

QUALIFICATION CHARACTERISTIC OF A MAJOR FIELD OF STUDY

“PEDAGOGY OF TEACHING IN MATHEMATICS, COMPUTER SCIENCE AND INFORMATION TECHNOLOGY”

“Bachelor of Science” Degree with a Professional Qualification **“Teacher of Mathematics, Informatics and Information Technology”**

The specialty “Pedagogy of Teaching in Mathematics, Computer Science and Information Technology” is from professional Area 1.3. Education Pedagogy ... The Bachelor degree is 4 years. The bachelors’ graduates in this specialty acquire the professional qualification "Teacher of Mathematics, Computer Science and Information Technology".

Requirements for the Professional Qualification and Competences of Students Completing This Major Field of Study

The specialty "**Pedagogy of Teaching of Mathematics, Informatics and Information Technology**", through the compulsory subjects included in the curriculum, provides fundamental broad-based preparation for students, and through the elective and optional disciplines – more profound knowledge in the fields of mathematics, psychology, methodology and pedagogy of mathematics, informatics and information technology, as well as other fields such as economics, ecology, business, law and more. Graduates have basic knowledge in mathematical fields such as algebra, geometry, mathematical analysis, differential equations, probabilities and statistics, numerical methods, mathematical optimization, as well as knowledge in computer science such as object-oriented programming, data structures and algorithms, information technology, and more. Bachelors in "Pedagogy of Teaching of Mathematics, Informatics and Information Technology", also have in-depth theoretical knowledge of psychology, pedagogy and methodology of teaching mathematics, computer science and information technology in school, as well as the knowledge and skills to perform pedagogical experiments and analyze their results. In the learning process, students acquire the skills and knowledge to independently search for the necessary scientific information from literary sources, multimedia presentation of various projects, reports and messages. Good command of English is a prerequisite for their successful professional realization.

PROFESSIONAL SKILLS AND COMPETENCE

After completing the Bachelor's Degree in the major, the student must have the following knowledge and skills:

- Knowledge of basic mathematical theories, principles and results in the various fields of mathematics;
- Building rigorous mathematical proofs and demonstrate proficiency in various methods of mathematical proof;
- Knowledge of the basic principles of computer science, programming, algorithms, know how to and successfully use information technology;
- Knowledge of the basic principles of pedagogy and teaching methodology of mathematics and informatics, and to be able to apply them in his pedagogical practice.

Each graduate teacher of mathematics, informatics and information technology must have acquired the following key skills: ability to formulate mathematical statements, to present evidence of those statements, to be familiar with the basics of computer science and information technology.

The basic skills that will improve the competencies of a teacher in mathematics and computer science are:

- Mastering the basics of elementary and high mathematics and being able to apply them creatively in his work;
- To be able to organize experimental studies, analyze their data, model the situation; to work with mathematics in an interdisciplinary context; to use computing tools to retrieve information;
- To be able to use abstract and logical thinking, of quantitative and qualitative analysis of the problems related to his professional realization;
- To be able to extract qualitative information from quantitative data;
- To organize experimental studies, analyze their data and model situations of pedagogical and methodological type;
- To use specialized programming languages and software in his/her work;
- To know English and to use it to gain new knowledge and to advance in one's professional realization.

PROFESSIONAL REALIZATION

The specialists in the area of “Pedagogy of Teaching in Mathematics, Informatics and Information Technology” are prepared to carry out pedagogical and educational work in all types and grades of educational institutions and institutes of the educational system.

The graduates of the major are prepared theoretically and practically to work as teachers of mathematics, informatics and information technology in all types of secondary schools, and as educators in classrooms, dormitories and others, to organize and conduct the educational process of mathematics, informatics and information technology in workshops, trainings and extracurricular courses. The teachers in the major can discover and develop the creativity of the students, needed to solve scientific, industrial and other problems, to provide proper professional orientation, to develop practical, experimental and intellectual skills in their students. These specialists can carry out experiments using teaching laboratory and computer equipment, and work as lecturers at universities and researchers at BAS institutes.

FLEXIBILITY OF SPECIAL TRAINING

The Faculty of Mathematics and Natural Sciences provides the parameters that guarantee the flexibility of the chosen specialty:

- acquisition of a second or new specialty within the framework of the bachelor program;
- transition from training in one major to another;
- acquisition of a higher education degree;
- early completion of training if desired by trainees;
- acquisition of a new major;
- transfer to another higher education institution, faculty, major and form of education;
- interrupting students' learning and continuing thereafter;
- selecting the lecturer by the students when more than one lecturer is teaching one course.

ADMISSION REQUIREMENTS AND PROCEDURES

The prerequisite knowledge, skills and abilities are described in the admission exam syllabus of mathematics. This information is available in the SWU “Neofit Rilski” Student Directory. Candidate - students take the entrance examination and after its successful passing, participate in the ranking for their desired majors.

CURRICULUM STRUCTURE

Major in "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

First year			ECTS
First Semester	ECTS credits	Second Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Foundations of Mathematics	2	Mathematical Analysis 2	8
Linear Algebra	7	Algebra	8
Analytical Geometry	7	Object-oriented Programming	6
Mathematical Analysis - 1	7	Mathematical Logic	5
Introduction to Programming	5	Foreign Language 2	3
Foreign Language 1	2	Sport	
Total:	30	Total:	30
		Total ECTS credits for the 1 st study year:	60
Second year			ECTS
Third Semester	ECTS credits	Fourth Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Differential Equations And Applications	5	Mathematical Optimization	5
High School Course in Algebra and Analysis	7	Operating System	5
Number`s Theory	4	High School Course in Geometry	7.5
Introduction to Information Systems and Technologies	4	High School Course in Informatics and Information Technologies	7.5
Computer Systems and Networks	5	Pedagogy	5
Psychology	5		
Total:	30	Total:	30
		Total ECTS credits for the 2 nd study year:	60
Third year			ECTS
Fifth Semester	ECTS credits	Sixth Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Methods of Teaching Informatics and Information Technologies	7	Probability and Statistics-Methodology and Technologies	6
Classroom Observation in Informatics and Information Technologies	3	Databases	6
Numerical Methods	6	Optimization Algorithms in Graphs and Networks	4
Geometry	6	Methods in Teaching Mathematics I	4
Optional course from I.A (group 1)	4	Classroom Observation in Mathematics	3
Optional course from I.B (group 1)	4	Information and Communication Technology for Teaching and Digital Work	3
Sport		Optional course from I.B (group 2)	4
Total:	30	Total:	30

		Total ECTS credits for the 3 rd study year:	60
Fourth year			ECTS
Seventh Semester	ECTS credits	Eighth Semester	ECTS credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Methods in Teaching Mathematics II	6	Teacher Practice in Mathematics	3
Current Teaching Practice in Mathematics	4.5	Teacher Practice in Informatics and Information Technologies	3
Current Teaching Practice in Informatics and Information Technologies	4.5	Inclusive Education	1.5
Workshop on Mathematics	3	Internet Technologies	3
Optional course from I.A (group 2)	4	Optional course from I.A (group 3)	4
Optional course from I.B (group 3)	4	Optional course from II. (group 2)	4
Optional course from II. (group 1)	4	Optional courses	1.5
		Thesis Defense	10
Total:	30	Total:	30
<u>Optional Courses - I.A group</u>		<u>Optional Courses - I.B group</u>	
<u>group 1</u>		<u>group 1</u>	
Fundamentals of arithmetic	4	Computer Security	4
Fundamentals of geometry	4	Object-oriented and Distributed Databases	4
Discrete Mathematics	4	Web Systems and Technologies	4
Mathematical Structures	4	Specialized Statistical Software	4
		Applied Statistics	4
<u>group 2</u>		<u>group 2</u>	
Semigroup Theory	4	Data Processing and Analysis in MSExcel and VBA	4
Geometry of Circles	4	Introduction to LATEX-2ε	4
Numerical Methods Monte Carlo	4	Workshop on Databases	4
Numerical Methods for Extremum Problems	4	Graphic Design of Printed and Promotional Materials	4
		Workshop on Web Design	4
<u>group 3</u>		<u>group 3</u>	
Practical Course in Mathematical Modelling in MATLAB	4	Interactive Multimedia Technologies	4
Computer Models in Natural Sciences	4	Web design and Internet Programming	4
Introduction to Cryptography	4	Programming in Object Pascal and Delphi	4
Oral and Written Communication	4	Programming in C++ Builder	4
		Mathematical Foundations of Computer Graphics	4
<u>Optional Courses - II group</u>		<u>Facultative Courses</u>	
<u>group 1</u>			
History of Mathematics	4	Extremum Problems and Modelling in High School Mathematics	1.5
Educational Computer Games in Mathematics and Informatics	4	Technologies and Methodologies of e-Learning	1.5
Curriculum and Teaching Methods in Optional and Extracurriculum Mathematics Courses	4	Workshop on Databases	1.5

