: The main topics to be considered:

- Bases of equilibrium thermodynamics
- Thermodynamic and statistical interpretation of basic thermodynamic quantities
- Surface tension
- Variation of physical condition
- Elements of non-equilibrium thermodynamics. Transmission processes – diffusion, thermal conductivity and internal friction.

Specific Goals of the Subject: 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.
Teaching Methods: lectures, laboratory exercises, tutorials, individual student's work, test-papers.

ENGLISH – PART II

Semester: II
Type of the course: seminars
Hours per week /FS/SS: 2 hours /SS/
ECTS credits: 2
Lecturers: Assoc. Prof. Radoslav Chairov, PhD
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course

Short Description: Training course includes the study of: Chemistry lessons in English, Specialized computer testing, Audio Visual System.
Course Aims: Students enrich their knowledge from the first semester to work with the specialized literature.
Teaching Methods: seminars.
Assessment: Three current test and written exam.

INTRODUCTION TO ORGANIC CHEMISTRY

Semester: III
Type of course: lectures and exercises.
Hours (weekly): 2 hours of lectures per week
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 discipline from the curriculum of the specialty “Pedagogy of education in Chemistry and Physics.
Description of the course:
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.
The lecture material includes the following sections: (A) The structural theory and properties of hydrocarbons (alkanes, alkenes, alkynes, alicyclic and aromatic hydrocarbons), (B) functional derivatives of hydrocarbons, (C) organic substances in nature.
The main tasks of the program "Introduction to Organic Chemistry" are:
1. To eliminate ignorance of basic concepts.
2. To acquaint students with the university approach to conducting the educational process.
3. To build a conceptual apparatus in the field of organic chemistry, which will be the basis for the course in Organic Chemistry.
Aim of the course:
To present to the students of the specialty "Pedagogy of teaching chemistry and physics" knowledge of basic concepts and theories in Organic Chemistry, as well as specific knowledge of different types of organic compounds.
Teaching methods: lectures
Assessment: written exam

ORGANIC CHEMISTRY -PART I

Semester: III
Cours Type: lectures, labs work
Hours per week/FS/: 3 lecture hours, 3 labs+tutorial hours per week /FS/
ECTS credits: 10
Lecturer: Assoc. Prof. Dr. Maya Chochkova, Chief Asst. Dr. Kiril Chuchkov

Department: Chemistry, Faculty of Natural Sciences and Mathematics, tel.: 073/ 885381, e-mail: himia@aix.swu.bg.
Course Status: Obligatory course
Short Description: The main object of the lectures is: a study of general theoretical problems: current concepts about the character of the chemical bonds in the molecules of organic compounds, methods for determination of composition, structure reactivity of organic molecules, explanation of general types of organic reactions and their mechanisms, problems of stereochemistry of organic compounds; study of general groups of organic compounds: alkanes, alkenes, alkynes, alkadienes, cyclic compounds, aromatic compounds, alkyl- and aryl halides, organometallic compounds, alcohols and ethers.
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 (labs + tutorials) seek to help the student by understanding and giving a meaning of the lectures, to acquire a habit of constructive application of knowledge, to build up skills in the field of organic chemistry.
Teaching Methods: lectures, laboratory work, individual student's work
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 and E2). Written final exam (Exam) (2 theoretical questions and 2 practice tests) Final rating = 0,1 . (D1+D2)/2 + 0,2 .[(K1+K2+K3)/3] +0,7 (Exam)

PHYSICAL CHEMISTRY – PART I

Semester: III
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 2 hour labs
ECTS Credits: 7
Lecturer: Prof. Boris Shivachev, Assistant Vasilka Markova
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description: The course includes the study of the principles of thermodynamics and their application on the main macroscopic objects: gases and liquids.
The material is divided into the following sections:
I. Fundamentals of thermodynamics;
II. Thermodynamics of open systems.
III. Thermodynamics of solutions and mixtures.
The lecture material is illustrated with laboratory and computational exercises, solving examples from the lecture and laboratory material; the information potential of the Internet is actively used.
Aim of the course:
Introduction to the basic principles of thermodynamics and thermodynamic approaches to describe macrosystems. Application of thermodynamic methods on different systems; qualitative interpretation of various phenomena and quantitative assessment of important thermodynamic parameters.
Teaching methods: lectures, exercises and individual activities.
Assessment: test controls during the semester and a test exam

ELECTRICITY AND MAGNETISM

Semester: III
ECTS credits 8,0
Hours per week: 2 Lec./ 1 Sem./ 2 Lab.
Evaluation Method: Written examination. Some intermediate tests conduct through the semester.
Status of the Subject: Compulsory
University: SWU "Neofit Rilski"-Blagoevgrad; 66, Ivan Mihailov Blvd.
Faculty: Natural Sciences & Mathematics
Department: Department of Mathematics and Physics
Lecturer: Assoc. Prof. Luben Mihov Ivanov PhD
Annotation: Students acquire knowledge about the basic laws describing electrical and magnetic phenomena. It is the basis for other courses taught in the Faculty of Natural Sciences and Mathematics, such as Optics, including electromagnetic light theory, Electrodynamics, Radiophysics and Electronics, Photovoltaics and more.
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
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.

INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING AND WORKING IN A DIGITAL ENVIRONMENT

Semester: III
Type of the course: lectures and laboratory exercises
Hours per week: 1 hours lectures, 1 hours labs/FS
ECTS Credits: 3
Lecturer: Prof. Daniela Tuparova, PhD
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description: The course includes knowledge on theory and practice by means of audio and information technologies in teaching. The course content is connected with the curriculum of the science teaching in the secondary school and optimal applications of different methods in chemistry and physics teaching.
Course Aims: The students need to obtain the theoretical and practical knowledge to use the different type of audio and information technologies in teaching. The end results of the course is

to give possibilities of the students to use successfully audio and information technologies in chemistry teaching as well as to realize a contemporary training process.
Teaching Methods: The lecture and the labs are carried out in a lecture hall equipped with a white magnetic board, multimedia PC system, Internet etc.
Exam: The control and the assessment are carried out during the lectures, the labs and the final project.

