QUALIFICATION CHARACTERIZATION

OF MAJOR FIELD OF STUDY "Educational Sciences"

FOR "BACHELOR OF SCIENCE" DEGREE
WITH PROFESSIONAL QUALIFICATION
"Teacher of chemistry and physics"

I. Requirements for professional qualities and competences of students who complete the present major field of study.

South-West University trains qualified teachers of chemistry and physics who are able to apply their knowledge and skills in the area of education, pedagogical sciences, laboratories of chemistry and physics.

During the completion of a Bachelor of Science (BSc) degree in pedagogy of teaching chemistry and physics, they can successfully realize themselves as teachers of: Chemistry and and Environmental protection, Physics and Astronomy, Man and Nature, as well as researches in education, chemistry, physics and other related fields.

After completion of the Bachelor of Science degree "Teacher of chemistry and physics", students obtain the opportunity to successfully continue their education in higher degrees (Master of Science and PhD) in Bulgaria and abroad.

II. Results of students preparations completing the present major field of study.

Students who have completed BSc degree in "Teacher of chemistry and physics" possess the following knowledge, skills and competences:

- to use basic knowledge in chemistry and physics fields
- to carry out practical exercises - laboratory and demonstrations experiments
- to plan, organize, analyze and manage educational instructive system
- to select the optimal complex of approaches, methods and tools, as well as, various forms in the educational process
- to perform internal qualitative and objective assessment of students' achievements
- to plan, organize and carry out of forms of education that are held outside the school.

The qualification characterization of Major field of study "Teacher of chemistry and physics" for the BSc degree is a basic document that determines the rules for developing the curriculum. This qualification characterization is in accordance to the state legislation in the field of higher education in Bulgaria.

CURRICULUM

Field of Study: "Teacher of chemistry and physics", Period of Study: 4 years (8 semesters)

First Year			
First Semester	ECTS credits	Second Semester	ECTS credits
Compulsory Courses		***Compulsory Courses***	
Mathematics – part 1	6.5	Mathematics – part 2	5.5
General and inorganic chemistry – part 1	11.0	Informatics	4.0
Mechanics	10.5	General and inorganic chemistry – part 2	9.0
Foreign language	2.0	Molecular physics	9.5
Sport	0	Foreign language	2.0
		Sport	0
	Total 30		Total 30
Second Year			
First Semester	ECTS credits	Second Semester	ECTS credits
Compulsory Courses		***Compulsory Courses***	
Organic chemistry – part 1	9.5	Organic chemistry – part 2	8.0
Physical Chemistry – part 1	8.0	Physical Chemistry – part 2	6.0
Electricity and magnetism	9.5	Theoretical Mechanics	4.0
Psychology	3.0	Optics	8.0
Sport	0	Pedagogy	4.0
		Sport	0
	Total 30		Total 30
Third Year			
First Semester	ECTS credits	Second Semester	ECTS credits
Compulsory Courses		***Compulsory Courses***	
Analytical Chemistry – part 1	7.0	Analytical Chemistry – part 2	4.0
Chemical Technology	3.0	Didactics in Teaching Chemistry	7.0
Electrodynamics	4.0	Classroom observation of chemistry	1.0
Methodology of Physics Teaching and Astronomy	7.0	Methods and technique of the school physics experiment	4.0
Classroom observation of physics	1.0	Astronomy	1.0
Atomic and Nuclear Physics	8.0	Quantum mechanics	4.0
		Education and development of special needs pupils	4.0
		Optional Courses of didactics 1	
		Research in Practice – after VI semester - 10 days	3.0
			2.0
		Optional Courses of didactics 1 (1course)	
		Basic concepts in chemistry	
		Methodology for solving chemical problems	3.0
		Diagnosis in training	3.0
			3.0
	Total 30		Total 30

Fourth Year			
First Semester	ECTS credits	Second Semester	ECTS credits
Compulsory Courses		***Compulsory Courses***	
Didactics and techniques of chemistry experiments in school	5.0	Class-practice period of chemistry	4.0
Audiovisual and information technologies in education	2.5	Class-practice period of physics	4.0
School-based teaching practicum of chemistry	3.0	Optional Course of chemistry 2	4.0
School-based teaching practicum of physics	3.0	Optional Course of physics 2	4.0
General Biology and Basis of Biochemistry	4.0	Optional Course of didactics 3	4.0
Optional Course of chemistry 1	4.5	State exam in chemistry and physics or thesis defense	10
Optional Course of physics 1	4.0		
Optional Course of didactics 2	4.0	***Optional Courses of chemistry 2 (1course)***	
		Renewable sources of energy: chemical aspects	4.0
Optional Courses of chemistry 1 (1course)		Comuter simulations of structure and properties of molecules	4.0
Applied electrochemistry	4.5	Bioorganic chemistry	
Chemometrics	4.5	Steroids	4.0
Biochemistry of Xenobiotics	4.5	Medicinal chemistry	4.0
Solid state chemistry	4.5	Photochemistry of organic matter	4.0
Environmental chemistry	4.5	Organic synthesis	4.0
Instrumental methods of analysis	4.5	Food supplements	4.0
Electrochemistry	4.5		4.0
Chemistry of Solar System	4.5	***Optional Courses of physics 2 (1course)***	
		Modern methods of studying space and environment	
Optional Courses of physics 1 (1course)	4.0	Quantum Electronics	4.0
Condensed Matter Physics	4.0	Statistical physics and thermodynamics	
General electrical engineering	4.0	Mathematical methods of physics	4.0
Biophysics	4.0		4.0
Extreme conditions protection		***Optional Course of didactics 3(1course)***	4.0
		Didactics in Teaching Men and Nature (part physics)	
Optional Courses of didactics 2 (1course)	4.0	Methodology of elective Physics training	4.0
Control and assessment in Chemistry Education	4.0	Methodology for solving physics problems	4.0
Modern methods in teaching chemistry	4.0		4.0
Modeling in Chemistry Education			
	Total 30		Total 30

TOTAL FOR 4 ACADEMIC YEARS: 240 CREDITS

Mathematics – I

Semester: 1st semester
Course Type: Lectures and tutorials
Hours per week /FS/SS: 2 lecture hours and 1 tutorial hours /FS
ECTS credits: 6,5
Lecturer: Assist. Prof. Ilinka Dimitrova, PhD
Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, tel. ++35973588532, e-mail: ilinka_dimitrova@swu.bg.
Course Status: Compulsory course in the B.S. Curriculum of Chemistry and Physics.
Short Description: The course includes basic concepts in Linear algebra – matrices, determinants, systems linear equations and methods for their solving; Analytic geometry – vectors, vector calculus, equations of the line in a plane and equations of some curves; Mathematical analysis – functions of a real variable, limit of a function, and differential calculation of functions.
Course Aims: The students have to obtain knowledge and skills to use fluently the basic mathematical concepts and apply them to solve real practical tasks in mathematics, chemistry and physics.
Teaching Methods: lectures, tutorials, homework, and problem solving tests.
Requirements/Prerequisites: The students should have basics knowledge from school course in mathematics.
Assessment: permanent control during the semester including homework and two written exams, and written exam in the semester's end on topics from tutorials and on topics from lectures.
Registration for the exam: coordinated with the lecturer and student Service Department
References:

1. Borisov, Il. Guidzhenov, "Mathematics I", University Press, South-West University "Neofit Rilski", Blagoevgrad, 2010 /in Bulgarian/.
2. Borisov. M. Kacarska. "Handbook on Linear Algebra and Analytic geometry". University Press, South-West University "Neofit Rilski", Blagoevgrad, 2011 /in Bulgarian/.
3. K. Chimev, Iv. Mirchev, Higher Mathematics, University Press, South-West University "Neofit Rilski", Blagoevgrad, 1999 /in Bulgarian/.
4. K. Chimev, Sl. Shtrakov, Iv. Mirchev, "Handbook in mathematics 1, 2, 3, University Press, South-West University "Neofit Rilski", Blagoevgrad, 1999 /in Bulgarian/.
5. Borisov, Il. Guidzhenov, Il. Dimitrova. "Linear Algebra". University Press, South-West University "Neofit Rilski", Blagoevgrad, 2009 /in Bulgarian/.
6. Borisov, "Lectures on Analytic geometry", University Press, South-West University "Neofit Rilski", Blagoevgrad, 2000 /in Bulgarian/.
7. V. Grozdanov, K. Jordjev, A. Markovska, Handbook on Mathematical Analysis – part I, University Press, South-West University "Neofit Rilski", Blagoevgrad, 2012 /in Bulgarian/.
8. V. A. Ilin, V. A. Sadovnichi, B. H. Sendov, Mathematical Analysis, V. 1 and 2, Sofia, Science and Art, 1989.