		Web Systems and Technologies	1.5
<i>group 2</i>		Graphic Design	1.5
Intercultural education	4	History of Bulgarian Education	1.5
Training and Development of Students with Special Educational Needs	4		
High School Mathematics Workshop	4		
		Total ECTS credits for the 4 th study year:	60
Total for 4 years:	240		

Total for 4 years: 240 credits

FOUNDATIONS OF MATHEMATICS

Semester: 1 Semester

Course type: lectures/ exercises

Hours per week: 2 hours lectures, 0 hours exercises/labs

ECTS credits: 2.0 credits

Lecturer: Assoc. Prof. Ph.D. Vasil Grozdanov

e-mail: vassgroz@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073/588557

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course Fundamentals of mathematics present a review, with some extension, of the high school algebra and geometry. The course objective is to align all students' knowledge of high school mathematics. On the other hand, this course will represent a transition from elementary to higher mathematics. Some major topics in algebra and geometry will be introduced with some extensions.

Course Objectives: The purpose of this course is for students to gain knowledge and skills in all important topics of high school mathematics and to apply this knowledge in their studies and future pedagogical work.

Teaching Methods: lectures, exercises, consultations, homework, coursework and ongoing tests.

Requirements/Prerequisites: Basic knowledge of elementary mathematics is required.

Assessment: ongoing tests and final written exam.

Registration for the exam: in agreement with the teacher and the department of student education.

LINEAR ALGEBRA

Semester: 1 Semester

Course type: lectures + labs + exercises

Hours per week: 3 hours lectures + 2 hours labs + 1 hour exercises

ECTS credits: 7.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Ilinka Dimitrova

e-mail: ilinka_dimitrova@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” – Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course includes the study of: basic concepts of combinatorics and complex numbers, matrices, determinants, systems of linear equations and methods for solving them, linear spaces, linear transformations and their actions, orthogonal and symmetric matrices and transformations, quadratic forms canonization.

Course Objectives: Students must acquire knowledge and skills to apply the studied theory to modeling and solving real-world practical problems, to perform basic actions with matrices, to solve determinants, systems of linear equations by Gauss and Kramer methods, to work freely with linear spaces and transformations, to quadratic form in canonical form.

Teaching Methods: Lectures, exercises, consultations, homework, coursework and ongoing tests.

Requirements/Prerequisites: Basic knowledge of the high school mathematics is required.

Assessment: Continuous control during the term, including homework and supervision, and a written exam on the topics of seminars and lectures.

Registration for the exam: in agreement with the teacher and the department of student education.

ANALYTICAL GEOMETRY

Semester: 1 Semester

Course type: lectures + labs + exercises

Hours per week: 3 hours lectures + 2 hours labs + 1 hour exercises

ECTS credits: 7.0 credits

Assessment: exam

Lecturers: Prof. Ph.D. Iliia Giudjenov

e-mail: iliadgl@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” – Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course includes the study of: vector calculus with free vectors, affine coordinate systems and analytical representation of lines and planes. After the introduction of the double ratio, projective coordinate systems are also used. The basic elements of projective, affine and metric theory of second degree figures are studied.

Course Objectives:

Students should acquire knowledge and skills to implement the analytical apparatus for the study of geometric objects.

Teaching Methods: Lectures, exercises, consultations, homework, coursework and ongoing tests.

Requirements/Prerequisites: Basic knowledge of Linear Algebra and Mathematical Analysis is required.

Assessment: written exam on the topics of seminars and lectures.

Registration for the exam: in agreement with the teacher and the department of student education.

MATHEMATICAL ANALYSIS 1

Semester: 1 Semester

Course type: lectures + labs + exercises

Hours per week: 3 hours lectures + 2 hours labs + 1 hour exercises

ECTS credits: 7.0 credits

Assessment: exam

Lecturers: Assoc. Prof. Ph.D. Vasil Grozdanov

e-mail: vassgroz@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: Discipline training involves learning infinite numbers and rows, boundary, continuity and derivative of the function of a variable, as well as exploring the variation and plotting the functions of a variable. Indefinite and definite integrals are studied.

Course Objectives: Learning the basic methods for studying the functions of a variable, as well as the basic methods for solving indefinite and definite integrals.

Teaching Methods: Lectures, exercises, consultations, homework, coursework and ongoing tests.

Requirements/Prerequisites: good knowledge of the high school mathematics is required.

Assessment: Written exam on the topics of the seminars and lectures.

Registration for the exam: In agreement with the teacher and the department of student education.

INTRODUCTION TO PROGRAMMING

Semester: 1 Semester

Course type: lectures and labs in a computer room.

Hours per week: 2 hours lectures + 2 hours lab

ECTS credits: 5.0 credits

Assessment: exam

Lecturers: Assist. Prof. Ph.D. Ivo Damyanov

e-mail: damianov@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad

Course Status:

Compulsory course in the B.S. Curriculum of "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Short Description: Introduction to programming is the first course in programming in the field of Informatics. The course includes topics related to syntax and semantics in programming languages, control constructs and operators in programming language, arrays, and more. The course is based on the C ++ programming language.

Course Objectives:

Students need to learn basic programming principles and algorithms.

Teaching Methods: lectures, laboratory work, discussions and problem solving, e-learning materials.

Requirements/Prerequisites: No special knowledge is required beyond those acquired in Computer Science and Information Technology courses from high school.

Assessment: current control assessment and written exam. Current assessment tests and problems during exercises and lectures. (50%). Final exam - test and problems (50%). In case of receiving the grade Poor (2) of either the final test or the final tasks, the final exam evaluation is Poor (2).

A minimum of 65% of the total score is required.

Registration for the course: automatic

Registration for the exam: in agreement with the teacher and the department of student education

FOREIGN LANGUAGE 1

Semester: 1 Semester

Course type: lab

Hours per week: 2 hours exercises

ECTS credits: 2.0 credits

Assessment: ongoing assessment

Lecturer: Ass. Bogdan Filatov

e-mail: bogdan@abv.bg

Department: Faculty of Philology, SWU “Neofit Rilski” – Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course "English Language" introduces students with the basics of English - grammar and vocabulary. The covered topics include phonetics, spelling, the parts of speech, verb tenses and syntax in English.

Course Objectives:

The purpose of the course is to provide students with knowledge of grammar rules and basic lexical knowledge; to meet the minimum requirements for written and spoken English language; to gain the ability to understand and use the common computer terminology.

Teaching Methods: Lab.

Requirements/Prerequisites: Minimum initial knowledge from high school would serve as a basis for upgrading new knowledge and skills.

Assessment: written exam.

Registration for the course: it is necessary to apply to the department at the end of current semester.

Registration for the exam: in agreement with the teacher and the department of student education.

MATHEMATICAL ANALYSIS 2

Semester: 2 Semester

Course type: lectures + labs + exercises

Hours per week: 3 hours lectures + 2 hours labs + 1 hour exercises

ECTS credits: 8.0 credits

Assessment: exam

Lecturers: Assoc. Prof. Ph.D. Vasil Grozdanov

e-mail: vassgroz@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” – Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The training in the course involves learning the basic concepts of mathematical analysis - part two. The course includes studying the functions of two or more variables, continuity, partial derivatives, local and conditional extremes, implicit functions, change of variables. Definition of double and triple Riemann's integral, properties and applications for calculating faces and volumes. First and

second-order curvilinear integrals. Surface integrals of the first and second kind. Basic integral formulas of analysis.

Course Objectives: Mathematical Analysis` discipline - part two is a basic mathematical discipline in the preparation of students. Knowledge is required to study Mathematical Analysis III, ordinary differential equations, optimization, numerical methods and more.

Teaching Methods: Lectures, exercises, consultations, homework, coursework and ongoing tests.

Requirements/Prerequisites: Basic knowledge of Mathematical Analysis I is required.

Assessment: Written exam on the topics of the seminars and lectures.

Registration for the exam: in agreement with the teacher and the department of student education.