ORGANIC CHEMISTRY -PART II

Semester: IV
Hours (weekly): 3 hours lectures, 3 hour lab
Course Type: Lectures, labs and tutorials
ECTS credits: 8.
Lecturer: Assoc. Dr. M. Chochkova, ch. assistant Dr. Kiril Chuchkov
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
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.
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, tutorials, laboratory work, individual student's work
Exam: Test, course work and final written exam: FE = 0.6CC + 0.4EE

PHYSICAL CHEMISTRY – PART II

Semester: IV
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 2 hour labs
ECTS Credits: 5
Lecturer: Prof. Dr. Boris Shivachev, Asst. Vasilka Markova
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description: The lecture material covers the following sections:
I. Chemical equilibrium;
II. Chemical kinetics;
III. Electrochemical thermodynamics and kinetics.
The lecture material is illustrated with laboratory and computational exercises, solving examples from the lecture and laboratory material; the information potential of the Internet is actively used.
Aim of the course: The aim of the course is to acquaint students with the application of the method of thermodynamics to describe chemical equilibrium; introduction of the basic models in

chemical kinetics; basic concepts and laws of electrochemical thermodynamics and kinetics and their applications.
Teaching methods: lectures, exercises and individual activities.
Assessment: test controls during the semester and a test exam

THEORETICAL MECHANICS

Semester: IV
Cours Tipe: Lectures and seminar exercises
Hours per week/FS/SS: 2 lecture hours, 1 seminar exercises hours per week/FS
ECTS credits: 4 credits
Lecturer: Assoc. Prof. Dr. Lyuben Mihov
University/Faculty/Department: SWU "Neofit Rilski"- Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Mathematics and Physics
Status of the Subject: Compulsory
Subject Description: The course considers theoretical bases of Classical Mechanics. The development follows where possible the axiomatic lines, the Newton's concepts of time and space and the variational principle in its Lagrangian and Hamiltonian forms. The equations of motions are derived from these principles. The mechanical systems of harmonic oscillator, particle in central field and solid body are considered in greater detail. A stress is put on the equations of motion, conservation laws and Galilean relativity in mechanics.
Specific Goals of the Subject: Students acquire knowledge about basic principles and properties of the classical mechanical phenomena. The course gives a base for others special courses such as Electrodynamics, Quantum mechanics, Atomic physics etc.
Pedagogical Methods: Lectures and seminar classes. During the seminar classes students solve varied problems on mechanical systems and their description. Parts of topics with practical importance are directed to the seminar classes.
Evaluation Method: Written examination. Some intermediate tests conduct through the semester.

OPTICS

Semester: IV
ECTS credits 6.0
Hours per week: 2 Lec./ 1 Sem./ 2 Lab.
Evaluation Method: Written examination. Some intermediate tests conduct through the semester.
Status of the Subject: Compulsory
University: SWU "Neofit Rilski"-Blagoevgrad; 66, Ivan Mihailov Blvd.
Faculty: Natural Sciences & Mathematics
Department: Department of Mathematics and Physics
Lecturer: Assoc. Prof. Luben Mihov Ivanov Ph.D.
Annotation: Students acquire knowledge about general phenomena and laws of light wave propagation. The course gives a base for others special courses such as Quantum electronics and Optical communication.
Subject Description: The course considers optics phenomena on the base of theory of electromagnetic wave propagation. It starts with Maxwell's equations and describes the general

properties of the light waves. Particular attention is paid to such phenomena as refraction on the dielectric and metal surface, total internal refraction. Important part of the course is the consideration of the interference and the diffraction of the light, some types of interferometers and principles of the working of diffractive gratings. In addition the basic principles of geometric optics are present.
Pedagogical Methods: Lectures are visualized by demonstrations. During the seminar classes students solve varied problems on optics. Parts of topics with practical importance are directed to the laboratory classes.
Evaluation Method: Written examination and some intermediate tests conduct through the semester.

PEDAGOGY

Semester: IV
Cours Type: compulsory
Hours per week: 2 lectures, 2 seminars,
ECTS credits: 4
Lecturer: Assoc. Dr. Snezhana Popova
Department: Pedagogy, Faculty of Pedagogy.
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.
Assessment form: exam

ANALYTICAL CHEMISTRY – PART I

Semester: V
Type of the course: Lectures and exercises
Hours per week / FS / SS: 2 hours lectures + 2 hours exercise per week / FS
ECTS credits: 6 credits
Lecturers: assoc.prof. Petko Mandzhukov, Ph.D., assoc. prof. Petranka Petrova, Ph.D.
Department: 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)

ELECTRODYNAMICS

Semester: V
Cours Tipe: Lectures and seminar exercises
Hours per week/FS/SS: 2 lecture hours, 1 seminar exercises hours per week/FS
ECTS credits: 4 credits
Lecturer: Assoc. Prof. Ralitsa Stanoeva, PhD
University/Faculty/Department: SWU “Neofit Rilski”-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Mathematics and Physics
Status of the Subject: Compulsory
Subject Description: The course considers theoretical bases of classical electrodynamics, the main features of the special theory of relativity being studied first. This allows later apply the Lagrange variational principle to derive the Maxwell equations in their relativistic covariant form and to obtain the field invariants. The more detailed properties of the field are studied on the base of three dimensional form of Maxwell equations, considering first the free field in vacuum, then field with sources and finally field in continuous media, including the nonlinear media.

Specific Goals of the Subject: Students acquire knowledge about basic principles and properties of the classical electromagnetic field. The course gives a base for others courses such as Quantum mechanics, Atomic physics, Astrophysics.
Pedagogical Methods: Lectures and seminar classes. During the seminar classes students solve varied problems on mechanical systems and their description. Parts of topics with practical importance are directed to the seminar classes.
Evaluation Method: Written examination. Some intermediate tests conduct through the semester.

ATOMIC PHYSICS

Semester: V
Cours Tipe: Lectures, seminars and laboratory exercises
Hours per week/FS/SS: 2 lecture hours, 1 seminar hour and 1 laboratory hour per week/SS
ECTS credits: 6 credits
Lecturer: Assoc. Prof. Ralitsa Stanoeva, PhD
University/Faculty/Department: SWU "Neofit Rilski"-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Mathematics and Physics;
Status of the Subject: Compulsory course
Subject Description: Introduction to Atomic and Molecular Physics. Structure of the Atom. The Bohr Model. Atomic Orbitals. Hydrogen Atom. One and Two Electron Atoms. Interaction of Atoms with Electromagnetic Radiation, External Electric and Magnetic Fields. Fine and Hyperfine Structure. Xray Spectra. Zeeman Effect. Balmer Series. Photoelectric Effects. The Periodic Table. The Nature of Chemical Bonds. Molecular Geometry. Intermolecular Interactions.
Specific Goals of the Subject: Students acquire basic knowledges required about Atomic and Molecular 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.
Teaching Methods: Lectures are visualised by demonstrations and laboratory tasks performance during the laboratory classes. Exercises and case studies are decided at seminars. From methods point of view teaching material is grouped in sections by logical consistency from Structure of Atoms and Atomic Models via Interaction of Atoms with External Electric and Magnetic Fields to Fine and Hyperfine Structure and the nature of Chemical Bonds. Practical topics are directed to the laboratory classes.
Requirements/Prerequisites: in General Physics and Maths.
Evaluation Method: Evaluation defined by a written exam and current control of the laboratory and seminar exercises taken certain gravity. Some intermediate tests conduct through the semester.