Abbreviation:
FS: Fall Semester
SS: Spring Semester

General and inorganic chemistry – part 1

Semester: 1st semester
Hours per week: 3 hours lectures, 3 hour laboratory exercises
Course Type: Lectures and laboratory exercises
ECTS credits: 11
Lecturer: Assoc. Prof. Mitko Stoev
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course status: Compulsory
Short Description:
The course "General and Inorganic Chemistry I" included lectures and laboratory exercises on the electronic structure of the atom, periodic low, structure of molecules and complex compounds, chemical bounds, chemical equilibrium, absorption, catalyze, solubility and solutions, electrochemical processes and corrosion of metals.
Course Aims:
The program is giving the basic of chemical knowledge and skills of students in the field of General Chemistry as a structure of matter, lows in the nature, skills in chemical experiment and individual work with chemical literature.
Teaching Methods: Lectures are presented by Power Point, video films, e-platform in Internet and graphical illustration on the white board.
Requirements: Knowledge in General Chemistry, Physics, Mathematics and Informatics are obligatory
Registration for the course: A request by students at the beginning of the term
Exam: Test, current control (lectures and labs), course work and final written exam
Final evaluation: FE = 0.7 x CC + 0.3 x WE
Registration for the exam: Coordination with lecturer and Students Service Department.
References:

1. Е. Киркова: Обща химия, Университетска библиотека No 397, Унив. изд. "Св. Климент Охридски", София, 2000 г.
2. Д. Лазаров: Обща и неорганична химия , Унив. изд. "Св. Климент Охридски", София,1999 г.
3. Л. Полинг, П. Полинг: Химия, Изд. Москва, 1978 г.
4. К. Дей, Д. Селбин : Теоретическая неорганическая химия, М., 1969 г.
5. Ф. Котон, Дж. Уйлкинсон : Современная неорганическая химия, I, II, III ч., М., 1968 г

Mechanics

Semester: 1st semester
Type of presentation: Lectures/ Seminar classes /Laboratory classes
Hours per week / AS / SS: 3 Lecture hours /30 Laboratory hours / AS
ECTS credits: 10,5
Lecturer: Assoc. Prof. Dimitrina Kerina, PhD, Assistant Prof. Darina Kaisheva, Assistant Prof. Rumiana Popova
Department: Physics Department, Faculty of Mathematics and Natural Sciences.

Course Status: Compulsory course for subject Chemistry and Physics, B.Sc. Curriculum.
Short Description: The general loading of the course is 75 hours (it includes 45 lecture hours, 30 hours laboratory exercises) and 220 out auditorium hours. Material is selected depending of the specificity of the speciality. In this course are considered the following main topics: Basic Concepts of Kinematics and Dynamics, Relative Physical Principals, Inertial and Non-inertial Co-ordinate Systems, Mechanics of Absolutely Solid State, Gravitation, Oscillations's Mechanics, Distortion in Solid State and Fluids's Mechanics.
Course Aims: Students acquire knowledge about objective fundamental natural laws, basic Physical methods of investigation and basic Physical concepts and relations.
Teaching Methods: Lectures are prepared on Power point. The contemporary technical equipment as multimedia, software, models, etc. is used for these lectures. Lectures are visualised by demonstrations and laboratory tasks performance during the laboratory classes.
Requirements / Prerequisites: Basic knowledge in General Physics and Mathematics.
Evaluation Method: The final rating is formed at the end of the course on the basis of the rating of a written test (WT) on all topics mentioned above and of the student's routine control (RC) in the following ratio: 0.4RC+0.6WT.

Final grade calculation is done by using a 6-point rating scale: the rating 6 equals level A on ECTS; the rating 5 equals level B on ECTS; the rating 4 equals level C on ECTS; the rating 3 equals level D on ECTS; the rating 2 equals level E on ECTS.
Inscribing for tuition: Not necessary.
Inscribing for exam: Agreement with the lecturer and the Students Service Department
References:

1. С. Тошев, И. Баев, М. Маринов, Л. Бончев. *Физика*, Наука и изкуство, София, 1987.
2. М. Маринов, Биофизика, София, 2006.
3. М. Надолийски, З. Пейков, "Учебник по физика", УАСГ, София, 2011.
4. А. Детлаф, Б. Яворский. *Курс физики*, Высшая школа, Москва, 1989 (in Russian)

Abbreviation:
AS: Autumn Semester
SS: Spring Semester

ENGLISH – PART I

Semester: 1st semester
Type of the course: seminars
Hours per week /FS/SS: 2 hours /FS/
ECTS credits: 2
Lecturers: assoc. prof. Katia Lekova.
Department: Department of Chemistry, Faculty of Mathematics and Natural Sciences.
Course Status: Compulsory course
Short Description:
Training course includes the study of: Specialized literature on Chemistry, Specialized literature on Environmental chemistry, Brief English grammar.
Course Aims:
Students should become familiar with the specialized terminology in chemistry and related fields, acquire knowledge to work with specialized texts, be able to apply their knowledge and skills in project work where good language skills.
Teaching Methods: seminars.

Requirements/Prerequisites: Basic knowledge in chemistry, English grammar, computer skills.
Assessment: Three current test and written exam.
Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

SPORT

Semester: 1st,2nd,3rd,4th semester
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.
Requirements/Prerequisites: no
Assessment: Current tests.

Mathematics – part 2

Semester: 2nd semester
Course Type: Lectures and tutorials
Hours per week: /FS/SS: 2 lecture hours and 2 tutorial hours /FS
ECTS credits: 5,5
Lecturer: Assist. Prof. Ilinka Dimitrova, PhD
Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, tel. ++35973588532, e-mail: ilinka_dimitrova@swu.bg
Course Status: Compulsory course in the B.S. Curriculum of Chemistry and Physics.
Short Description: The course includes basic concepts of integral calculus, ordinary differential equations, probability theory and linear optimization.
Course Aims: The students have to obtain knowledge and skills to use fluently the basic mathematical concepts and apply them to solve real practical tasks in mathematics, chemistry and physics.
Teaching Methods: lectures, tutorials, homework, and problem solving tests.
Requirements/Prerequisites: The students should have basics knowledge from school course in mathematics and Mathematics I.

Assessment: permanent control during the semester including homework and two written exams, and written exam in the semester's end on topics from tutorials and on topics from lectures.
Registration for the exam: coordinated with the lecturer and student Service Department
References:

1. Bainov, D., K. Chimev. Handbook on Ordinary Differential Equations. University Press, South-West University "Neofit Rilski", Blagoevgrad, 1992 /in Bulgarian/.
2. Borisov, A., Il. Guidzhenov. Mathematics III. University Press, South-West University "Neofit Rilski", Blagoevgrad, 2010 /in Bulgarian/.
3. Chimev, K., Iv. Mirchev, Higher Mathematics, University Press, South-West University "Neofit Rilski", Blagoevgrad, 1999 /in Bulgarian/.
4. Chimev, K., Sl. Shtrakov, Iv. Mirchev, "Handbook in mathematics 1, 2, 3, University Press, South-West University "Neofit Rilski", Blagoevgrad, 1999 /in Bulgarian/.
5. Dimitrov, B., N. Yanev. Probability and Statistics. Sofia, 1990 /in Bulgarian/.
6. Kopanov, P., V. Noncheva, S. Hristova. Handbook on Probability and Statistics. University Press "Paisii Hilendarski, Plovdiv, 2012 /in Bulgarian/.
7. Grozdanov, V., K. Jordjev, A. Markovska, Handbook on Mathematical Analysis – part I, University Press, South-West University "Neofit Rilski", Blagoevgrad, 2012 /in Bulgarian/.
8. Ilin, V. A., V. A. Sadovnichi, B. H. Sendov, Mathematical Analysis, V. 1 and 2, Sofia, Science and Art, 1989.
9. Karashtranova, E. Interactive education in probability and statistics. University Press, South-West University "Neofit Rilski", Blagoevgrad, 2010 /in Bulgarian/.
10. Kenderov, P., G. Hristov, A. Donchev. Mathematical optimization. University Press "Kliment Ohridski", Sofia, 1995 /in Bulgarian/.
11. Mihov, I., K. Chimev. Handbook on variation statistics and probability theory. Sofia, 1991 /in Bulgarian/.