ALGEBRA

Semester: 2 Semester

Course type: lectures + exercises

Hours per week: 3 hours lectures + 2 hours exercises

ECTS credits: 8.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Ilinka Dimitrova

e-mail: ilinka_dimitrova@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Short Description: The course includes the study of: basic concepts of semigroups and group theory, theory of rings and fields, algebraic polynomials. The concepts are introduced in the abstract and are supported by many examples. Kelly's theorem, Lagrange's theorem, and the basic theorem for cyclic groups are proved. Basic concepts` necessary for the study of a symmetric group are described, emphasizing its importance in some practical applications. The ring material includes field characteristics, simple fields, ring homomorphisms theorem and practical analysis of specific rings. The topic of finite fields is also included. The polynomial section deals with classical issues such as the private and residual division theorem, Euclid's largest common divisor algorithm, Horner's scheme, polynomial roots, Viet formulas, symmetric polynomials, and modern applications of polynomials over end fields.

Course Objectives: Students should acquire knowledge and skills in basic algebraic structures - semigroups, groups, rings and fields, in polynomial theory and in the application of this apparatus to solve some practical problems related to other mathematical and informatics disciplines. The acquired knowledge in this fundamental discipline is aimed at using by students in their education in a number of other disciplines.

Teaching Methods: Lectures, exercises, consultations, homework, coursework and ongoing tests.

Requirements/Prerequisites: Basic knowledge of number`s theory and linear algebra is required.

Assessment: Ongoing semester control, including homework and coursework and written exam on seminars and lectures.

Registration for the exam: in agreement with the teacher and the department of student education.

OBJECT-ORIENTED PROGRAMMING

Semester: 2 semester

Course type: lectures and labs

Hours per week: 2 hours lectures + 2 hours lab

ECTS credits: 6.0 credits

Assessment: exam

Lecturers: Assoc. Prof. Irena Atanasova, PhD

e-mail: irenatm@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad,

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course is designed to introduce students to the basics of object-oriented programming. It is a natural extension of the Introduction to Programming discipline. C ++, a modern, multi-language language, is selected. The basic principles of visual programming in different environments are discussed without going into detail. The course is basic to the subject of computer science and is necessary for better acquisition of many other disciplines included in the curriculum. Good understanding of the subject`s matter is essential in determining the qualification of a future IT specialist.

Course Objectives: The main goals and objectives for the students in the course are the following:

- to develop algorithmic thinking;
- to master the data structures that can be processed using a computer;
- to develop logically the individual steps in the solutions of the tasks;
- to be able to use basic programming techniques;
- to master the methods and tools of object-oriented programming in a visual programming environment;
- to master some of the classic algorithms, as well as to create their own algorithms;
- to get accustomed to good programming style;
- to learn the basic principles of software development.

Teaching Methods: The lectures are illustrated with lecture boards, slides, presentations, multimedia projector and laboratory work using the available computer equipment located in the faculty and separated in several computer rooms. The available computer equipment meets the modern requirements and is sufficient for the normal conduct of all laboratory exercises. During the seminars, tasks related to the development of algorithms for computer programs written in C ++ are solved and discussed.

Requirements/Prerequisites: The course is a continuation of the course Introduction to Programming. Students must have basic mathematical knowledge.

Assessment: Current control is carried out during laboratory sessions during the semester by two control tests and coursework – the first is set by the lecturer, the second is designed and formulated by the student according to their interests (1/3 of the final score). The course ends with a written exam on the course material (2/3 of the final grade).

Registration for the course: automatic (compulsory course)

Registration for the exam: in agreement with the teacher and the department of student education.

MATHEMATICAL LOGIC

Semester: 2 semester

Course type: lectures and lab

Hours per week: 2 hours lectures + 1 hour lab

ECTS credits: 5.0

Assessment: exam

Lecturers: Prof. Ph.D. Borislav Yurukov

e-mail: yurukov@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad,

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course in mathematical logic aims to acquaint students with the basic concepts and results of pre-emptive and predicate logic, and adjective and predictive calculus. Specific first-order theories are considered.

Course Objectives: The course in mathematical logic aims to introduce students to the development of concepts and methods of mathematical logic in the context of development in mathematics.

Teaching Methods: conversations, demonstrations, problem solving.

Requirements/Prerequisites: Basic knowledge of mathematics.

Assessment: The written exam includes solving problems and answering questions from the syllabus of the course.

Registration for the course: automatic (compulsory course).

Registration for the exam: in agreement with the teacher and the department of student education.

FOREIGN LANGUAGE 2

Semester: 2 semester

Course type: lab

Hours per week: 2 hours exercises

ECTS credits: 3.0 credits:

Assessment: ongoing assessment

Lecturer: Ass. Bogdan Filatov

e-mail: bogdan@abv.bg

Department: Faculty of Philology, SWU “Neofit Rilski” – Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course "English Language" introduces students with the basics of English - grammar and vocabulary. The covered topics include phonetics, spelling, the parts of speech, verb tenses and syntax in English.

Course Objectives: The purpose of the course is to provide students with knowledge of grammar rules and basic lexical knowledge; to meet the minimum requirements for written and spoken English language; to gain the ability to understand and use the common computer terminology.

Teaching Methods: Lab

Requirements/Prerequisites: Minimum initial knowledge from high school would serve as a basis for upgrading new knowledge and skills.

Assessment: ongoing assessment

Registration for the course: it is necessary to apply to the department at the end of current semester.

Registration for the exam: in agreement with the teacher and the department of student education.

DIFFERENTIAL EQUATIONS AND APPLICATIONS

Semester: 3 Semester

Course type: lectures + exercises

Hours per week: 2 hours lectures + 2 hours exercises

ECTS credits: 5.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Nikolay Kitanov

e-mail: nkitanov@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 588 557

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course contains a wide range of mathematical topics and problems of differential equations and applications, known and established by the teaching practice in the world (introduction to the history and quantitative theory of differential equations, examples and problems, leading to differential equations, as well as elements of nonlinear dynamics, from variational dynamics calculations, etc.). The course provides basic mathematical knowledge of the mathematical description of the evolution of processes of different nature, required in the activity of each teacher of mathematics and informatics, and in the design of the models in the natural sciences in the next semesters.

The course is part of the package of the basic courses in higher mathematics, adapted primarily to the natural sciences – with practical focus and visualization. The course consists separate modules and mostly attractive and well thought-out color computer animations, graphics, drawings, formulas. For each section there are appropriately selected examples and exercises. It is possible to change problem parameters, initial conditions, etc. In most tasks, automatic control (or self-control) is provided, which is a well-designed test related to the specific task and theory.

Course Objectives:

The proposed course aims to provide students with generally accepted and necessary mathematical knowledge of differential equations and their applications that describe the dynamics of processes, not only in natural, but also in economic and social processes.

Teaching Methods: Lectures and exercises. Multimedia course.

Requirements/Prerequisites: The course requires the advance knowledge of “Mathematical Analysis I and Mathematical Analysis II” and an introductory Linear Algebra and Geometry course from the first semester.

Assessment: written exam /it is possible to increase your grade with up to 1 point with the results from the ongoing assessments, midterm tests, and participation in the classroom/.

Registration for the course: automatic (compulsory course).

Registration for the exam: in agreement with the teacher and the department of student`s education.

HIGH SCHOOL COURSE IN ALGEBRA AND ANALYSIS

Semester: 3 Semester

Course type: lectures and lab

Hours per week: 3 hours lectures + 3 hours lab

ECTS credits: 7.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Kostadin Samardzhiev

e-mail: k_samardzhiev@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone: 073 / 588 557

Course Status: Compulsory course in the B.S. Curriculum of "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Short Description: The construction and development of the notion of number is difficult both in its mathematical and philosophical aspect, but it is also difficult in its teaching and lecturing aspect. After acquiring the knowledge of basics of arithmetic in the construction of the concept of number, in the course in "High School Algebra", this course begins with the formulation of the basic algebraic laws - commutative, associative, idempotent (neutral) elements in the actions of addition and multiplication, as well as the law of distribution, combining two operations with natural numbers. Based on the actions of addition and multiplication, the relevant regulations are also defined. The basic properties of the linear ordinance emerge – the boundedness of the lower bound of each set of natural numbers, archimedes, etc., as well as the method of mathematical ordinance associated with the two ordinances. All of this is illustrated with specific examples. The question of recording a natural number in different number systems is also considered. Since it is shown that for every two positive integers $a, b \in \mathbb{N}$ the equations $a + x = b$ and $ax = b$ in the half-ring of natural numbers \mathbb{N} have no solutions, the need to extend the half-ring \mathbb{N} to the ring of integers \mathbb{Z} is clarified, the half-field of fractions \mathbb{Q}_+ , and finally to the field of rational numbers \mathbb{Q} . For each of these structures, the validity of the basic properties of the ordinances introduced in the half-ring of natural numbers is emphasized. All of this is illustrated with relevant examples and tasks. Most of the time is dedicated to the field of real numbers and the corresponding tasks in this field - square equations and inequalities, system equations and inequalities, including those with irrational expressions, and such equivalents with the participation of special functions in the form of indicative, logarithmic, trigonometric and others.