METHODOLOGY OF PHYSICS TEACHING I

Semester: V
Type of course: lectures, seminars

Hours (weekly) / ZS / LS: 2 hours of lectures + 1 hour of exercises per week / ZS
Number of credits: 3
Lecturers: Assoc. Prof. Dr. Radost Vasileva, University / Faculty / Department: SWU "Neofit Rilski" Blagoevgrad, 66 "Ivan Mihailov" Str. / Faculty of Natural Sciences and Mathematics / Department of Mathematics and Physics;
Status of the discipline in the curriculum: Compulsory course
Description of the course: The course is built in accordance with modern ideas and trends in the development of the methodology of teaching physics as a pedagogical science and in the practice of teaching physics in high school. The first part of the course reveals the theoretical and methodological foundations of the content, organization and management of the educational process in physics in high school and presents the main state-approved educational and methodological documentation.
Aim of the course: The main goal of the course is for students to receive the necessary theoretical training for organizing and conducting an effective educational process in physics in high school, applying appropriate modern didactic technologies. Along with theoretical knowledge, they must acquire a number of important skills of an applied nature. These skills are related to scientific and methodological analysis of teaching material in physics, building criteria for orientation and selection of educational content and forms, tools and methods of teaching its study, methodological development of lessons in physics, planning, organization and management of the cognitive activity of the students, verification and assessment of knowledge, etc.
Teaching methods: lectures, seminars and extracurricular activities
Assessment method: written exam on the lecture material

ASTRONOMY

Semester: V
Type of the course: lectures
Hours per week: 1 hours.
ECTS Credits: 3
Department : Mathematics and physics
Course Status : Compulsory
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 10eV. 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
Assessment: Written exam after the end of the lecture course.

CLASSROOM OBSERVATION OF PHYSICS

Semester: V
Hours per week: 1 lecture class
ECTS credits: 2.0
Type of discipline: Compulsory
Department: Mathematics and physics;
Course description: "Attendance of Physics Lessons" is an inseparable part of the learning course. It is taught simultaneously with the theoretical class in "Methods of Teaching Physics" and fills the requirements for real-time training of the students that are to receive a teaching degree. Successful participation in the learning process builds the foundation not only for the methodological practice course but also for the pre-graduate methodological practice in Physics course.
Objectives and aims: The main purpose of the course is to provide the aspiring teachers with the skills necessary to cope with the challenges in a real-time teaching environment. The participants are expected to: develop a framework for observing and analyzing ongoing classes in Physics; become acquainted with the requirements and the approaches in developing methodological procedures on a given topic; to acquire rudimentary skills in planning, organizing and managing the educational process of a given target group; get competent in public speaking, optimal teaching tempo, setting up student discussions, monitoring class behavior, conducting physical experiments, encouraging student development through individual work etc.
Grading criteria: Results are graded according to the requirements in Regulation 21 of the Bulgarian Ministry of Education from September 30th, 2004, which deals with the system of accumulation and transfer of credits. The total number of credits for the course is 1,5. Grades are based on the following two criteria: continuous assessment and final mark. The final mark is based on the grade from the participation in seminars (SG) as well as the average grade from the turned in home assignments (AG). Both of those grades must be at least passing grades. The final mark is calculated based on the following formula: Final Mark = 0,6*(SG) + 0,4*(AG)

ANALYTICAL CHEMISTRY – PART II

Semester: VI
Type of the course: Lectures and exercises
Hours per week/ FS / SS: 2 hours lectures + 2 hours exercise per week / SS
Number of credits: 6 credits
Lecturers: assoc.prof. Petko Mandzhukov, PhD., assoc. prof. Petranka Petrova, PhD.
Department: " Chemistry " e-mail: himia@swu.bg
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
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]

DIDACTICS IN TEACHING PHYSICS II

Semester: VI
Type of course: lectures, seminars
Hours (weekly) / ZS / LS: 2 hours of lectures + 1 hour of exercises per week / ZS
Number of credits: 3
Lecturers: Assoc. Prof. Dr. Radost Vasileva
University / Faculty / Department: SWU "Neofit Rilski" Blagoevgrad, 66 "Ivan Mihailov" Str. / Faculty of Natural Sciences and Mathematics / Department of Mathematics and Physics
Status of the discipline in the curriculum: Compulsory course
Description of the course: The course is built in accordance with modern ideas and trends in the development of the methodology of teaching physics as a pedagogical science and in the practice of teaching physics in high school. The second part of the course deals with issues related to the main sections and topics of the school course in physics. The emphasis is on the most important structural element in the content of physics education - physical theory. In the context of a physical theory, a scientific-methodological analysis of the studied material is made and on this basis original methodological solutions for presenting the educational content are sought, as they are substantiated from a didactic and psychological point of view.
Aim of the course: The main goal of the course is for students to receive the necessary theoretical training for organizing and conducting an effective educational process in physics in high school, applying appropriate modern didactic technologies. Along with theoretical knowledge, they must acquire a number of important skills of an applied nature. These skills are related to scientific and methodological analysis of teaching material in physics, building criteria for orientation and selection of educational content and forms, tools and methods of teaching its study, methodological development of lessons in physics, planning, organization and management of the cognitive activity of the students, examination and assessment of the knowledge, etc.
Teaching methods: lectures, seminars and extracurricular activities
Assessment method: written exam on the lecture material

DIDACTICS IN TEACHING CHEMISTRY

Semester: VI
Type of the course: lectures and seminars
Hours per week: 4 hours lectures, 1 hour seminar/ SS
ECTS Credits: 3
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Lecturer: Senior Assistant Professor Dr. Damyana Grancharova, Assistant Professor Dr. Aleksandra 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.
Exam: final written exam