Abbreviation:
FS: Fall Semester
SS: Spring Semester

INFORMATICS

Semester: 2nd semester
Type of the course: Lectures and seminars.
Hours per week: /FS /SS: 1 lecture hours and 1 hours seminar /FS/
ECTS credits: 4.0
Lecturers: assoc. prof. Dimitar Kovachev.
Department: Department of Informatics, Faculty of Natural Sciences and Mathematics, 073-588 532.
Course Status: Compulsory course
Short Description:
Informatics is a rapidly developing field in research and practical knowledge. Nowadays that is widely applied in every area of human knowledge and activity. In this context, it continuously refreshs and acquires new knowledge. On the other hand computer equipment and ability to work with it is necessary and useful for students in preparing their in other disciplines.

Course Aims:
Obtaining and extending of the knowledges and skills in the field of informatics and information technologies.
Teaching Methods: lectures and exercises.
Requirements/Prerequisites: Basic knowledge in mathematics and chemistry.
Assessment: current tests and written exam.
Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

General and inorganic chemistry – part 2

Semester: 2nd semester
Hours per week: 2 hours lectures, 2 hour laboratory exercises
Course Type: Lectures and laboratory exercises
ECTS credits: 9
Lecturer: Assoc. Prof. Mitko Stoev
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course status: Compulsory
Short Description:
The course "General and Inorganic Chemistry II" included lectures and laboratory exercises is discussing the elements and there compounds. The main topics of discussions are hydrogen, elements and compounds from A and B I-VIII groups of a periodical table. The chemical, physical properties and application of the elements and compounds are presented during the lectures. The laboratory work is focusing on preparation methods of a chemical compounds from the main and secondary groups of periodical table.
Course Aims:
The program is giving the basic of chemical knowledge and skills of students in the field of chemistry of elements and their compounds.
Teaching Methods: Lectures are presented by PowerPoint, video films, e-platform in Internet and graphical illustration on the white board.
Requirements: Knowledge in General Chemistry, Physics, Mathematics and Informatics are obligatory
Registration for the course: A request by students at the end of the previous term
Exam: Test, current control (lectures and labs), course work and final written exam
Final evaluation: FE = 0.7 x CC + 0.3 x WE
Registration for the exam: Coordination with lecturer and Students Service Department.
References:

1. Д. Лазаров, Неорганична химия, Унив. Изд. София, 1993.
2. Е. Киркова, Химия на елементите и техните съединения, Унив. Изд. София, 1990 г.
3. Л. Генов, М. Манева-Петрова, Неорганична химия I и II ч., Наука и изкуство, 1989 г.
4. Ф. Котън, Дж. Уилкинсън: Съвременна неорганична химия I и II ч., Наука и изкуство, С., 1977.
5. К. Дей, Д. Селбин, Теоретическая неорганическая химия, Мир, Изд. Химия, 1976.
6. Mark J. Winter: Periodic table of the elements (http://www.webelements.com).

Molecular physics

Semester: 2nd semester
Hours per week: 3 Lectures / 3 Laboratory exercises / Spring Semester
Course Type: Lectures and laboratory exercises
Course №: Obligatory course № 9
ECTS credits: 9,5
Lecturers: Assoc. Prof. Radost Ivanova Vassileva, Ph.D.
Department: Physics, Faculty of Natural Sciences and Mathematics.
Course Status: Obligatory course in Pedagogy of Teaching Chemistry and Physics B.S. Curriculum
Short Description: The main topics to be considered: Bases of equilibrium thermodynamics, Thermodynamic and statistical interpretation of basic thermodynamic quantities, Variation of physical condition, Surface tension, Elements of non-equilibrium thermodynamics. Transmission processes – diffusion, thermal conductivity and internal friction.
Specific Goals of the Course: The course aims to gives students a necessary minimum basic knowledge about the main macroscopic physical phenomena in the field of the thermodynamics and molecular physics. Some practical applications of this knowledge are an object of treatment in laboratory exercises and seminars.
Pedagogical Methods: lectures, laboratory exercises, seminars, tutorials, individual student's work, test-papers.
Requirements/Prerequisites: basic knowledge in mechanics and mathematics
Subsidiary Materials: physics textbooks and manuals, handbooks, physics encyclopedic dictionaries
Assessment: written exam on the theoretical material from the lectures
Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.
References:

1. Maksimov, M. Bases of Physics – Part I. Sofia, Bulvest – 2000, 2010. (in Bulgarian).
2. Gramatikov, P. Physics – I. Blagoevgrad, SWU "Neofit Rilski", 2009. (in Bulgarian).
3. Joseph M. Powers. Lecture Notes on Thermodynamics –University of Notre Dame, 2010; J. B. Tatum. Heat and Thermodynamics , 2008; Eric Bertin. Introduction to Statistical Physics , ENS Lyon , 2010. http://www.e-booksdirectory.com.
4. Hans Kroha. Thermodynamics and Statistical Physics , 2005.
5. H. Young, R. Freedman. University Physics. N.Y., Addison-Wesley Publishers Co, 2000.

ENGLISH – PART II

Semester: 2nd semester
Type of the course: seminars
Hours per week /FS/SS: 2 hours /SS/
ECTS credits: 2

Lecturers: assoc. prof. Katia Lekova.
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.
Requirements/Prerequisites: Basic knowledge in chemistry, English grammar, computer skills.
Assessment: Three current test and written exam.
Registration for the exam: Students and the lecturer agree on the convenient dates within the announced calendar schedule of examination session.

ORGANIC CHEMISTRY – I -part

ECTS credits: 9,5	Weekly classes : 3L +3 labs +0 s +0 p + p
Form of Assessment:	Exam
Type of exam:	Written
Semester :	IV - semester
Methodological guide:	Department of "Chemistry "
Faculty:	Faculty of Mathematics and Natural Sciences
Lecturer:	Assoc. Prof. A. Chapkanov, PhD , chapkanov@swu.bg Assoc. Prof. Zivko Velkov, PhD
Status of course:	Obligatory

DESCRIPTION:

In the course will be considered the general theoretical questions: modern conceptions of the chemical bond nature in the molecules of organic compounds, methods for establishing the composition, structure and organic molecules reactivity, types of organic reactions and their mechanisms, rate of chemical reactions, problems of the organic compounds stereochemistry and their practical application. The course includes the study of basic classes and groups of organic compounds such as alkanes, alkenes, alkynes, alkadienes, alicyclic compounds, aromatic hydrocarbons, halogenated derivatives of hydrocarbons, hydroxyl derivatives of hydrocarbons and including homologous order, names, nomenclature, physical and chemical properties and preparation. Will be considered the specific types of reactions for each class separately and dependencies associated with the reaction of their ability, the factors influence on the rate of reactions.

Aim of the course:

The course aims is to provide the students basic knowledges of the composition, structure, properties and methods of preparation of the most important classes of organic compounds.

Practical workshops and seminar in practical form designed to help the students perception and understanding of the lecture material and build the habit of creative application of knowledge, to develop experimental skills, working in the field of organic chemistry.

Teaching methods: Lectures, laboratory work and seminars, problems decission, testing, out-of-class work.
Prerequisites: Basic knowledge of inorganic chemistry and physics.
Teaching methods: lectures and exercises.
Evaluation : written exam

Registration for the course: not necessary
Registration for examination: agreement with the lecturer and academic department
Final assessment (FA) is formed only if the student has been assessed as the current control at least Medium 3.00.

Final score: FS = 0,4. CC $_{midl}$. + 0,6. WE.

Semester: 3rd semester
Cours Tipe: lectures, labs work
Hours per week/FS/: 3 lecture hours, 4 labs+tutorial hours per week /FS/
ECTS credits: 9
Lecturer: Assoc. Prof. Zhivko Velkov, Assoc. Prof. Atanas Chapkanov.
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
Requirements/Prerequisites: knowledge in inorganic chemistry and physics
Assessment:2 tests; tutorial control, evaluation of lab work, written final exam
Rating:
Running control carried out by the lecturer (2 combined tests, connected with the content of the Organic chemistry I part) D1, D2, D3 and D4.
Evaluation of the work in the lab (K1, K2 и K3); Running control from the tutorial (E1 и E2). Written final exam (Exam) (2 theoretical questions and 2 practice tests)

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

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

1. Book in Organic Chemistry;
2. Practical Handbook in Organic Chemistry G. Petrov, *Organic Chemistry*, University Publishing House " St.Kliment Ochridski", 1966.