Self-study for the course includes homework, coursework, library and computer room work, consultations, preparation for control work, assimilation of lectures and more. n. The ratio of classroom to self-study is 90:135.

Course Objectives: The course of lectures and exercises reflects the status of the above material taught in the school mathematics course and is based on the known basic algebraic structures. It aims to teach students to know these basic structures and the possible tasks that can be solved in them. With the help of acquired habits and skills, starting with an algebraic expression or a system of such with the help of possible equivalents of transformations allowed in the structure under consideration, the student, subsequently a teacher, will have to bring it to the complete canonical form.

Teaching Methods: lectures, lab, consultations, homework and tests.

Requirements/Prerequisites: Knowledge of high school algebra.

Assessment: Written exam on the seminars and lectures content.

Registration for the exam: In agreement with the teacher and the department of student education.

NUMBER`S THEORY

Semester: 3 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures and 1 hour exercises

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Prof. Ph.D. Oleg Mushkarov

e-mail: muskarov@math.bas.bg

Course Status:

Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The training begins with the introduction of the basic concepts of number theory – divisibility, comparisons, basic arithmetic theorems, and Fermat and Euler theorems. The structure of the group of residual classes, which are relatively simple with the module, is then considered. The theory of comparisons with one and several unknowns is being developed. The quadratic residues are introduced, proving the Euler criterion. Some diophantine equations and the function $[x]$ are considered.

Course Objectives: To acquire knowledge of the theoretical foundations and skills for applying the theory of numbers.

Teaching Methods: lectures, discussions, discussions on methods for solving comparisons, solving problems in number theory.

Requirements/Prerequisites: Basic knowledge of school courses, elementary concepts in group theory required.

Assessment: ongoing control during the semester (two control works) and a written examination in two parts - solving problems and developing theoretical questions.

Registration for the course: it is necessary to apply to the department at the end of current semester.

Registration for the exam: in agreement with the teacher and the department of student education.

INTRODUCTION TO INFORMATION SYSTEMS AND TECHNOLOGIES

Semester: 3 Semester

Course type: lectures and labs

Hours per week: 2 lectures /1 hour labs

ECTS credits: 4 credits

Lecturer: Prof. Ph.D. Daniela Tuparova

e-mail: ddureva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 / 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course is an introduction to information systems and technologies. Basic and theoretical concepts of information technologies – information, information activities, informatics and information technologies,

basic functions of operating systems, word processing systems, data processing systems, multimedia presentation of information to the public are considered in theoretical and practical terms, the most popular services on the global Internet, information protection, legal and ethical aspects when using information technologies.

The course is a natural continuation of the courses in Informatics and Information Technology from high school.

Course Objectives: Students must acquire knowledge of:

- Basic concepts in information technology;
- Types of base and application software and its application;
- The most popular services on the global Internet;
- Protection of information and legal and ethical aspects when using information technology.

Teaching Methods: lectures, lab work, discussions and problem solving.

Requirements/Prerequisites: No special knowledge is required beyond the lessons learned in Computer Science and Information Technology from high school.

Assessment: Assessment by ongoing control and a written exam (test).

Registration for the course: it is necessary to apply to the Student Education Department at the end of the current semester.

Registration for the exam: in agreement with the teacher and the teaching department.

COMPUTER SYSTEMS AND NETWORKS

Semester: 3 Semester

Course type: lectures, seminar exercises and labs

Hours per week: 2 lectures + 1 hour exercises + 1 hour labs

ECTS credits: 5 credits

Lecturer: Prof. Ph.D. Nina Sinyagina

e-mail: nisina36@abv.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone: 073 / 588 532

Course Status: Compulsory course in the B.S. Curriculum of "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Short Description

The course "Computer Systems and Networks" is intended for students of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology", trained under the bachelor's program. The Global Network – The Internet – is a global computer - (virtually) inexhaustible computing power and an inexhaustible store of information. Nowadays, we cannot imagine any activity without network connectivity, access to these global resources. Whatever program you write, it must be able to "talk" to the outside world. For example, to have open sockets (IP address: port) from which to "listen" for requests from other programs somewhere on the Web. All this makes it necessary to obtain knowledge on computer networks and communications. The course covers computer systems and networks, the principles of building computer networks and how the global Internet works.

Courses Objectives:

The purpose of the Computer Systems and Networks course is to provide students with a clear idea of what the initial requirements for creating web-based applications like programs that "talk" to the outside client-server and peer-to-peer systems. The material is a prerequisite for courses in Web technology, network programming and parallel processing systems.

Expected results: The expected results are the acquisition of the following knowledge and skills: to know the different types of computer networks used today, as well as the ways to build and design a universal computer network.

Teaching Methods: lectures, seminar exercises and labs.

Assessment: test and ongoing assessment, and written final exam.

Registration for the course: automatic (compulsory course).

Registration for the exam: in agreement with the teacher and the department of student education.

PSYCHOLOGY

Semester: 3 Semester

Course type: lectures, lab

Hours per week: 2 hours lectures, 2 hours seminar exercises

ECTS credits: 5 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Maria Mutafova

e-mail: mariamutafova@swu.bg

Department: Psychology, Faculty of Philosophy

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The discipline Psychology has a total of 45 hours, of which 30 hours lectures, 15 hours lab and 80 hours self-study. It introduces students to the essence of the major areas of psychology, their importance for pedagogical systems; cognitive mental functions and their role in training; the sociopsychological characteristics of the ages and the professional position of the teacher. It enables students to acquire a certain system of theoretical knowledge in the field of Psychology, to comprehend them in accordance with the modern requirements of pedagogical practice, to acquire skills for their application in specific situations in accordance with age, to form a positive stereotype for pedagogical activity with psychological determinism.

The course in Psychology is divided into the following three modules:

The first module – Theoretical-historical and introductory problems of Psychology, which introduces students to the process of distinguishing psychology as an independent science, the main theoretical and methodological issues that are developed in it and psychic functions.

The second module – Theoretical and applied problems of age, presents to the students with the basic theoretical assumptions about the psychogenesis of the person, the need to periodize it; acquaintance with the mental characteristics of each age period and their importance in the process of education and training.

The third module – Current Issues in Educational Psychology, dedicated to the assimilation of information on the nature of the main and leading activities, their importance during each age period, the role of the educator in the implementation of systematic training.

Teaching Methods: lecture (introductory, traditional, summarizing, selective) discussion, exam training.

Assessment: the total value of 5 credits is converted into 50 contingent units. 25 conditional units are recruited from auditorium and 25 conditional units are obtained from independent work. The assessment from the current control test is calculated by the formula: $2 + (5 * \text{number of solved items in the test})$: total

number of items in the test). In the evaluation of the current control test average (3), 2 units; good (4) gives 3 units; very good (5) gives 4 units; excellent (6) gives 5 units. Students are given instructions for developing theoretical topics in psychology and guidelines for developing scientific and practical topics in psychology. There are 40 conditional units required for admission to the exam.

All assessments are based on written works that are stored within the timeframe specified by the Education Regulations. They are subject to control by the relevant authorities.

MATHEMATICAL OPTIMIZATION

Semester: 4 Semester

Course type: lectures and labs

Hours per week: 2 hours lectures and 2 hours exercises.

ECTS credits: 5.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Stefan Stefanov

e-mail: stefm@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Course Objectives: The purpose and main task of the course Mathematical Optimization is to provide students with knowledge of basic theoretical results and methods for solving different classes of optimization (extreme) problems.