CLASSROOM OBSERVATION OF CHEMISTRY

Semester: VI
Type of the course: exercises
Hours per week: 1 hours/SS
ECTS Credits: 2
Lecturer: Assistant Professor Dr. Aleksandra Tencheva
Department: Chemistry, Faculty of Natural Sciences and Mathematics;
Course Status: Compulsory course
Short Description: The course is held parallel to the course "Didactics in Teaching Chemistry" according to requirements of the student's practical preparation. This course provides the basic of successful leading of current and pre diploma pedagogical practices in chemistry. Basic knowledge 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: VI
Cours Tipe: Lectures, seminars exercises
Hours per week/FS/SS: 2 lecture hours, 1seminar hour and 1 laboratory hour per week/SS
ECTS credits: 5 credits
Lecturer: Assoc. Prof. Ralitsa Stanoeva, PhD
University/Faculty/Department: SWU "Neofit Rilski"-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Department of Mathematics and Physics
Status of the Subject: Compulsory course
Subject Description: Basic concepts of Nuclear Physics. Nuclear structure. Nuclear models. Nuclear Forces. Isotopic Spin. Parity Violation. Nuclear reactions. Fission. Fusion. Scattering theory. Neutron Physics. Accelerators. Nuclear reactors. Radiation α, β and γ. Basic concepts of Radiation Safety.
Specific Goals of the Subject: Students acquire basic knowledges required about Atomic and Molecular 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.
Teaching Methods: The lectures are visualised by demonstrations and laboratory tasks performance during the laboratory classes. Exercises and case studies are decided at seminars. From methods point of view teaching material is grouped in sections by logical consistency from Structure of Nuclei and Nuclear Models via Nuclear reactions, Neutron Physics to Radiation and Radiation Safety.
Evaluation Method: Evaluation defined by a written exam and current control of the seminar exercises taken certain gravity. Some intermediate tests conduct through the semester.

METHODS AND TECHNIQUE OF THE SCHOOL PHYSICS EXPERIMENT

Semester: VI
Cours Tipe: Tutorials
Hours per week/FS/SS: 2 tutorial hours per week/FS
ECTS credits: 2 credits
Lecturer: Asst. Todor Cholakov
University/Faculty/Department: SWU "Neofit Rilski"-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Department of Mathematics and Physics
Status of the Subject: Compulsory
Subject Description: Introduction. Kinematics. Dynamics and Statics. Mechanical Work and Energy. Fluid Mechanics. Structure and Properties of Gases, Solids and Liquids. Transition between physical conditions of the substance. Electrostatics. Direct electrical current. Current in different media. Mechanical oscillations and waves. Sound. Magnetism. Optics.

Specific Goals of the Subject: Learning this course is connected with the formation of practical skills and habits in students for organization, preparation and implementation of the physics experiment in education, and all types of the physics experiment are taught. The curriculum allows implementing a close connection between the student's theoretical knowledge about particular physics phenomena and processes, and the practical realization of the various experiments, chosen in accordance with them. Their elaboration is precisely conformed to the high school physics curriculum. The main goal of the course is to prepare students for teaching physics as an experimental science.

Teaching Methods: Students perform demonstration experiments, frontal experiments, laboratory and experimental work. After each laboratory class, students prepare the respective protocols.
Evaluation Method: Current grade at the end of the course. This grade is formed on the basis of the theoretical knowledge and practical skills to perform school physics experiment, demonstrated by students during the course, as well as on the basis of grades got for the defense of laboratory experiment protocol.

QUANTUM MECHANICS

Semester: VI
Cours Tipe: Lectures and tutorials
Hours per week/FS/SS: 2 lecture hours, 1 tutorial hour per week/SS
ECTS credits: 3 credits
Lecturer: Assoc. Prof. Ralitsa Stanoeva, PhD
University/Faculty/Department: SWU "Neofit Rilski"-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Mathematics and Physics;
Status of the Subject: Compulsory
Subject Description: Basic quantum mechanical postulates. Quantum mechanical formalism: state space and Hermitean operators. Schrodinger equation: exactly solvable models: Hydrogen atom, harmonic oscilator, potential well.Approximate methods: perturbation theory, Hartry-Fock method. Identical particles and Pauli principle. Angular momentum and spin. Many-electron atoms and periodic system of elements. Scattering theory and Rutherford formula. Klein-Gordon and Dirac equations.
Specific Goals of the Subject: The course aims at giving fundamentals knowledge of quantum physics and to serve as a foundation for courses as statistical physics, quantum electronics astrophysics and other special courses.
Teaching Methods: lectures, tutorials, individual student's work
Requirements/Prerequisites: General knowledge in mathematical methods of physics and analysis
Evaluation Method: Evaluation defined by a written exam and current control of the seminars taken certain gravity. Some intermediate tests conduct through the semester.

Didactics and techniques of chemistry experiments in school

Semester: VII
Type of the course: lectures and laboratory exercises
Hours per week: 2 lecture hours and 2 laboratory exercises /FS/
ECTS credits: 6
Lecturer: **Chief Assistant Professor Dr. Damyna Grancharova**
Department: SWU "Neofit Rilskii"-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Chemistry;
Course Status: Compulsory course
Short Description: The lecture course "Didactics and techniques of chemistry experiment in school" contains a short description of the chemistry processes, technique works and some methodological peculiarities of conducting chemical experiments. The exercises allow the students to understand different technical requirements for chemistry experiments and their role in various organization of the cognitive process in chemistry lessons in the schools.
Course Aims: The aim of the course is to help students to understand main experimental techniques and different didactic ideas for the role, place and meaning of chemistry experiment in the schools teaching process. The course lectures contain short description of the chemistry processes, applied technique and some didactics specialties connected with the opportunity for their appliance in teaching „Human and nature" (5-6th grade) and „Chemistry and environmental protection" (7-12th grades). Laboratory exercises help students to acquire in school abilities and skills for effective and safety chemistry experiments.
Teaching Methods: lectures and laboratory exercises
Assessment: written exam and current tests.