Physical Chemistry – part I

Semester: 3rd semester
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 2 hour labs
ECTS Credits: 8
Lecturer: Prof. Mario Mitov, PhD
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description:
The course in the Physical Chemistry I includes the principles of the Thermodynamics and their application on the main macroscopic objects: gases, liquids and solids. This material is distributed in three parts as follows: (i) FUNDAMENTALS OF THE THERMODYNAMICS; (ii) THERMODYNAMICS OF OPEN SYSTEMS; (iii) THERMODYNAMICS OF SOLUTIONS.The lectures are illustrated by computing and laboratory exercises, solving examples from the lecture and the laboratory material.
Course Aims:
The aims of the curriculum of the Physical Chemistry are to expand the professional horizons and culture of the students, building on knowledge obtained from previous chemical disciplines and adding new facts and methods. Students are expected to acquire skills for proper orientation associated with phenomena, effects and processes in macroscopic homogeneous systems. It is expected that students can solve problems based on the knowledge on fundamentals of thermodynamics for quantitative interpretation of experimental.
Teaching Methods: lectures and practical exercises.
Requirements/Prerequisites: The basic knowledge on General Chemistry and Mathematics.
Exam: final written exam
Assessment: 2 tests on the lecture material D1, D2; 2 tests on practical material K1, K2; written final exam
Rating: = 0,4 .($\frac{D1+D2}{2}$) + 0,2 .($\frac{K1+K2}{2}$) + 0,4 (Exam)
Registration for the exam: Coordinated with lecturer and Students Service Department

Electricity and magnetism

Semester: 3rd semester
Cours Tipe: lectures, seminars, laboratory classes
Hours per week: 3 lecture hours, 3 labs.
ECTS credits: 9,5
Lecturer: Assoc. Prof. Luben Mihov Ivanov, Ph.D.
Department: Physics, Faculty of Natural Sciences and Mathematics
Status of the Subject: Compulsory

Subject Description: The course considers the general laws of electrical and magnetic phenomena. The first part studies basic laws of electrical phenomena such as electromotive force, electric fields, electrical potential, Gauss law, dielectrics and metals in electrical field, conductors, and electrical current. The second part considers magnetic phenomena and includes field of moving charge, electrical dipole, magnetic forces, electromagnetic induction, and magnetic properties of mater. The third section concerns questions of movement of the electrical parts in electric and magnetic fields.

Specific Goals of the Subject: Students acquire knowledge about Electromagnetism, Optics, Quantum Mechanics, Modern Atomic and Nuclear Physics. Material is selected depending of the specificity of the specialty. For that reason some specific topics are presented in details. Parts of topics with practical importance are directed to the laboratory classes.

Pedagogical Methods: Lectures are visualized by demonstrations and laboratory tasks performance during the laboratory classes. From methods point of view teaching material is grouped in sections following logical consistency of the cause.

Preliminary Requirements: Basic knowledge in Physics and Mathematics.

Subsidiary Materials: Educational literature on General and Applied Physics and printed materials on the topics given by lecturer.

Evaluation Method: Final examination in written form and subsequent conversation with the lecturer. Some intermediate tests conduct through the semester.

Inscribing for tuition: Not necessary.

Inscribing for exam: Agreement with the lecturer.

References:

1. Иванов Л. М. „Електричество и магнетизъм “ Университетско издателство „Н. Рилски“, 2011;
2. Иванов Л. М. „Обща физика II част“ Университетско издателство „Н. Рилски“, 2010
3. B. Crowell., “Electricity and Magnetism”, Wiley, 1998;
4. Ив. Лалов „Електромагнитни явления” Университетско издателство Св. Кл. Охридски”, София, 1997;
5. Т.И.Трофимова, Курс физики”, Университетско издателство Св. Кл. Охридски”, София, 1994;
6. Савельев И.В. „Курс общей физики” 2е изд. Москва, Наука, 1988;
7. С.А.Тошев, И.Баев, М.Маринов, Л. Бончев, „Физика” ДИ „Наука и изкуство”, София 1987;
8. М. Яворский, А.А. Делтаф, „Курс физики” , „Вышая школа”, Москва, 1989;
9. Фейман Р., Лейтон Р. Сендс, „Файманови лекции по физика”, т.5 „Електричество и магнетизъм”, „Мир”, Москва**;**
10. Ив. Амов „Инженерна физика”, ВПИ, Благоевград, 1991**.**

Abbreviation:

FS: Fall Semester

SS: Spring Semester

PSYCHOLOGY

(GENERAL, DEVELOPMENTAL AND EDUCATIONAL PSYCHOLOGY)

ECTS credits: 3
Weekly workload: 2+1.
Form of Assessment: exam
Type of the exam: written
Lecturer: Prof. Maria Mutafova, PhD,
Department of Psychology,
e-mail: mariamutafova@swu.bg

Annotation:

Bachelors acquire specialized theoretical competence in Psychology (General, Developmental and Educational psychology) course . The purpose of the proposed training is students to benefit from advances in world practice in General, Developmental and Educational psychology, and building skills to interpret data from empirical studies for application of appropriate methods of psychological diagnosis, research design and psychological characteristics of the interaction between teachers and students of varying ages. Competence, skills and research culture in Psychology is stimulated.

ORGANIC CHEMISTRY – II -part

ECTS credits: 8	Weekly classes : 3L +3 labs +0 s +0 p + p
Form of Assessment:	Exam
Type of exam:	Written
Semester :	III - semester
Methodological guide:	Department of "Chemistry "
Faculty:	Faculty of Mathematics and Natural Sciences
Lecturer:	Assoc. Prof. A. Chapkanov, PhD , chapkanov@swu.bg Assoc. Prof. Zivko Velkov, PhD
Status of course:	Obligatory

DESCRIPTION:

Second part of organic chemistry is a logical continuation of the studied classes of the first part. The course will be examined the properties of a number of other important classes of organic compounds and groups such as carbonyl derivatives, carboxylic acids and their functional derivatives, nitrogen-containing, important natural biologically active compounds such as carbohydrates, amino- carboxylic acids, peptides, lipids and etc., including homologous order, names, nomenclature, physical and chemical properties and receiving. Will be discussed the specific types of reactions for each class separately and dependencies associated with the reaction, their ability and the factors influence on the rate of reaction. A special attention is paid to the practical application of the studied compounds and the effects which they have on the living organisms development.

Aim of the course:

The course aims is to provide the students basic knowledges of the composition, structure, properties and methods of preparation of the most important classes of organic compounds.

Practical workshops and seminar in practical form designed to help the students perception and understanding of the lecture material and build the habit of creative application of knowledge, to develop experimental skills, working in the field of organic chemistry.

Teaching methods: Lectures, laboratory work and seminars, problems decission, testing, out-of-class work.
Prerequisites: Basic knowledge of inorganic chemistry and physics.
Teaching methods: lectures and exercises.
Evaluation : written exam
Registration for the course: not necessary
Registration for examination: agreement with the lecturer and academic department
Final assessment (FA) is formed only if the student has been assessed as the current control at least Medium 3.00.