The question of the existence of a solution to extreme problems is considered. The main results and approaches for solving nonlinear optimization problems are presented: John's theorem, Lagrange multiplier theorem, general nonlinear optimization theorem. The study of and on the basics of convex analysis and the representativity of sets is included: convex sets, convex envelope of sets, Radon theorem and Heli theorem, sum of sets and multiplication of set by number, projection of a point on set, separation of convex sets, reference hyperplanes, dimension of convex sets, endpoints and Minkowski - Crane - Milman theorem, cones, conjugate (polar) cones, convex cones representation, convex sets representation, multilateral sets, convex functions derived in a direction sub-gradients and sub-differentials, differentiable convex function. After this preliminary preparation, we present the main results of convex optimization: the Kun-Tucker theorem, the differential form of the Kun-Tucker theorem. The topic of quadratic optimization is also covered.

The seminar exercises and laboratory classes provide the study of the theory and methods of linear optimization: general and canonical linear optimization problem, geometric method for solving two-dimensional linear problems, simplex method, artificial basis method (M-method) for solving the canonical problem with unknown initial basis, ambiguity in linear optimization; classical transport problem, finding an initial support plan, distribution method and method of potentials for solving the transport problem, integer transport problem, transport problems with prohibitions, task for assignments. Matrix games are studied on this basis: a minimax theorem (by John von Neumann), a geometric method for solving games 2×2 , $2 \times n$, $m \times 2$, as well as the relationship between matrix games and linear optimization.

Software products that implement the methods are also used.

Expected results: knowledge of the basic theoretical concepts, application of the studied methods for solving problems, programming of some of the methods.

Self-study for the course includes: mastering the lecture material, homework, coursework, working in a library, working in a computer room, preparing for control work and more.

The study of the subject requires basic knowledge of Mathematical Analysis, Linear Algebra and Analytical Geometry.

OPERATING SYSTEM

Semester: 4 Semester

Course type: lectures and exercises

Hours per week: 2 hours lectures and 2 hours exercises.

ECTS credits: 5.0 credits

Assessment: exam

Lecturer: Prof. Ph.D. Nina Sinyagina

e-mail: nisina36@abv.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course introduces students to the history, construction and operation of operating systems. The study material includes an introductory part – an overview of computer and operating systems. Following are questions from process organization and management, memory management, single and multi-processor scheduling. Topics for organizing input and output, disk planning, organizing, and working with the file system are a must-have for any OS course. We end with distributed processes and security

Course Objectives: Students are introduced to the theoretical foundations of operating systems.

Tasks - Forming Habits for

- Working with different operating systems.
- Programming in OS environment.

Teaching Methods: lectures, discussions and exercises

Requirements/Prerequisites: none (basic course)

Assessment:

- Ongoing control - 30% of the assessment
- Final test 70% of the evaluation

The course is considered as successfully completed with a minimum of 65% of the maximum score.

Registration for the course: automatic (compulsory course)

Registration for the exam: in agreement with the teacher and the department of student education.

HIGH SCHOOL COURSE IN GEOMETRY

Semester: 4 Semester

Course type: lectures and lab

Hours per week: 3 hours lectures and 3 hours seminar exercises

ECTS credits: 7.5 credits

Assessment: exam

Lecturer: Assoc. Prof. Kostadin Smardzhiev, Ph.D.

e-mail: k_samardzhiev@swu.bg

Department: Department of Mathematics, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course covers the following geometric transformations: equality, similarity, affinity. Basic topics include face of a polygon and a tetrahedron.

Course Objectives: Students will acquire the theoretical and practical background needed to teach geometry in schools.

Teaching Methods: lectures, lab, consultations, homework and tests.

Requirements/Prerequisites: Basic knowledge of geometry, studied during school years.

Assessment: Written exam on seminar exercises and on theoretical material during the lectures.

Registration for the exam: In agreement with the teacher and the department of student education.

HIGH SCHOOL COURSE IN INFORMATICS AND INFORMATION TECHNOLOGIES

Semester: 4 Semester

Course type: lectures, exercises

Hours per week: 3 hours lectures, 3 hours exercises

ECTS credits: 7.5 credits

Assessment: exam

Lecturers: Prof. PhD Daniela Tuparova

e-mail: ddureva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course is designed to give students an insight into to the status and trends of the development of computer science and IT education in high school. It covers the core modules of the content of the school courses in computer science and IT.

Included are questions related to basic concepts in computer science such as: information, algorithm, software and hardware.

Course Objectives:

Upon completion of the course, students should be able to:

- To be familiar with the development of secondary school education in the subjects of computer science and IT.
- Knowledge of IT and IT curricula;
- Use programming languages taught in high school;

Teaching Methods: lectures, discussions, exercises and a project.

Requirements/Prerequisites: Students must have studied the following subjects, Operational Systems, Programming Languages, Data Structures, Databases, Discrete Mathematics, Computer Networks.

Assessment:

- practical work - 50%
- Written exam - 50% of the grade

The course is considered as successfully completed with a minimum of 65% of the maximum score.

Registration for the exam: in agreement with the teacher and the department of student education.

PEDAGOGY

Semester: 4 Semester

Course type: lectures and seminar exercises

Hours per week: 2 hours lectures, 2 hours seminar exercises

ECTS credits: 5.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Lydia Tsvetanova-Churukova

e-mail: lidycveta@swu.bg

Department: Department of Pedagogy, Faculty of Pedagogy

Short Description: The curriculum offers specialized pedagogical knowledge, differentiated into two main modules: Theory of Education and Theory of Learning. It is intended for students in the field of Pedagogy of Teaching in ..., which presupposes its reduced profile and type, without depriving itself of the opportunity to offer a deep reading of pedagogical knowledge.

Course Objectives:

The purpose of the discipline training is to acquire knowledge and develop competencies for their pedagogical use. The discipline offers a wide range of knowledge in the field of pedagogical such as educational and didactic phenomena, events, situations, as well as educational design related to new information and communication technologies. Main tasks of training:

1. Orientation in pedagogical issues and mastering the conceptual apparatus of science pedagogy
2. Developing a set of professional competences for pedagogical competence and professional creative thinking.
3. Broad and specialized pedagogical competence through situational and reflective thinking in the field of pedagogical knowledge and its applied aspects. Course content:

The content of the discipline includes 30 hours of lectures and 30 hours of family-based exercises, the main problematic framework of which is related to the problems of upbringing and training as a professional task in specialized social institutions such as the school, as well as the broad social resonance they may have in society. Both classical ideas of pedagogy and up-to-date or avant-garde ideas, dictated by the change of scientific paradigms in the 20th century, have been used.

Teaching Methods and Assessment:

Classical, heuristic and interactive teaching methods are used for students such as: Socratic talk and seminar, case study, educational theater, project method, business games, morphological analysis, koans, auto-trainings, psychodrama, methods for teaching lateral thinking, etc.

METHODS OF TEACHING INFORMATICS AND INFORMATION TECHNOLOGIES

Semester: 5 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 2 hours exercises

ECTS credits: 7.0 credits

Assessment: exam

Lecturers: Prof. PhD Daniela Tuparova

e-mail: ddureva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course includes methods and principles of teaching computer science and IT in high school, planning and organization of computer science and IT lessons. Specificity of teaching the core modules of the IT and IT curricula.

Course Objectives:

Upon completion of the course, students should be able to:

- Define the goals of training in computer science and information technology. Know and apply the methods and principles of training.
- To plan the lesson activity.

Teaching Methods: lectures, discussion, exercises and a project.

Requirements/Prerequisites: Students must have studied Psychology, Pedagogy, Operating Systems, Programming Languages, Data Structures, Databases, Computer Networks, School of Computer Science and IT.

Assessment:

- course work – 30% of the assessment
- practical work – 30%
- written exam – 40% of the assessment

The course is considered as successfully completed with a minimum of 65% of the maximum score.

Registration for the exam: in agreement with the teacher and the department of student education.

CLASSROOM OBSERVATION IN INFORMATICS AND INFORMATION TECHNOLOGIES

Semester: 5 Semester

Course type: exercises – classroom observation

Hours per week: 1 hours classroom observation

ECTS credits: 3 credits

Assessment: ongoing assessment

Lecturer: Assist. Katerina Marcheva

e-mail: k_marcheva@hotmail.com

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

Classroom observation is a type of hands-on training and involves observing and discussing lessons at school. It is directly related to the mathematics and informatics training course. The main emphasis in the observations is the implementation of learning principles, methods, organizational structure of the lesson, communication between teachers and students, etc. Before each observation, students are divided into groups and observe a specific component of the lesson. After the observation, each group presents an analysis of the observed components. The pros and cons of the lesson are discussed.

Course Objectives:

Upon completion of the course, students should be able to:

- analyze the observed classroom lessons;
- develop a lesson plan for a topic.