METHODS OF SOLVING PHYSICS PROBLEMS

Semester: VII
Cours Tipe: Lectures and tutorials
Hours per week/FS/SS: 2 lecture hours, 2 tutorial hours per week/FS
ECTS credits: 5 credits
Lecturer: Assoc. Prof. Radost Vassileva, PhD
University/Faculty/Department: SWU "Neofit Rilski"-Blagoevgrad; 66 Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Department of Mathematics and Physics
Status of the Subject: Compulsory
Subject Description: This course reveals the essence of the concept *physics problem*, the place, role and didactic functions of physical problems in the process of education, as well as their classification, the methods of solving the basic problem types, the system of units of measurement in physics as an object and means of cognition. Special attention is paid to the opportunities for problem solving offers for establishing inter-disciplinary connections in education.
Specific Goals of the Subject: The course aims at providing students with both theoretical and practically oriented knowledge for efficient application of adequate didactic techniques for using physics problems in the education in physics at middle and secondary school. In the pursuit of this goal, the syllabus focuses on the profound methodological preparation of would-be teachers, the formation of criteria and skills for selecting the proper physics problems and the methods for their application in the teaching process.
Teaching Methods: lectures, seminars, individual student's work

Evaluation Method: Evaluation defined by a written exam and current control of the seminars taken certain gravity.

GENERAL BIOLOGY AND BASIS OF BIOCHEMISTRY

Semester: VII
Course Type: lectures
Hours (weekly): 2 hours lectures
ECTS Credits: 3
Lecturer: Prof. Ivanka Stankova
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)

CURRENT PEDAGOGICAL PRACTICE IN CHEMISTRY

Semester: VII
Type of the course: exercises
Hours per week: 3 hours/FS
ECTS Credits: 2
Lecturer: Assistant Dr. Aleksandra Tencheva
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
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 courseassures 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 6th grade) and "Chemistry and environment protection" (7th, 8th and 9th 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

CURRENT PEDAGOGICAL PRACTICE IN PHYSICS

Semester: VII
Type of the course: exercises
Hours per week: 3 hours/FS
ECTS Credits: 2
Department: Mathematics and Physics, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Course description: "School practice in Physics" is an inseparable part of the "Chemistry and Physics" learning course. It follows the theoretical courses in "Methods of Teaching Physics" and "Attendance of Physics Lessons" and fills the requirements for real-time training of the students that are to receive a teaching degree. Successful participation in the course lays the ground for coping with the pre-graduate methodological practice in Physics. Students prepare in advance and enact lessons based on the "Human and Nature" for the 5th and 6th grades, as well as the "Physics and Astronomy" for 7th -12th grades teaching curriculum.
Grading criteria: Each student prepares in advance at least two different lessons for new material acquisition, which are then carried out with different target groups. Students are required to observe the lessons of their peers who are stationed in the same school. Together with their mentor, they discuss the methodological procedures used in each observed lesson. Grades are based on the following two criteria: continuous assessment and final mark. The final mark (FM) is based on the grade from the participation in seminars (SG) as well as the grades for the two practical lessons (PG1 and PG2). All three grades must be at least passing grades. The final mark is calculated based on the following formula: FM = 0,4*SG+0,6(PG1+PG2)/2.

CLASS-PRACTICE PERIOD OF CHEMISTRY

Semester: VIII
Type of the course: exercises
Hours per week: 3 hours/SS
ECTS Credits: 6
Lecturer: Assistant Dr. Aleksandra Tencheva
Department: Department of Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description: The course is led after classroom observations and a current pedagogical practice and is according to the requirements for students practical preparation. Thus, the student will receive "teacher" qualification. The sterling course assures 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 sterling and effective teaching 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. Class-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

CLASS-PRACTICE PERIOD OF PHYSICS

Semester: VIII
Type of the course: exercises
Hours per week: 3 hours/SS
ECTS Credits: 6
Department: Mathematics and physics
Course description: "Pre-graduation School Practice in Physics" is an inseparable part of the "Chemistry and Physics" learning course. It follows the "Attendance of Physics Lessons" and the "School Practice in Physics"courses and fills the requirements for real-time training of the students that are to receive a teaching degree. Successful participation in the learning process provides the students with the required knowledge to be able to work in a professional teaching environment.
Objectives and aims: The main purpose of the course is to provide the aspiring teachers with the skills necessary to cope with the challenges in a real-time teaching environment. The participants are expected to: become acquainted with the requirements and the approaches in developing methodological procedures on a given topic; acquire rudimentary skills in planning, organizing and managing the educational process of a given target group; to carry out at least ten lessons on given different topics, which they will on a later stage reenact with different target groups, thus raising their own professional teaching competency; get used to the norms in public speaking, optimal teaching tempo, setting up student discussions, monitoring class behavior, conducting physical experiments, encouraging student development through individual work etc.
Grading criteria: Each student prepares in advance at least ten different lessons for new material acquisition, which are then carried out with different target groups. Students are required to observe the lessons of their peers who are stationed in the same school. Together with their mentor, they discuss the methodological procedures used in each observed lesson. Grades are based on the following three continuous assessment marks: mark assigned by the teacher in charge of the practical course and based on given lesson that he/she observes (OM); mark assigned by the mentor and based on overall performance in the practical course (MM); and a mark on turned in written lesson plans and observation sheets (DM). The final mark (FM) is calculated according to the following formula:
FM = 0,5*(OM) + 0,3*(MM) + 0,2*(DM)

INCLUSIVE EDUCATION

Semester: VIII
Hours per week: 1 lectures
ECTS credits: 4
Type of the course: Compulsory
Department: Pedagogy, Faculty of Pedagogy.
Lecturer: prof. Pelagia MihaylovaTerziyska, PhD. Department "Pedagogy"
Course summary: The course is aimed at training, development and socialization of children with special educational needs integrated into mainstream schools. Designed for the acquisition of knowledge about the specifics of working with these students. The main objective is introduces the students with the most effective methods, approaches and the pedagogical technologies for teaching, of different groups of pupils with SEN, to clarify the psychological and pedagogical problems of education and social adaptation in the midst from their peers in norm.
Content of the course: The main substantive points were: initial knowledge of the main characteristics of children and pupils with SEN; specifics of the educational process in the mainstream school in terms of integrated training; features of academic activities and teaching methods for different groups of pupils with SEN; specific requirements to the teacher.
Teaching and assessment: Training includes lectures. Knowledge available in the system, using interactive methods - case studies, discussions, debates, role-plays, planning and conducting analysis miniexperiments behavior of children with SEN in different situations and different social and cultural environment. There were strict criteria for the development of papers, which are transmitted within a given period for checking. After that all papers will be discussed in class.
Form of Assessment: exam