Final score: $FS = 0,4.\ CC_{midl.} + 0,6.\ WE.$

Semester: 4th semester
Course Title: Organic Chemistry II
Course Type: Lectures and lab work
Hours per week/SS/: 3 lecture hours, 4 labs hours per week /SS/
ECTS credits: 9
Lecturer: Assoc. Prof. Zhivko Velkov, Assoc. Prof. Atanas Chapkanov.
Department: Chemistry, Faculty of Natural Sciences and Mathematics, telephone: 885381, e-mail: himia@aix.swu.bg.
Course Status: Obligatory course
Short Description:
The main object of the lectures in Organic Chemistry II part is: Study of properties and mechanism of chemical reactions of carbonyl compounds, carboxylic acids and their derivatives, N-containing compounds, heterocyclic compounds, important biologically active natural compounds: carbohydrates, amino acids, peptides, nucleotides, lipids, isoprenes, steroids and alkaloids.
Course Aims:
The aim of the course in organic chemistry is to give the students thorough knowledge about the composition, structure, properties and methods for preparation of the most important organic compounds.
The practical exercises seek to help the student by understanding and giving a meaning of the lectures, to acquire a habit of constructive application of knowledge, to build up skills in the field of organic chemistry.
Teaching Methods: lectures, laboratory work, individual student's work
Requirements/Prerequisites: knowledge in inorganic chemistry and physics
Assessment: 2 tests; evaluation of lab work, written final exam
Rating:
Running control carried out by the lecturer (2 combined tests, connected with the content of the Organic chemistry II part) D1, and D2. Evaluation of the work in the lab (K1, K2 и K3); Written final exam (Exam) (2 theoretical questions and 2 practice tests)

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

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

1. Book in Organic Chemistry;
2. Practical Handbook in Organic Chemistry G. Petrov, *Organic Chemistry*, University Publishing House " St.Kliment Ochridski", 1966.

Physical Chemistry – part II

Semester: 4th semester
Type of the course: lectures and laboratory exercises
Hours per week: 2 hours lectures, 1 hour labs
ECTS Credits: 6
Lecturer: Prof. Mario Mitov, PhD
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description:
The course in the Physical Chemistry II applies the Thermodynamic method for description of equilibrium and non-equilibrium chemical and electrochemical systems. The material is distributed in four parts as follows: (i) Chemical equilibrium; (ii) Chemical kinetics; (iii) Surface phenomena; (iv) Electrochemistry. The lectures are illustrated by computing and laboratory exercises, solving examples from the lecture and the laboratory material.
Course Aims:
The aims of the curriculum of the Physical Chemistry-II are to apply the Thermodynamics and the Physical laws to examining the chemical and electrochemical processes. Students are expected to acquire skills for proper orientation associated with phenomena, effects and processes in chemical and electrochemical systems.
Teaching Methods: lectures and practical exercises.
Requirements/Prerequisites: The knowledge of thermodynamical principles and laws.
Exam: final written exam
Assessment: 2 tests on the lecture material D1, D2; 2 tests on practical material K1, K2; written final exam
Rating: = 0,4 .($\frac{D1+D2}{2}$) + 0,2 .($\frac{K1+K2}{2}$) + 0,4 (Exam)
Registration for the exam: Coordinated with lecturer and Students Service Department

Theoretical Mechanics

Semester: 4th semester
Cours Tipe: Lectures and seminar exercises
Hours per week/FS/SS: 2 lecture hours, 2 seminar exercises hours per week/FS
ECTS credits: 4
Lecturer: Assistant Prof. Ralitsa Stanoeva, PhD, Assistant prof. R. Popova.
Department: Physics, Faculty of Natural Sciences and Mathematics.
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.
Preliminary Requirements: Basic knowledge in General Physics (Mechanics) and Mathematical Calculus.
Subsidiary Materials: Educational literature on Classical Mechanics.
Evaluation Method: Written examination and additional conversation with the lecturer upon course topics. Some intermediate tests conduct through the semester.
Inscribing for tuition: Not necessary.
Inscribing for exam: Agreement with the lecturer.
Note: The lecture course could be suitable for students of other natural sciences
Abbreviation:
FS: Fall Semester
SS: Spring Semester

Optics

Semester: 4th semester
Cours Tipe: Lectures, seminars. laboratory classes
Hours per week/FS/SS: 3 lecture hours, 0 seminar exercises hours, 1 hour labs FS
ECTS credits: 8
Lecturer: Assoc. Prof. Luben Mihov Ivanov Ph.D.
Department: Physics, Faculty of Natural Sciences and Mathematics.
Status of the Subject: Compulsory
Subject Description: The course considers 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**.**
Specific Goals of the Subject: 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.
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.
Preliminary Requirements: Basic knowledge in Physics and Mathematics.
Subsidiary Materials: Educational literature on General and Applied Physics and printed materials on the topics given by lecturer.

Evaluation Method: Written examination and additional conversation with the lecturer upon course topics. Some intermediate tests conduct through the semester.
Inscribing for tuition: Not necessary.
Inscribing for exam: Agreement with the lecturer.
Note: The lecture course is suitable for students of all natural and technical sciences.
References:

1. Иванов Л. М. „Обща физика II част“ Университетско издателство „Н. Рилски“, 2010
2. Justin Pedtrose, Mihael Ware, “Physics of Light and Optics” Brigham Young University, 2011.
3. Н. И. Колитевский, “Волновая оптика” Москва 1992 М.
4. Борн, Волф, “ Основы оптики” Москва 1984
5. Г. С. Ландсберг, “Оптика” Наука, Москва 1976
6. Т.И.Трофимова, Курс физики”, Университетско издателство Св. Кл. Охридски”, София, 1994.
7. Савельев И.В. „Курс общей физики” 2е изд. Москва, Наука, 1988
8. С.А.Тошев, И.Баев, М.Маринов, Л. Бончев, „Физика” ДИ „Наука и изкуство”, София 1987
9. М. Яворский, А.А. Делтаф, „Курс физики” , „Вышая школа”, Москва, 1989.
10. Фейман Р., Лейтон Р. Сендс, „Файманови лекции по физика”, т.5 „Електричество и магнетизъм”, „Мир”, Москва 1991.

Abbreviation:
FS: Fall Semester
SS: Spring Semester

Pedagogy

Semester: 4th semester

Cours Tipe: compulsory
Hours per week: 30 lectures, 30 seminars, 0 practical exercise
ECTS credits: 4

Lecturer: Assoc. prof. D.Sc. Lidiya Tsvetanova - Churukova
Tel. 0888492612; e-mail: lidycveta@mail.bg
Department: Pedagogy, Faculty of Pedagogy.

Assessment form: exam
Type of the exam: written
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.

References:

1. Kuzovlev V.P, Gerasimova E. H. , Ovchinnikova A.Z. , Tsvetanova - Churukova L.Z. , Popkochev T.A. Pedagogy . - Blagoevgrad : Publishing SWU " N.Rilski " Publishing EGU " I.A.Bunin " , 2010, 2011.
2. Experience in usage of integrated forms of training in primary grades in the Bulgarian schools (Text) / LZ Cvetanova - Churukova / / Educational psychology in the multicultural space - Elets, 2010 № 3 . - V.1 -2 . ;
3. Tsvetanova - Churukova L.Z. Integrated education in primary grades. Monograph. - Blagoevgrad: SWU "N.Rilski", 2010 + CD; Toihurst, W. & Group Using The Internet, Yndianopols, 1996 .
4. Education trends in perspective: Analysis of the world education indicators. - 2005 ed. - Paris: UNESCO, 2005. - 229 p.
5. The encyclopedia of comparative education and national systems of education / Ed. By T. Neville Post lethwaite. - Oxford: Pergamon Press, 1988. - XXVIII, 778 p.
6 . Global education digest 2004: Comparing education statistics across the world. - Montreal: UNESCO inst. for Statistics, 2004. - 153 p.
7 . Bruner, Jerome Seymour The culture of education. - Cambridge, Mass: Harvard Univ Press, 1996. - XVI, 224 p.
8 . E-LEARNING and training in Europe: A survey into the use of e-learning in training and professional development in the European Union. - Luxembourg: Office for office. Publ. of the Europ. Communities, 2002 . - VI, 65 p.
9. INTERNATIONAL mobility of the highly skilled: OECD proceedings. - Paris: OECD, 2002. - 348 p.
10 . NATIONAL action to implement lifelong learning in Europe. - Brussels: Eurydice, 2001. - 151 p.
11. WHAT schools for the future? Schooling for tomorrow. - Paris: OECD, 2001. - 250 p.
12. CHANG, Gwand-Chol et al. Educational planning through computer simulation / G. - C.Chang, M.Radi - Paris: UNESCO, 2001. - [VIII], 85 p.
13. Learning to bridge the digital divide: schooling for tomorrow. - Paris: OECD, 2000. - 137 p.
14. LEARNING to change: the experience of transforming education in South East Europe, Ed. By Terrice Bassler. - Budapest etc.; Centr. Europ. Univ. Press, 2005. - XIX, 220 p.
14. Marty Nicole Informatique et nouvelles pratiques d ecriture. - Paris: Nathan, 2005. - 256

p.
15 . Charlier Bernadette, Peraya Daniel Technologie et innovation en pedagogie. - Bruxelles: De Boeck & Larcier sa; Editions De Boeck Universite, 2003. - 230 p.