Teaching Methods: observation, discussion.

Requirements/Prerequisites: Knowledge of the course "School course in computer science and IT", knowledge of the course "Methodology of teaching in computer science and IT", which is conducted in parallel with this course.

Assessment:

- Lessons Learned – 30%
- Developed lessons in 2 lessons – 30%
- Participation in discussions – 40%

The course is considered as successfully completed with a minimum of 65% of the maximum score

Registration for the exam: None. The evaluation is based on analysis and developments presented and the participation in the discussions during the observations.

NUMERICAL METHODS

Semester: 5 Semester

Course type: lectures and labs

Hours per week: 2 hours lectures, 2 hours labs

ECTS credits: 6.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Stefan M. Stefanov

e-mail: stefm@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 / 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

Discipline training involves studying the basic numerical methods of mathematical analysis, algebra and differential equations. A detailed study of interpolation is envisaged as a way of approaching table-set functions; as well as another basic approach to function approximation is the root mean square approximation (least squares method). Special emphasis is placed on the topics of numerical differentiation

and numerical integration – the quadrature formulas of Newton-Coates and Gauss. It is envisaged to study the basic methods for numerically solving nonlinear equations. Another important topic is the numerical solution of systems of linear equations, which are obtained in many mathematical, physical, technical, etc. tasks. Methods for numerical solution of the Cauchy problem for ordinary 1st order differential equations, for numerical solution of the boundary value problem for 2nd order ordinary differential equations and variational methods for solving operator (including differential) equations are studied.

Course Objectives:

Students must gain knowledge of the basic numerical methods of mathematical analysis, algebra and differential equations that find application in solving various problems.

Teaching Methods: lectures, seminar exercises and labs

Requirements/Prerequisites: Basic knowledge of mathematical analysis, linear algebra, analytical geometry, differential equations

Assessment: written exam on tasks / or release on the basis of two control works / (assessment is 30% weight) and theory on two topics (assessment is 30% weight); current control: two homeworks (20% weight rating) and two coursework (weights 20%)

Enrollment for course training: no special enrollment is required

Registration for the course: automatic (compulsory course)

Registration for the exam: in agreement with the teacher and the department of student education

GEOMETRY

Semester: 5 Semester

Course type: lectures and lab

Hours per week: 2 hours lectures and 2 hours seminar exercises

ECTS credits: 6.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Nikolay Kitanov

e-mail: nkitanov@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, 073 / 588 557

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course training involves the study of basic issues in classical differential geometry of lines, surfaces, and surfaces in three-dimensional real Euclidean space.

Course Objectives: Students must acquire knowledge and skills in applying differential geometric methods for studying geometric objects.

Teaching Methods: lectures, lab, consultations, homework and supervision.

Requirements/Prerequisites: Knowledge of Analytical Geometry, Mathematical Analysis and Differential Equations is required.

Assessment: Written exam on seminars and theoretical material from lectures.

Registration for the exam: in agreement with the teacher and the department of student education.

PROBABILITY AND STATISTICS - METHODOLOGY AND TECHNOLOGIES

Semester: 6 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 2 hours exercises

ECTS credits: 6 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Elena Karashtranova

e-mail: helen@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course was developed as a base course in probability and statistics. The purpose of the course is to introduce students in the field of Mathematics and Informatics during their study with some basic ideas and methods of probability theory, in order to use them in modeling processes and phenomena in the field of natural sciences and computer analysis, as well as elementary modeling of social processes and phenomena in society and life.

With the help of this course, students will acquire knowledge of stochastics useful for their learning activity as well as their future experimental or scientific activity;

The course provides seminars and labs to illustrate the learning process and gain practical skills to work with MS-Excel extensions, as well as application packages.

Course Objectives: Upon completion of the course, students will be acquainted with the basic concepts of probability and statistics and their relationship with:

- Decision theory
- Evaluation theory
- Decision theory for small samples
- Test hypotheses about the type of empirical distribution.

Students should gain knowledge of the interdisciplinary nature of stochastics and discover the connections between Mathematics-Informatics-Physics-Economics and many other scientific fields.

Teaching Methods: seminar, discussion, laboratory work.

Requirements/Prerequisites: Students must have studied the subjects of Mathematical Analysis and Information Technology

Assessment:

- Ongoing control – 50% of the assessment
- Written exam – 50% of the grade

The course is considered as successfully completed with a minimum of 65% of the maximum score.

Registration for the course: automatic (compulsory course).

Registration for the exam: in agreement with the teacher and the department of student education.

DATABASES

Semester: 6 Semester

Course type: lectures and labs

Hours per week: 2 hours lectures, 2 hours labs

ECTS credits: 6.0 credits

Assessment: exam

Lecturer: Prof. Ph.D. Peter Milanov

e-mail: milanov@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course training includes the study of:

- logic and fundamentals of databases;
- physical bases of databases;
- relational approach;
- proper languages;
- analysis of relational systems.

Course Objectives:

Students will acquire knowledge of basic databases, methods of building and normalizing databases.

Teaching Methods: lectures and exercises.

Requirements/Prerequisites: Basic knowledge of: linear algebra and set theory is required.

Assessment: written exam

Registration for the course: automatic (compulsory course).

Registration for the exam: in agreement with the teacher and the department of student education.

OPTIMIZATION ALGORITHMS IN GRAPHS AND NETWORKS

Semester: 6 Semester

Course type: lectures, lab

Hours per week: 2 hours lectures, 1 hour lab

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Nikolay Kitanov

e-mail: nkitanov@swu.bg

Department: Department of Mathematics, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073/588 557

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The 1970s ushered in an exciting era of research and applications of networks and columns in operations research, industrial engineering and other related fields.

Columns are found everywhere under different names: "structures", "road maps" in civil engineering; "Connecting devices" for electrical engineers; "Sociograms", "Communication Structures" and "Organizational Structures" in Sociology and Economics; "Molecular structures" in chemistry; "Distribution networks" in gas and electricity companies.

Due to its wide applicability, graph theory has grown extremely rapidly in recent years. A major factor in this growth is the development of large and fast computing machines. The introduction of macro systems, such as portable or telecommunication links, results in large-scale graphs whose successful analysis depends on the existence of "good" algorithms and the availability of fast computers. In this regard, the current course focuses on the creation and presentation of algorithms for the analysis of columns that are used in various fields to help solve existing problems.

Although in general the efficiency of algorithms is of great importance, this course is not intended to be a reference for analyzing the effectiveness of algorithms. Often a particular method is discussed because of its close relationship with concepts and methods already discussed.

The main task is to give the student the clearest possible idea of graph algorithms.

This course addresses some of the following basic questions:

- Presentation of graph theory (basic concepts and definitions, modeling with graphs and links, machine representation of links and graphs, complexity calculator, heuristics / heuristic algorithms /).
- Algorithms related to tree structures (algorithms for tree cover, minimum and maximum tree cover, tree propagation and forest)
- Shortest paths (Dijkstra, Ford and Floyd algorithms, search for longitudinal roads, application of shortest path algorithms).
- Flow algorithms (search for increasing flow chains, Ford Falkerson algorithm for maximum flow, modification of Edmonds and Carp, search for maximum flow at several sources and goods, flow with minimum cost, transport task, dynamic flows).
- Top and rib combinations (problem statement and examples, maximum power and weight couplings in bipolar and arbitrary columns, assignment task).
- CPP problems (Euler cycles and circuits, Chinese postman task in undirected and oriented columns).
- TSP problems (Hamilton cycles, salesman task, branch-and-bound TSP algorithms, TSP heuristic algorithms).
- Object placement (search for centers and medians in columns).
- Network planning and management (critical path finding method, topological sorting of peaks, estimate of earliest and least deadlines, minimum value projects, generalized network schedules).

Course Objectives:

Students will acquire basic knowledge and skills to solve real-life problems modeled in the language of graphs and networks.

Teaching Methods: lectures, exercises and extra-curricular work.

Requirements/Prerequisites: Prior knowledge of linear algebra, mathematical optimization.

Registration for the course: Automatic (compulsory course).

Registration for the exam: In agreement with the teacher and the department of student education.

METHODS IN TEACHING MATHEMATICS – I

Semester: 6 Semester

Course type: lectures

Hours per week: 2 hours lectures

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Prof. Ph.D. Iliia Gyudzhenov

e-mail: iliadg@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course includes problems in the common methodology of teaching mathematics such as teaching mathematical concepts, theorems, proofs in the school mathematics course, builds different forms of problem solving skills.