COMPETENCE APPROACH AND INNOVATION IN EDUCATION

Semester: VIII
ECTS credits: 4
Weekly hours: 2 hours of lectures, 1 hour of seminars
Form of assessment: exam
Discipline status: required
Lecturers: Assoc. Prof. Dr. K. Marulevska
Annotation: The course of study in the discipline Competence approach and innovations in education takes into account the importance of the competence approach in educational theory and practice, as well as the importance of innovation processes in the field of education. Attention is focused on the processes related to the improvement of the pedagogical environment, with increasing the efficiency and productivity of the functioning educational structures. The course focuses on the role and nature of the competence approach in education, types of competencies, basic methodological approaches to the formation of key competencies, as well as building an innovative culture of students in specialties in which future teachers are trained. In the process of learning students have the opportunity to acquire knowledge, build skills and competencies for adequate actions and behavior in the specific conditions of innovation in the modern school. The focus is on new ideas implemented in the specific pedagogical environment and their technological dimensions in new approaches, forms, methods, didactic and educational tools.

The course of study in the discipline has the task to stimulate creativity in students and to form in them professional and personal readiness for perception, understanding and support of innovations, as well as successful integration of innovation culture into the overall structure of professional pedagogical competence of modern teachers. strategies, didactic technologies and methodological techniques and forms for building and developing key competencies of students in the educational process.
Teaching methods: lectures, seminars and extracurricular activities;
Assessment: Written exam

DEVELOPMENT OF LESSONS FOR ONLINE TRAINING

Semester: II, IV
ECTS credits: 3
Weekly hours: 2 hours of lectures, 2 hour of seminars
Assessment form: exam
Course status: elective
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.

MANAGEMENT OF EDUCATIONAL INSTITUTIONS

Semester: II, IV
Course type: lectures Hours (weekly): 2 hours of lectures
Number of credits: 3 credits
Teacher: Assoc. Prof. Dr. Blaga Djorova
Department: Pedagogy
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 AN EDUCATIONAL ENVIRONMENT

Semester: II, IV
Course type: lectures Hours (weekly): 2 hours of lectures
Number of credits: 3 credits
Teacher: Prof. Dr. Gergana Dyankova
Department: Pedagogy

Course Description: The offered course clarifies and analyzes the communicative competence of the teacher as a primary resource for implementing effective pedagogical interaction. Emphasis is placed on specific tools from the field of communicative behavior that optimize pedagogical communication. 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 in order to optimize the educational environment. 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

INCLUSIVE EDUCATION FOR CHILDREN AND STUDENTS WITH SPECIAL EDUCATIONAL NEEDS

Semester: II, IV
Course type: lectures Hours (weekly): 2 hours of lectures
Number of credits: 4 credits
Teachers: Prof. Dr. Pelagia Terziyska
Department: Pedagogy
Course status: Compulsory
Course Description: 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. Course Objective: 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 course: not necessary Registration for the exam: agreed with the teacher and the academic department

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

Semester: II, IV, VI
Course type: Lectures and Laboratory Exercises
Hours (weekly): 1 lecture hour, 1 laboratory hour
Credits: 3.0 ECTS
Department: Department of Mathematics and physics, 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: V
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
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.
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 utilizing contemporary 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, Poor
Teaching methods: lectures and practical exercises.

BASIC CONCEPTS IN CHEMISTRY

Semester: V
Type of the course: lectures and exerceses
Hours per week: 2 hour lectures and 1 hour exerceses
ECTS Credits: 4
Department: Chemistry
Lecturers: Senior Assistant Professor Dr. Damiana Grancharova
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.
Assessment: Written exam.

INNOVATIVE STEM METHODS IN NATURAL SCIENCE TEACHING

Semester: **V**
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: V

Type of course: lectures, exercises

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

Number of credits: 4 credits

Department: Chemistry, Faculty of Natural Sciences and Mathematics, South-West University "Neofit Rilski" – Blagoevgrad;

Teachers: Senior Assistant Professor Dr. Damiana Grancharova

Status of the course in the curriculum: Elective

Description of the course:

The course "Basic Concepts in Chemistry" examines the basic concepts and concepts in chemistry in connection with their introduction and study in the subjects Man and Nature and Chemistry and Environmental Protection. in secondary school. Attention is paid to the scientifically accurate content of the concepts and the inaccuracies that accompany their introduction in school. The concepts are introduced consistently in accordance with the curricula and the State Educational Requirements.

Objective of the course:

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 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 chemistry course and the courses in Inorganic Chemistry, Analytical Chemistry and Physical Chemistry.

Assessment: Written exam.

CONTROL AND EVALUATION IN THE SCIENCE EDUCATION

Semester: V
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

MODELS IN NATURAL SCIENCES EDUCATION

Semester: V
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", FMNS, 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

HYGIENE OF CHILDREN AND ADOLESCENT AGE

Semester: V
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

DIAGNOSTICS OF ACADEMIC ACHIEVEMENTS IN PHYSICS

Semester: V
Course type: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 2 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics
Status of the course in the curriculum: Elective
Abstract: The course "Diagnostics of Academic Achievements in Physics" is included as an elective in the curriculum of the specialty "Pedagogy of Education in Chemistry and Physics". It is studied by students studying in the educational and qualification degree "Bachelor". The course "Diagnostics of Academic Achievements in Physics" has a total teaching load of 30 hours, of which 15 hours of lectures and 15 hours of practical (laboratory) exercises. The extracurricular employment of students is 30 hours. Current control of the academic achievements of students is carried out during the semester in the hours for practical exercises. Training in the course ends with a written exam.
Course content: 1. Introduction to pedagogical diagnostics. 2. Theoretical and methodological foundations of pedagogical diagnostics. 3. Methods of pedagogical diagnostics. 4. Qualitative techniques for diagnostics and assessment. 5. Quantitative techniques for diagnostics and assessment. 6. Bloom's taxonomy of cognitive goals. 7. Didactic tests as the main method for diagnosing academic achievements in physics. 8. Rating scales. 9. Measurement qualities of tests.
Teaching and assessment technology: Lectures are held in a lecture hall equipped with the necessary equipment - a computer and a multimedia projector, using computer presentations developed in accordance with the lecture content. The material base of the Physics Department is used to conduct practical exercises. Students perform practical tasks that are given by the assistant and discussed with him. At the end of each practical exercise, students present and defend the implementation of their assigned tasks. The semester certificate is given to students who have received a grade of at least "Average 3" in the current control. The training in the course "Diagnostics of Academic Achievements in Physics" ends with a written exam on the course content. A final grade is formed only if the student has received a grade of at least "Average 3" in the written exam. When forming the final grade, the grades from the written exam (40%) and from the current control (60%) are taken into account.
Course content:
1. Introduction to pedagogical diagnostics.
2. Theoretical and methodological foundations of pedagogical diagnostics.
3. Methods of pedagogical diagnostics.
4. Qualitative techniques for diagnostics and assessment.
5. Quantitative techniques for diagnostics and assessment.
6. Bloom's taxonomy of cognitive objectives.
7. Didactic tests as the main method for diagnosing academic achievements in physics.
8. Rating scales.
9. Measurement qualities of tests.