ANALYTICAL CHEMISTRY - I part

Semester: V semester
Type of the course: Lectures and exercises
Hours per week / FS / SS: 2 hours lectures + 2 hours exercise per week / FS
ECTS credits: 7 credits
Lecturers: assoc.prof. Petko Bozhidarov Mandzhukov, Ph.D.,
head ass.prof. Petranka Petrova Petrova, Ph.D.
University / Faculty / Department: SWU "N. Rilski", Blagoevgrad , bul "Ivan Mihailov " №66 Faculty of Mathematics and Natural Sciences , Department of " Chemistry "
e-mail: himia@swu.bg
COURSE STATUS IN THE CURRICULUM: Compulsory from the bachelor's curriculum
in " Chemistry and Physics"
COURSE DESCRIPTION: Basic principles of analytical chemistry. Modeling equilibria in solutions and evaluation of parameters related to chemical analysis. Theory of classical qualitative analysis - systematic analysis in solutions. Basic methods of sampling and preparation of samples. Methods for detection , identification , separation and masking components of the analyzed sample. Basic principles of classical quantitative analysis . Gravimetric analysis. Volumetric analysis. Selecting a method for solving a particular analytical task, selecting indicators and conditions for the analysis. Evaluation of systematic and random errors caused by various factors including the accuracy of the overall analytical procedure.

COURSE AIM: The course aims to introduce students to the basics of classical analytical chemistry and approaches in modeling and evaluation of parameters in equilibrium systems. Provides the basic knowledge necessary for the processing of the classical methods for the quantitative analysis needed to operate main instrumental methods of analysis .
Teaching methods: lectures, seminars , and individual work
Prerequisites: Basic knowledge of general chemistry, physical chemistry , and mathematics.
Assessment: Two tests K1 and K2; assessment of laboratory work L, final written exam E.
Final score: = 0.5 x [(K1 + K2) / 2] + 0.2 x [L] + 0.3 x [E]
Note: estimates K1 = K2 = K = Excellent (6) - the student is exempted from written examination and receives a final rating: Excellent (6)
Registration for examination: in agreement with the lecturer and academic department abbreviations:

FS: Fall semester
SS: Spring semester

Chemical Technologies

Semester: 5 th
Hours (weekly): 2 hours lectures

Course Type: Lectures
ECTS credits 3
Lecturer: Professor Dragomir Yankov, PhD
Department:. Chemistry, Faculty of Natural sciences and Mathematics.
Course status: Obligatory course in Chemistry B.S. Curriculum
Short Description: One studies the processes and equipment on which the chemical technology are based. The students get acquaintance with the fundamental laws of fluid mechanics, heat and mass-transfer and the constructions of machines and apparatusse4s where they take place. The students get basic knowledge on important industrial processes of creating the chemical productions in relation with the contemporary requirements to them. The application of those principles is illustrated by examples from inorganic and organic technologies which are well developed in Bulgaria and in the same time are fundamental for the chemical industry.
Course Aims: To show the fundamentals of the processes most widely used in the chemical technologies and their application in selecting and determining the characteristics of equipment for industrial realization of these processes. To show the application of knowledge from different sciences (chemistry, material science, ecology, etc.) in creating a chemical technology and to acquaint the students with the most important chemical and metallurgical productions.
Teaching Methods oral presentations illustrated by schemes, drawing and video clips demonstrated by appropriate techniques
Requirements: Knowledge in chemistry, physical chemistry, physics and mathematics
Registration for the course: It is not necessary, because the course is compulsory
Exam: Test and final written exam
Registration for the exam: Coordination with lecturer and Students Service Department.

References:
[1] D. Elenkov, Automation in chemical industry, Technology, Sofia 1967 (in bulgarian)
[2] L. Kogan, Unit operation in chemical technology, Chemistry, Leningrad, 1977 (in Russian)
[3] P. Wankat, Rate controlled separations, Elsevier Science, New York, 1990
[4] E. Ignjatovic, Chemical technique. Processes and apparatuses, Technosphere, Moscow, 2007, p.1, 2,3 (in Russian)
[1] R. Dimitrov, B. Boyanov, Inorganic Chemical Technology, University Press Plovdiv, Plovdiv, 2001
[2] I. Muhlenov, General Chemical Technology, High School, Moscow, 1984
[3] Van den Bong, V. Jong, Industrial Chemical Processing, Prentis Hall, London, 1990
[4] M. Hocking, Modern Chemical Technology and Emission Control, Publishing House "St. Kl. Ohridski ", Sofia, 2002
[5] A. Kutepov M., T. I. Bondareva, M. D. Berengarten, General Chemical Technology, High School, Moscow, 1990
[6] A. Stefanova, S. Voinov and others., Handbook of fundamentals of chemical technology, Technical University, Sofia, 1971

ELECTRODYNAMICS

Semester: 5th semester
Type of presentation: lectures, seminar classes, laboratory classes

Hours per week / AS / SS: 2 Lecture hours /2 Seminar hours / AS
ECTS credits: 4
Lecturer: Assoc. Prof. Dimitrina Kerina, PhD, Assistant Prof. Rumiana Popova
Department: Physics, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course for subject Chemistry and Physics, B.Sc. Curriculum.
Short Description: The general loading of the course is 60 hours (it includes 30 lecture hours and 30 hours seminar exercises) and 60 out auditorium hours. In this course are considered the following main topics: Electrical charges, Basic Laws of Electrostatic Fields, Mechanical influence of the Electrostatic Field, Basic Laws of the Stationary Fields, Mechanical influence of the Stationary Magnetic Fields, Alternative Electromagnetic Fields and Mechanical influence of the Electromagnetic Field.
Course Aims: Students acquire knowledge about Electromagnetic interactions in vacuum and Special theory of relativity.
Teaching Methods: Lectures are prepared on Power point. The contemporary technical equipment as multimedia, software, models, etc. is used for these lectures. Lectures are visualised by demonstrations and seminar tasks performance during the seminar classes.
Requirements / Prerequisites: Basic knowledge in General Physics and Mathematics.
Evaluation Method: The final rating is formed at the end of the course on the basis of the rating of a written test (WT) on all topics mentioned above and of the student's routine control (RC) in the following ratio: 0.4RC+0.6WT.
Final grade calculation is done by using a 6-point rating scale: the rating 6 equals level A on ECTS; the rating 5 equals level B on ECTS; the rating 4 equals level C on ECTS; the rating 3 equals level D on ECTS; the rating 2 equals level E on ECTS.
Inscribing for tuition: Not necessary.
Inscribing for exam: Agreement with the lecturer and the Students Service Department
References:

1. Христо Попов, *Електродинамика,* Унив. изд. Св. Климент Охридски, 1995 .
2. Димитър Трифонов, *Класическа електродинамика*, Ун. Издателство на ЮЗУ „Неофит Рилски", 1995.
3. В. Карлуковски, *Лекции по електродинамика и теория на относителността*, Херон Прес, 2004.
4. David J. Griffiths, *Introduction to Electrodynamics,* Prentice-Hall International, 1999.

Abbreviation:
AS: Autumn Semester
SS: Spring Semester

Methodology of Physics Teaching and Astronomy

Semester: 5th semester
Type of presentation: lectures, seminars
Hours per week / AS / SS: 4 lectures, 1 leminar (fall semester)
ECTS credits: 7
Lecturers: Assoc. Prof. Radost Ivanova Vassileva, Ph.D.
Department: Physics, Faculty of Natural Sciences and Mathematics.

Course Status: obligatory course in Pedagogy of Teaching Chemistry and Physics B.S. Curriculum

Course Description: The discipline is constructed implementing the most significant and outstanding ideas and trends in the development of the Methodology of Physics Teaching as an educational science and also in the practice of teaching physics in secondary school. The theoretical and methodological grounds of curriculum, organization and management of the educational process in physics teaching in secondary school are introduced as well as the main state endorsed documents concerning it.

Specific Goals of the Course: The main objective of the course is the students to get a contemporary innovational preparation to apply suitable didactic technologies to organize an effective learning and educational process in physics teaching in secondary school.