Course Objectives: To prepare students to be able to teach mathematics at school.

Achieving this goal is completing the following objectives:

1. Mastering methods and tools that provide effective mastery of the basic mathematical information - concepts, axioms, theorems, proofs of theorems, problems and their solutions.
2. Familiarity with the specifics of the organization of the process of studying of mathematics, according to the specific structure of mathematical knowledge.

Teaching Methods: lectures, consultations and self-work.

Requirements/Prerequisites: knowledge of high-school mathematics, as well as knowledge of psychology and pedagogy.

Assessment: written exam.

Registration for the exam: in agreement with the teacher and the department of student education.

CLASSROOM OBSERVATION IN MATHEMATICS

Semester: 6 Semester

Course type: labs

Hours per week: 1 hour

ECTS credits: 3.0 credits

Assessment: ongoing assessment

Lecturer: Assist. Daniela Kitova

e-mail: dg34@mail.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” – Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The discipline "Classroom Observation in Mathematics" introduces students to their future profession. Students observe lessons thought by high-school teachers, discuss the lessons based on pre-assigned tasks, and present three analysis of observed lessons in written form.

Course Objectives: The purpose of the course is to provide students with an understanding of basic requirements for lessons in mathematics, to acquire skills for developing different types of lessons, to select and systematize the tasks offered to students, to evaluate the work of the individual student and the class as a whole.

Teaching Methods: Practical exercises

Requirements/Prerequisites: Students should be familiar with the Methods of Teaching Mathematics and the content of the school course in mathematics: what course material is being taught and at what level.

Assessment: The final grade is formed from the discussion of the observed lessons - 60% - and from the presented written analysis of the observed lessons - 40%.

INFORMATION AND COMMUNICATION TECHNOLOGY FOR TEACHING AND DIGITAL WORK

Semester: 6 Semester

Course type: lectures and labs

Hours per week: 1 hour lectures and 1 hour exercises

ECTS credits: 3.0 credits

Assessment: exam

Lecturer: Prof. Ph.D. Daniela Tuparova

e-mail: ddureva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone.073 588 532

Course Status: Compulsory course in the B.S. Curriculum of "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Short Description: The curriculum is oriented towards mastering the modern tools and technologies applicable to education. The main features and applications of software packages in computer science and IT training are discussed. Emphasis is placed on the use of a variety of multimedia training products and the use of Internet technologies for research and development of teaching aids.

The training is supported by teaching materials published in the e-learning system maintained by the E-Learning Research Laboratory of the Faculty of Mathematics and Natural Sciences:

www.e-learning.swu.bg

Courses Objectives and Expected Results:

Upon completion of the course, students should be able to:

- know the principles of using software products in computer science training;
- acquire knowledge and skills to work with tools for presenting study materials and creating interactive tests;
- be familiar with trends in the development of multimedia technologies in training;
- create their own multimedia teaching materials to support the learning process.

Teaching Methods: lectures, labs, discussions and practical problem solving.

Requirements/Prerequisites: No special knowledge is needed beyond those acquired in Computer Science and Information Technology courses from high school.

Assessment: ongoing assessment and written exam (test).

Registration for the exam: in agreement with the teacher and the department of student education.

METHODS IN TEACHING MATHEMATICS - II

Semester: 7 Semester

Course type: lectures and exercises

Hours per week: 2 hours lectures and 2 hours exercises

ECTS credits: 6.0

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Kostadin Samardzhiev

e-mail: k_samardzhiev@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073/588 557

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course includes problems in the special methodology of teaching mathematics, namely the topics: functions, relations and operations, equations and inequalities, uniformities and similarities, vectors, geometric figures in the plane and space and their place in the school mathematics course.

Course Objectives: To prepare students for their future realization as teachers of mathematics, informatics and information technology.

Teaching Methods: lectures and exercises

Requirements/Prerequisites: Knowledge of high-school mathematics, as well as knowledge of psychology and pedagogy.

Assessment: written exam

Registration for the exam: in agreement with the teacher and the department of student education.

CURRENT TEACHING PRACTICE IN MATHEMATICS

Semester: 7 Semester

Course type: exercises

Hours per week: 2 hours exercises

ECTS credits: 4.5 credits

Assessment: ongoing assessment

Lecturer: Assist. Daniela Kitova

e-mail: dg34@mail.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 588 557

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course "Current Teaching Practice in Mathematics" prepares students for their future profession. Each student takes two lessons - one in grade 5-8 and one in grade 8-12, and the rest from group observe.

Course Objectives: The purpose of the course is to provide students with an understanding of the structure of the mathematics lesson, to acquire skills to develop a mathematics lesson, to select and systematize the tasks offered to students, to evaluate the work of the individual student and the class as a whole.

Teaching Methods: Practical exercises

Requirements/Prerequisites: Students should be familiar with the Methods of Teaching Mathematics and the content of the school course in mathematics: what course material is being taught and at what level.

Assessment: They present the plans of two lessons in mathematics and three analysis of observed lessons in written form. The final grade is formed from the assessment of the thought lessons – 60% – and from the presented plans and analysis of the lessons – 40%.

CURRENT TEACHING PRACTICE IN INFORMATICS AND INFORMATION TECHNOLOGIES

Semester: 7 Semester

Course type: labs

Hours per week: 2 hours weekly

ECTS credits: 4.5 credits

Assessment: ongoing assessment

Lecturer: Assist. Katerina Marcheva

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course "Current Teaching Practice in Informatics and Information Technologies" prepares students for their future profession. It is conducted after the lectures on Methods of Teaching Informatics and IT and Classroom Observation and meets the requirements for the practical training of students who receive a teacher qualification. The full implementation of the current practice provides the basis for the successful undergraduate pedagogical practice in informatics.

Course Objectives: The main objective of the course is to acquire the skills for planning, preparation and implementation of a lesson in computer science and information technology in a specific learning environment. Each student must prepare and deliver a minimum of 2 lessons per class. The rest of the students in the group prepare a lesson plan for themselves, watch and observe the lesson from their classmates and participate in the discussion.

Thus, there is an opportunity to compare the planned and realized lessons, to defend the proposed lesson plans and to generate new ideas.

Teaching Methods: practical exercises

Requirements/Prerequisites: Students should be familiar with the Methods of Teaching Informatics and the content of the school course in informatics: what course material is being taught and at what level.

Assessment: They present the plans of two lessons in informatics and two analysis of observed lessons in written form. The final grade is formed from the assessment of the thought lessons – 60%, and from the presented plans and analysis of the lessons – 40%.

WORKSHOP ON MATHEMATICS

Semester: 7 Semester

Course type: lectures and seminar exercises

Hours per week: 1 hour lectures + 1 hour seminar exercises

ECTS credits: 3.0 credits

Lecturer: Assoc. Prof. Ph.D. Kostadin Samardzhiev

e-mail: k_samardzhiev@abv.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073/588557,

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The construction and development of the concept of number is difficult both in its mathematical and philosophical aspect, but also in its learning and teaching. Following the familiarity with the concepts of arithmetic in the construction of the concept of number, in the course in "Workshop On Mathematics" – bachelor's degree – 7 semester begins with the formulation of the basic algebraic laws – communicative, associative, non-idempotent elements in the actions of addition and multiplication as well as the distributive law combining the two operations of the natural numbers N . Based on the actions of addition and multiplication, the corresponding regulations are also defined. The basic properties of the linear ordinance are listed – bounded below by each set of natural numbers, Archimedes, etc., as well as the method of mathematical ordinance associated with the two ordinances. The question of the divisibility of natural numbers and the concept of a prime number is also considered. All this is illustrated by specific examples. The question of recording a natural number in different number systems is also considered.

Since it is shown that for every two positive integers a, b the equations $a + x = b$ and $ax = b$ in the half-ring of the natural numbers have no solutions, the need to extend the half-ring to the ring of integers Z , respectively, is clarified. The half-field of fractions Q_t and finally to the field of rational numbers Q . For each of these structures, the validity of the basic properties of the ordinances introduced in the semicircle of natural numbers is emphasized. All of this is illustrated with relevant examples and tasks. Most of the time spent in the study hours is in the field of real numbers and corresponding tasks in this field - quadratic equations and inequalities, systems of equations and inequalities, including such and irrational expressions, and such equivalents with the participation of special functions such as exponential, logarithmic, trigonometric and other.