Teaching and assessment technology:

Lectures are held in a lecture hall equipped with the necessary equipment - a computer and a multimedia projector, using computer presentations developed in accordance with the lecture content.
The material base of the Physics Department is used to conduct practical exercises. Students perform practical tasks that are given by the assistant and are discussed with him. At the end of each practical exercise, students present and defend the implementation of their assigned tasks. The semester certificate is awarded to students who have received a grade of at least "Average 3" in the current control.
The training in the course "Diagnostics of Academic Achievements in Physics" ends with a written exam on the course content. A final grade is formed only if the student has received a grade of at least "Average 3" in the written exam. When forming the final grade, the grades from the written exam (40%) and from the current control (60%) are taken into account.

MODERN EDUCATIONAL TECHNOLOGIES IN PHYSICS TEACHING

Semester: V
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 2 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics
Status of the course in the curriculum: Elective

ANNOTATION: The course "Modern Educational Technologies in Physics Education" is included as an elective in the curriculum of the specialty "Pedagogy of Chemistry and Physics Education". It is studied by students studying in the educational and qualification degree "Bachelor".
The course "Modern Educational Technologies in Physics Education" has a total teaching load of 30 hours, of which 30 hours are lectures. The extracurricular employment of students is 30 hours.
Current control of students' academic achievements is carried out during the semester in the hours for independent work.
The training in the course "Modern Educational Technologies in Physics Education" ends with a written exam on the educational content.
The course "Modern Educational Technologies in Physics Teaching" has input links with the courses in "Pedagogy", "Psychology", "Physics Teaching Methodology", "Physics Observation", etc. The output links are with the specialized courses studied in the following semesters, included in the curriculum of the specialty.

GOALS AND EXPECTED RESULTS

The course "Modern Educational Technologies in Physics Teaching" aims to provide students with basic knowledge in the field of theoretical research and the specified main methodological directions and trends for the use of modern educational technologies in physics teaching in secondary school.

TEACHING METHODOLOGY FOR "MAN AND NATURE" (PHYSICS MODULE)

Semester: V
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 2 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics
Status of the course in the curriculum: Elective
Course description: Motion of celestial bodies in the Solar System. Space research. Stars and constellations. Bodies and substances. Temperature and heat. Transitions between aggregate states of bodies and substances Movement of bodies Types of forces. Action of forces. Forces and pressure. Electric forces. Electric current. Magnetic forces.

Course objective: The course aims to introduce the content and methodology of teaching the subject "Man and Nature", included in the junior high school stage (V, VI grade) of the basic educational level. In its essence, it represents an integration of physical, chemical and biological knowledge. The emphasis is placed on the first part, called "Physical phenomena". From a methodological point of view, various approaches are considered for the formation of basic knowledge in students about objects, processes and phenomena in inanimate and animate nature, in their unity and diversity. They are tailored to the age characteristics of the students and are aimed at recognizing, describing and comparing different objects, phenomena and processes, as well as revealing dependencies between them, mainly at a qualitative level. Special attention is paid to inter-subject connections.

Teaching methods: lectures, exercises and extracurricular work

Prerequisites: basic knowledge of physics, chemistry and biology

Supporting materials: textbooks on the subject "Man and Nature" for primary school, educational literature on physics teaching methodology and reference books on physics
Assessment method: written exam on practical exercises and theoretical material from the lectures

HISTORY OF PHYSICS

Semester: V
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 2 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics
Status of the course in the curriculum: Elective

Annotation: The course "History of Physics" is included as an elective in the curriculum of the specialty "Pedagogy of Teaching Chemistry and Physics". It is studied by students studying in the educational and qualification degree "Bachelor",

The course "History of Physics" has a total number of 30 hours of lectures. The extracurricular employment of students is 30 hours.
The training in the course ends with a written exam,

BIOELECTROCHEMICAL SYSTEMS

Semester: VII
Type of course: lectures and exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Assoc. Prof. Dr. Elitsa Chorbadzhiyska
Department: Chemistry
Status of the course in the curriculum: Elective

Description of the course: The course introduces the basic concepts used, presents the different types of bioelectrochemical systems - structure, principle of operation, application, etc. Bioelectrochemical systems combine biocatalyzed and electrocatalyzed processes. The lecture material covers topics related to electrocatalysis, biocatalysis, varieties of microbial fuel cells and electrolysis cells, as well as their applications. The acquired material is consolidated through practical work and seminars, project development, implementation of set research problems. Topics related to the design and optimization of different types of bioelectrochemical systems are covered.
Teaching methods: lectures and exercises
Assessment: written exam

HAZARDOUS ENVIRONMENTAL POLLUTANTS

Semester: VII
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
Department: GEOES, UK-4, Faculty of Mathematics and Natural Sciences, Blagoevgrad
Status of the course in the curriculum: Elective
Description of the course: The main objective of the course is to introduce students to some of the main sources and substances posing a risk to the environment. Sources and substances posing a risk to human health and environmental quality, 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 for students on environmental protection. Basic concepts and terms, regulatory requirements, MPC, pollution prevention measures are examined.
Teaching methods: lectures, exercises, coursework development

ENVIRONMENTAL CHEMISTRY

Semester: VII
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
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

STEM TECHNOLOGY TOOLS IN THE CHEMICAL LABORATORY

Semester: VII
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;
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

LASER TECHNOLOGY

Semester: VII
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics, Faculty of Mathematics and Natural Sciences;
Annotation: The course aims to introduce students to the most modern light sources - lasers, which have the properties of coherence, monochromaticity and to show their application in science and technology.