Pedagogical Methods: lectures, seminars, tutorials, individual student's work

Requirements/Prerequisites: basic knowledge in Psychology and Pedagogy

Subsidiary Materials: Physics textbooks for the high and higher schools, textbooks on methods for teaching physics, reference books and encyclopedic dictionaries on Physics

Assessment: final written exam on the theoretical material from the lectures

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

References:

1. Кюлджиева М. Дидактика на физиката в средното училище. Шумен, УИ „Епископ Константин Преславски", 1997.
2. Методика преподавания физики в средней школе. Под редакцией С. Е. Каменецкого, Л. А. Ивановой. М., Просвещение, 1987.
3. Бугаев, А. И. Методика преподавания физики в средней школе. М., Просвещение, 1981.
4. Андреев, М. Процесът на обучението. Дидактика. С., УИ „Св. Климент Охридски", 1996.
5. Гюрова, В., В. Божилова, В. Вълканова, Гр. Дерменджиева. Интерактивността в учебния процес. С., Агенция ЕВРОПРЕС, 2006.
6. Разумовский, В. Г. Развитие творческих способностей учащихся в процессе обучения физики. М., Просвещение, 1975.
7. Пидкасисты, П. И. Самостоятельная познавательная деятельность школьников в обучении. М., Педагогика, 1980.
8. http://www.phys.uni-sofia.bg/annual/arch/101/full/GSU-Fizika-101-10_full.pdf
9. Бижков, Г. Теория и методика на дидактическите тестове. С., 1996.
10. Василев, Д. Проверяването и оценяването на знанията в обучението. С., Народна просвета, 1987.

Classroom observation of physics

ECTS credits: 1.5
Grading format: Continuous assessment
Semester: 5

Weekly credit hours: 1 lecture class
Type of discipline: Obligatory

Methodical guidance:
Department of Physics
Faculty of Natural Sciences

Teachers:
Chief Assistant Prof. Rumyana Popova, Department of Physics

Course description:

"Attendance of Physics Lessons" is an inseparable part of the " Chemistry and Physics" 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 analysing 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 behaviour, 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 Educaion 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:

$$\text{Final Mark} = 0{,}6*(SG) + 0{,}4*(AG)$$

Atomic and Nuclear Physics

Semester: 5^{th} semester
Type of presentation: lectures, laboratory classes
Hours per week / AS / SS: 2 lectures, 2 lab
ECTS credits: 8
Lecturer: Assistant Prof. Ralitsa Stanoeva, Ph.D.
University/Faculty/Department: SWU "Neofit Rilsky"-Blagoevgrad; 66, Ivan Mihailov Blvd./ Natural Sciences & Mathematics/ Physics
Status of the Subject: Eligible
Subject Description: Introduction to Atomic and Molecular Physics. Structure and Models of the Atom. Hydrogen Atom. Interaction of Atoms with Electromagnetic Radiation, External Electric and Magnetic Fields. Zeeman Effect. Intermolecular Interactions. Basic concepts of Nuclear Physics. Nuclear structure. Nuclear Forces. Isotopic Spin. Parity Violation, Neutron-Proton diagrams. Radiation α, β and γ. Nuclear models. Nuclear

reactions. Neutron Physics. Fission. Fusion. Nuclear reactors. Basic concepts of Radiation Safety. Elementary particles.

Specific Goals of the Subject: The students acquire basic knowledges required about Atomic and Nuclear Physics. Material is selected depending of the specificity of the speciality. For that reason some specific topics are presented which are not included in the Physics programme for non-physical students.

Pedagogical Methods: Lectures are visualised by demonstrations and laboratory tasks performance during the laboratory classes. From methods point of view teaching material is grouped in sections by logical consistency from Structure of Atoms and Atomic and Nuclear Models to Nuclear Physics. Practical topics are directed to the laboratory classes.

Preliminary Requirements: Basic knowledge in General Physics and Maths.

Subsidiary Materials: Educational literature on Atomic and Nuclear Physics and printed materials on the topics given by lecturer.

Evaluation Method: Written examination. Some intermediate tests conduct through the semester.

Inscribing for tuition: Not necessary.

Inscribing for exam: Agreement with the lecturer.

Note: The lecture course is suitable for students of all natural and technical sciences.

ANALYTICAL CHEMISTRY - II part

Semester: VI semester

Type of the course: Lectures and exercises

Hours per week/ FS / SS: 2 hours lectures + 2 hours exercise per week / SS

Number of credits: 4 credits

Lecturers: assoc.prof. Petko Bozhidarov Mandzhukov, Ph.D.,

Head Ass. Prof. Petranka Petrova Petrova, Ph.D.

University / Faculty / Department: SWU " N. Rilski", Blagoevgrad , bul "Ivan Mihailov " № 66 Faculty of Mathematics and Natural Sciences , Department of " Chemistry "

e-mail: himia@swu.bg

COURSE STATUS IN THE CURRICULUM: Compulsory from bachelor’s curriculum in " Chemistry and Physics"

COURSE DESCRIPTION: General stages of the analysis using instrumental methods. Absolute and relative methods, calibration and basic metrological characteristics of instrumental analytical methods. Potentiometry and spectrophotometry. Principles of atomic spectral , electrochemical magnitohimichnite, chromatographic and radiochemical methods.

COURSE AIM: The course aims to familiarize students with the basic principles of the most commonly used instrumental methods for determination of various analytes in different samples. The physical basis, the advantages and limitations of the commonly used analytical methods are discussed. The aim is to equip students with the knowledge necessary to select the appropriate analytical method for solving a particular analytical task. Special attention is paid to the specifics of the analysis of trace elements.

Teaching methods: lectures, seminars , and individual work

Prerequisites: Basic knowledge of general chemistry, physical chemistry , and mathematics course completion Analytical Chemistry Part I .

ASSESSMENT: Project K; assessment of laboratory work L , written final exam E

Final score: = 0.5 x [K] + 0.2 x [L] + 0.3 x [E]

Registration for examination: in agreement with the lecturer and academic department regulations.

abbreviations:
ZS: winter semester
PM: summer semester

Didactics in Teaching Chemistry

Semester: 4th semester
Type of the course: lectures and seminars
Hours per week: 5 hours lectures, 1 hour seminar/ SS
ECTS Credits: 7
Lecturer: Assoc. Prof. Velichka Dimitrova, PhD
Department: Chemistry, Faculty of Natural Sciences and Mathematics.
Course Status: Compulsory course
Short Description:
General Didactics in Teaching Chemistry includes: didactics in teaching chemistry, methods of scientific pedagogical researches in general didactics, aims, contents, forms and means of chemistry education and environmental protection; educational chemical experiment.
Special methods of didactics in teaching chemistry includes: national educational requirements for the school content, school programs in 5-10 the grade, classical ideas on matter structure, theory of electrolytic dissociation, valence and oxidation state, inductive study on chemical elements – alkali metals and halogens, periodical law and periodical system, deductive learning of chemical elements, as well as organic chemistry.
Course Aims:
The course aims to prepare students for their future teaching activities at the primary and secondary schools. A general place takes system an acquiring of theoretical and practical knowledge, formulation of contemporary intellectual, personal and social competences. Special attention has to be laid on the connection between chemistry and practice, as well as the problems of the environmental protection.
Teaching Methods: Presentations of lectures and seminars are by mans of slides, CD - multimedia, school experiments.
Requirements/Prerequisites: The basic knowledge on Chemistry, Pedagogy, Pedagogic Psychology and Audiovisual and Information Technology in education.
Exam: final written exam
Assessment: 3 homework D1,D2,D3; 2 tests K1, K2 (project); written final exam
Rating: $= 0{,}2 \,.\left(\frac{\mathbf{D}1+\mathbf{D}2+\mathbf{D}3}{3}\right) + 0{,}5 \,.\left(\frac{\mathbf{K}1+\mathbf{K}2}{2}\right) + 0{,}3$ (Exam)
Registration for the exam: Coordinated with lecturer and Students Service Department

Classroom observation of chemistry

Semester: 4th semester

Type of the course: exercises
Hours per week: 1 hours/SS
ECTS Credits: 1
Lecturer: Assoc. Prof. Velichka Dimitrova, PhD
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 students practical preparation. This course provides the basic of successful leading of current and pre diploma pedagogical practices in chemistry. Basic knowledges of Psychology, Pedagogy, Pedagogy Psychology, Didactics in Teaching Chemistry and Audiovisual and information technologies in teaching, as well as a school course of Chemistry and environment protection (for the 6-12 grades) are required.
Course Aims:
The aim of the course classroom observation in school is to prepare students for their teaching practice in chemistry. Main focus of the course is the observation and lessons analyses in chemistry in order to help students to acquire a model of theoretical knowledge and practical know-how. This will help them to build contemporary intellectual, personal and social competencies in organizing and leading teaching activities for their future realization
Requirements: The base knowledge on chemistry, physics and biology from secondary school is requested, as well as the knowledge on university courses on psychology, pedagogy and didactics in chemistry and physics teaching.
Assessment: current control

Methods and technique of the school physics experiment

Semester: 6th semester
Type of the course: Laboratory exercises
Hours per week: 2 laboratory hours (Spring semester).
ECTS Credits: 4
Lecturers: Assoc. Prof. Radost Ivanova Vassileva, Ph.D.
Department: Physics, Faculty of Natural Sciences and Mathematics.
Course Status: Obligatory course in Pedagogy of Teaching Chemistry and Physics B.S. Curriculum
Course 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 Course: 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 students' 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.

Pedagogical Methods: Students perform demonstration experiments, frontal experiments, laboratory and experimental work. After each laboratory class, students prepare the respective protocols.
Requirements/Prerequisites: Basic knowledge in Physics and Methods for teaching physics.
Subsidiary Materials: High school physics textbooks, physics experiment textbooks and manuals, handbooks, physics encyclopedic dictionaries.
Assessment: 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 protocols.
References:

1. Попов, Б., Др. Иванов. Учебният експеримент по физика – част първа. С., Народна просвета, 1990.
2. Попов, Б., Др. Иванов. Учебният експеримент по физика – част втора. С., Народна просвета, 1992.
3. Иванов, Др. Забавни опити по физика. 1. Механика. С., „Просвета" АД, 2001.
4. Иванов, Др. Забавни опити по физика. 2. Термодинамика и молекулна физика. С., „Просвета – София" АД, 2003.
5. Иванов, Др. Забавни опити по физика. 3. Електричество и магнетизъм. С., „Просвета – София" АД, 2005.
6. Иванов, Др. Забавни опити по физика. 4. Оптика. С., „Просвета – София" АД, 2007.
7. Христозов, Д., И. Младенов, С. Арменски, Н. Андреев, М. Минев, Х. Манев. Лабораторен практикум по физика. С., Наука и изкуство, 1990.
8. Методика преподавания физики в средней школе. Под редакцией С.Е. Каменецкого, Л. А. Ивановой. М., Просвещение, 1987.
9. Попов, Х., В. Караиванов, Ст. Станев, Др. Иванов. Ооо, физика! Пак ли?! С., „Просвета – София" АД, 2005.

Astronomy

Lecturers : assistant professor Ivo Angelov, PhD

University/Faculty/Department : SWU "Neofit Rilski", 66 Ivan Mihailov str. ,
Blagoevgrad / Natural sciences and Mathematics / Physics

Course Status : Compulsory course in the "Pedagogics of the teaching in chemistry and physics" B.S Curriculum.

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 10^{20}eV.

Special attention is paid to the structure of our Galaxy, its place in the Universe and its relationship with other astronomical objects.

The visual positions and movements of the celestial objects, including the Sun, the planets and their satellites are examined. An accent is taken on the Solar system and the modern cosmic methods for its examination. A subject of explanation in details is the connection between the observed characteristics of the stars, their inner structure and the respective methods for observation and examination.

Course Aims :
The course in *Astronomy* has the task to acquaint the students with the basic methods and concepts of the classic astronomy and also with the modern ideas for the internal structure if the stars, their evolution, and the related with it observational characteristics.

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

Requirements/Prerequisites : knowledge in common physics, nuclear physics.

Assessment : Written exam after the end of the lecture course.

Registration for the Course : Not necessary

Registration for the Exam : Coordinated with the lecturer.

EDUCATION AND DEVELOPMENT OF SPECIAL NEEDS PUPILS

Hours per week: 2 lectures, 1seminar
ECTS credits: 5
Type of the course: elective
Form of Assessment: exam
Type of exam: written
Department: Pedagogy, Faculty of Pedagogy.
Lecturer: Assoc. prof. Pelagia MihaylovaTerziyska, PhD**.** Department "Pedagogy"
E-mail: pterziyska@abv.bg
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 mini-experiments 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.

References:

1. Ainscow M., Booth T. (2003) The Index for Inclusion: Developing Learning & Participation in Schools. Bristol: Center for Studies in Inclusive Education
2. Cortiella, C. (2009). The State of Learning Disabilities. New York, NY: National Center for Learning Disabilities.
3. Stainback, W., & Stainback, S. (1995). *Controversial Issues Confronting Special Education*. Allyn & Bacon.
4. Strully, J., & Strully, C. (1996). Friendships as an educational goal: What we have learned and where we are headed. In W. Stainback & S.
5. Thomas, G., & Loxley, A. (2007) *Deconstructing Special Education and Constructing Inclusion* (2nd Edition). Maidenhead: Open University Press.
6. Terziyska, P. (2012).). Children with special educational needs in the mainstream environment.
7. Trainer, M. (1991). *Differences in common: Straight talk on mental retardation, Down Syndrome, and life*. Rockville, MD" Woodbine house.

Didactics and techniques of chemistry experiments in school

Semester: 7th semester

Type of the course: lectures and laboratory exercises

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

ECTS credits: 5

Lecturers: assoc. prof. Velichka Dimitrova, PhD

Department: Chemistry, Faculty of Natural Sciences and Mathematics.

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

Audiovisual and information technologies in education

Semester: 7th semester
Type of the course: lectures and laboratory exercises
Hours per week: 3 hours lectures, 1 hours labs/FS
ECTS Credits: 3
Lecturer: Assoc. Prof. Velichka Dimitrova, 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 knowledges 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.
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.
Exam: The control and the assessment are carried out during the lectures, the labs and the final project.
Registration for the exam: Coordinated with lecturer and Students Service Department

School-based teaching practicum of chemistry

Semester: 7th semester
Type of the course: exercises
Hours per week: 2 hours/FS
ECTS Credits: 3
Lecturer: Assoc. Prof. Velichka Dimitrova, PhD
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 course assures the basics of successful leading of pre-diploma pedagogical practice in chemistry. The current pedagogical practice in chemistry can be led only on condition that the student is covered successfully exams in general and inorganic chemistry, physical chemistry, analytical and organic chemistry.

Course Aims:

The aim of the course is to give students abilities for planning, preparation and realization of the lessons for "Human and nature" (5th and 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 plan-scenario of the lesson, observe their colleagues and take part in the discussion after the lesson.

Thus, the students have the opportunity to compare planned and realized lessons, to defende of proposed plans and new ideas.

Requirements: The base knowledge on chemistry, physics and biology from secondary school is requested, as well as the knowledge on university courses on psychology, pedagogy and didactics in chemistry and physics teaching.

Assessment: current control

School-based teaching practicum of physics

ECTS credits: 1.5
Weekly credit hours: 2 seminar classes
Grading format: Continuous assessment
Type of discipline: Obligatory
Семестър: 7

Methodical guidance:
Department of Physics
Faculty of Natural Sciences

Teachers:
Chief Assistant Prof. Rumyana Popova, Department of Physics

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.

Course description:

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.

General Biology and Basis of Biochemistry

Semester: 7th semester
Course Type: lectures
Hours (weekly): 2 hours lectures
ECTS Credits: 4
Lecturer: Assoc. Prof. Milena Koleva
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 T_1 и T_2 and Final exam
Rating: 0,4 [(T_1+ T_2):2] + 0,6 (Exam)
Requirements: Knowledge in Chemistry, Biochemistry and Biology.
Exam: final exam

Class-practice period of chemistry

Semester: 8th semester
Type of the course: exercises
Hours per week: 3 hours/SS
ECTS Credits: 4
Lecturer: Assoc. Prof. Velichka Dimitrova, PhD
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

ECTS credits: 1.5
Weekly credit hours: 3 seminar classes
Grading format: Continuous assessment
Type of discipline: Obligatory
Semester: 8

Methodical guidance:
Department of Physics
Faculty of Natural Sciences

Teachers:
Chief Assistant Prof. Rumyana Popova, Department of 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 behaviour, 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:

$$FM = 0,5*(OM) + 0,3*(MM) + 0,2*(DM)$$