Course content: The course examines the physical foundations of laser technology and a description of the principle of operation of the most common laser sources is given. The physical principles of amplification and generation of light based on induced radiation are considered. Also, open laser resonators, the principles of operation of gas and solid-state lasers, as well as some tunable laser sources are considered.

Teaching and assessment methods: Lectures illustrated with demonstrations, laboratory exercises with solving practical problems.

GENERAL METROLOGY

Semester: VII
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics, Faculty of Mathematics and Natural Sciences;
Status of the course in the curriculum: Elective
Annotation: The course "General Metrology" is included as an elective in the curriculum of the specialty. It is studied by students studying in the educational and qualification degree "Bachelor".
Current control of the students' academic achievements is carried out during the semester in the hours of laboratory exercises. Training in the course ends with a written exam.

Course content:
1. Introduction to general metrology. Historical development and importance of metrology.
2. Divisions of metrology.
3. Normative documents in metrology.
4. Physical quantities and units of measurement.
5. Standards.
6. Accuracy and errors.
7. Measuring instruments. Main characteristics.
8. Basic measurements in metrology.
9. Metrological control of measuring instruments.

10. Standardization and certification in metrology.

Teaching and assessment methods: Lectures are held in a lecture hall equipped with the necessary equipment - a computer and a multimedia projector, using computer presentations developed in accordance with the lecture content.
The laboratory for "General Metrology" is used to conduct laboratory exercises. Laboratory exercises are conducted in groups. Students work in subgroups of 2–3 people at a workplace and perform practical tasks described in the methodological instructions and previously discussed with the assistant. After each laboratory exercise, students prepare a protocol. The exercise is considered completed after submitting and defending the corresponding protocol. The semester is certified to students who have completed all laboratory exercises, submitted and defended the relevant protocols and received a grade of at least "Average 3" in the current control.
The training in the course "General Metrology" ends with a written exam on the course content. A final grade is formed only if the student has received a grade of at least "Average 3" in the written exam. When forming the final grade, the grades from the written exam (40%) and the current control (60%) are taken into account.

RADIOPHYSICS

Semester: VII
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics, Faculty of Mathematics and Natural Sciences;
Annotation: The course aims to familiarize students with the basic laws describing alternating current electrical circuits.

Course content: The course “Radiophysics” aims to provide basic training in the physics of wave processes. It is dedicated to the study of electromagnetic oscillations and resonance phenomena occurring in electrical circuits.

Teaching and assessment methods: Lectures illustrated with demonstrations, laboratory exercises with the development of laboratory tasks on built laboratory sets and the compilation of the relevant protocols.

MAGNETIC PHENOMENA AND MATERIALS

Semester: VII
Type of course: lectures, exercises
Hours (weekly): 2 hours of lectures, 1 hour of exercises
Number of credits: 4 credits
Teacher: Assoc. Prof. Dr. Ralitsa Stanoeva
Department: Mathematics and Physics, Faculty of Mathematics and Natural Sciences;
Description of the course: The program contains materials on the basic experimental facts, the important quantitative relationships between quantities and the generally accepted models for explaining the more important phenomena in the field of magnetism.

Practical classes consist in students getting acquainted with the basic experimental methods of magnetism and, in particular, with the methods for studying the basic magnetic characteristics of substances.
Specific objectives of the course: The aim of the course is for students to acquire knowledge about the basic concepts in the field of magnetism and magnetic materials and their methods for studying them.
Pedagogical method: lectures, exercises and extracurricular work

Assessment method: Written exam, held after the end of the lecture course. During the training, a written test is held on the material, the grades of which participate in the formation of the final grade.

PHYSICAL METHODS IN MEDICINE

Semester: VII
Type of course: seminars
Hours (weekly): 1 hour seminars
Number of credits: 1 credit
Teacher: Assoc. Prof. Dr. Svetoslav Kolev
Department: Mathematics and Physics, UK1, 66 Ivan Mihaylov Street, Blagoevgrad.
Status of the course in the curriculum: Optional
Description of the course: 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 the main diagnostic and therapeutic techniques are examined. The versatile application of physical knowledge, methods and equipment in medicine is shown.
Course objective: The course objective is for students to acquire lasting knowledge of the basic principles on which modern medical devices operate, their diagnostic and treatment capabilities.
Teaching methods: seminars.
Assessment: written exam

Condensed Matter Physics

Semester: VI
ECTS credits: 1.0
Form of assessment: written exam Status of the discipline: Optional
Methodological guidance:
Department of Mathematics and Physics, Faculty of Natural Sciences,
Annotation: The course "Condensed Matter Physics" is included as
optional in the curriculum of the specialty "Pedagogy of Teaching Chemistry and Physics". It is studied by students,
trained in the educational and qualification degree "Bachelor".
The course "Condensed Matter Physics" has a total teaching time of 15 hours,
of which 15 hours are lectures. The extracurricular work of the students is 15 hours.

The training in the course ends with a written exam.
Course content:
1. Condensed matter model. Main types of condensed matter.

2. Chemical bonds. Types. Energy of the chemical bond.
3. Geometric properties of the crystal lattice.
4. Defects in crystal lattices.
5. State of electrons in multi-electron atoms and in the crystal.
6. Elastic properties of condensed matter.
7. Magnetic properties of condensed matter.
8. Dielectric properties of condensed matter.
9. Macroscopic polarization of solids.
10. Optical properties of condensed matter.
11. Superconducting properties of condensed matter.

Teaching and assessment technology:

Lectures are held in a lecture hall equipped with the necessary equipment - a computer and a multimedia projector, using computer presentations developed in accordance with the lecture content.

The laboratory for "Mathematics and Physics of Condensed Matter" is used to conduct laboratory exercises. Laboratory exercises are conducted in groups. Students work in subgroups of 2-3 people at a workplace and perform practical tasks described in the methodological instructions and previously discussed with the assistant. After each laboratory exercise, students prepare a protocol. The exercise is considered completed after submitting and defending the relevant protocol. Students who have completed all laboratory exercises, submitted and defended the relevant protocols and received a grade of at least "Average 3" in the current control receive a certificate of the semester. The training in the course "Condensed Matter Physics" ends with a written exam on the course content. A final grade is formed only if the student has received a grade from the written exam of at least "Average 3". When forming the final grade, the grades from the written exam (60%) and the current control (40%) are taken into account.