Self-study includes homework, coursework, work in libraries and computer rooms, consultations, preparation for control work, understanding and learning the lecture material and more. The ratio between classroom and self-study is 30:60 hours.

Course Objectives: Students must learn and understand the basic concepts, actions and regulations of the various extensions of the number concept, as well as successfully use the methods for solving equations, inequalities and systems of equations and inequalities.

Teaching Methods: Lectures, lab, consultations, homework, coursework, tests.

Requirements/Prerequisites: good knowledge of high-school mathematics.

Assessment: Written exam on the topics of the seminars and lectures.

Registration for the exam: In agreement with the teacher and the department of student education.

TEACHER PRACTICE IN MATHEMATICS

Semester: 8 Semester

Course type: exercises

Hours per week: 3 hours weekly

ECTS credits: 3.0 credits

Assessment: ongoing assessment

Lecturer: Assist. Prof. Daniela Kitova

e-mail: dg34@mail.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone: 073 588 557

Course Status: Compulsory course in the B.S. Curriculum of "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Short Description: The discipline "Teacher Practice in Mathematics" prepares students for their future profession. With the Rector's Order, students are allocated to a 10-week internship at school. They take

three lessons each week and observe their colleagues for two hours. They must take 15 high and 15 mid-course lessons throughout the practice. The schoolteachers assist in the development of lessons and control the work of trainees at school. If the trainee is not prepared for the lesson, the base teacher and the principal have the right to request a termination of the traineeship.

Course Objectives: The purpose of the course is to prepare students for their chosen profession - to gain an understanding of the structure of mathematics lessons and skills for developing different types of mathematics lessons, to select and systematize the tasks offered to students, to evaluate the work of the individual student and class in general.

Teaching Methods: practical exercises

Requirements/Prerequisites: Students should be familiar with the Methods of Teaching Mathematics and the content of the school course in mathematics: what course material is being taught and at what level.

Assessment: They present the plans of lessons in mathematics in written form. The final grade is formed from the assessment of the 2-3 thought lessons /observed by the teacher practice trainer/ - 60%, and from the presented plans of the lessons – 40%.

TEACHER PRACTICE IN INFORMATICS AND INFORMATION TECHNOLOGIES

Semester: 8 Semester

Course type: exercises

Hours per week: 3 hours

ECTS credits: 3.0 credits

Assessment: ongoing assessment

Lecturer: Assist. Prof. Katerina Marcheva

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The course "Teacher Practice in Informatics and Information Technologies" is included as compulsory. It is conducted after the lectures on Methods of Teaching Informatics and IT and Classroom Observation and meets the requirements for the practical training of students who receive a teacher qualification. The full implementation of the current practice provides the basis for the successful professional realization as a teacher in informatics.

Course Objectives: The main objective of the undergraduate pedagogical practice in informatics is the acquisition of competencies for the preparation and organization of full and effective training in informatics and information technology.

During the undergraduate pedagogical practice, students complete almost all activities of the computer science teacher. This allows, in addition to take a number of lessons, to familiarize themselves with the teaching documentation and to engage in various extracurricular activities of students.

The pre-graduation practice in informatics prepares the students for the practical exam (teaching a lesson) before a committee determined by an order of the Rector.

Teaching Methods: Practical exercises

Requirements/Prerequisites: Students should be familiar with the Teaching Methods in Informatics and IT and the content of the school computer science course: what course material is being taught and at what level.

Assessment: They present the plans of lessons in mathematics in written form. The final grade is formed from the assessment of the 2-3 thought lessons /observed by the teacher practice trainer/ - 60%, and from the presented plans of the lessons – 40%.

INCLUSIVE EDUCATION

Semester: 8 Semester

Course type: lectures

Hours per week: 1 hour lectures

ECTS credits: 1.5

Assessment: exam

Lecturer: Prof. Ph.D. Pelagia Terziyska

e-mail: pelagia.terziyska@swu.bg

Department: Management of Education and Social Pedagogy, Faculty of Pedagogy, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description: The discipline broadens and enriches the pedagogical preparation of students with major problems of the development of students with special educational needs and the specifics of their education. Students are introduced to the optimal approaches for meaningful and procedural realization of the education of students with special educational needs, depending on their capabilities and needs.

Course Objectives: Students to acquire sufficient competence for the basic characteristics of students with special educational needs, for the ways and means, forms and methods of correction-pedagogical interaction with them, for their social pedagogical problems, for the conditions that empower these students for active participation in the educational process and successful coping with the assigned learning tasks.

Teaching Methods: lectures, stimulation of active debate in subgroups, didactic games, case studies, planning and conducting mini-experiments to analyze the behavior of students with special educational needs at different moments of the lesson and extra-curricular activity.

Assessment: written exam.

Registration for the exam: in agreement with the teacher and the department of student education.

INTERNET TECHNOLOGIES

Semester: 8 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1 hour exercises

ECTS credits: 3 credits

Lecturers: Prof. Nina Sinyagina

e-mail: nisina36@abv.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Compulsory course in the B.S. Curriculum of “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”.

Short Description:

The course is designed as an introduction to technologies for implementing Web-based Internet / Intranet information systems using Oracle technology. Topics related to the process of designing and implementing effective Internet / Intranet information systems, improving their reliability and security in terms of the

global information infrastructure and correctly designing information systems related databases, are discussed. Students are introduced to one of the most common technological solutions in the field of databases for the development of Web-based information systems.

Course Objectives:

Upon completion of the course, students should be able to:

- design web-based information systems;
- implement web-based information systems.

Teaching Methods: lectures, discussion, exercises

Requirements/Prerequisites: Students must have studied the courses "Databases" and "Programming on the Internet".

Assessment:

- course work – 50% of the assessment
- Written exam test – 50% of the grade

The course is considered successfully completed with a minimum of 51% of the maximum score.

Registration for the course: automatic (compulsory course).

Registration for the exam: in agreement with the teacher and the department of student education.

OPTIONAL COURSES

FUNDAMENTALS OF ARITHMETICS

Semester: 5 Semester

Course type: lectures + seminar exercises

Hours per week: 2 hours lectures + 1hour exercises

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Ilinka Dimitrova

e-mail: ilinka_dimitrova@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad 073/ 588 557,

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The main goal of a comprehensive high school algebra course is to construct the notion of number and the related operations and the relation of ordinance, starting with natural numbers, going through natural and rational numbers, and reaching real, and in individual cases and complex numbers. The overall theoretical construction and development of the above concepts is also the purpose of the course. The basis of the course is theoretical. It begins with the definition of the term finite set, following the term induction set, introduced in the early 20th century by Bertrand Russell. Particular attention is paid in the beginning of the notion of the natural number, of the operations of the addition and multiplication of two natural numbers and the laws which satisfy them, and of the inequality between the two natural numbers. It goes from decimal to arbitrary number system and continues with extensions of the half-ring of natural numbers to the ring of integers, to the half-field of fractions and their ordinances, as extensions

of the already established in the half-ring of natural numbers. The course ends with review of the real and complex numbers.

Course Objectives: Introducing the students to the modern theoretical ideas and presentation of the comprehensive high school algebra course.

Teaching Methods: Lectures, seminar exercises, consultations, coursework, and tests.

Requirements/Prerequisites: Basic knowledge of higher algebra and number theory is required.

Assessment: Continuous control during the semester, including homework and coursework, and a written exam on the content of the seminars and lectures.

Registration for the course: it is necessary to apply to the department at the end of the fourth Semester.

Registration for the exam: In agreement with the teacher and the department of student education.

FUNDAMENTALS OF GEOMETRY

Semester: 5 Semester

Course type: lectures + seminar exercises

Hours per week: 2 hours lectures + 1hour exercises

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Nikolay Kitanov

e-mail: nkitanov@abv.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad 073/ 588 557

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description: Three of the axiomatics of Euclidean geometry are outlined: the axiomatics of D. Hilbert, the metric axiomatics of Kagan - Birchov-Kolmogorov, and the axiomatics of H. Weil, and their equivalence is proved. Particular attention is paid to the fact that in metric axiomatics the concept of a real number is taken as the primary object which is why complete metric axiomatics contains in addition to the six geometric axioms and axioms for real numbers. This necessitates, in the proof that the axioms of Hilbert follow the axioms of metric axiomatics, to prove that the axioms of real numbers follow the axioms of Hilbert, which is done in detail.

We believe that the course will enrich the students' knowledge of the deductive construction of Euclidean geometry, which will allow the future mathematics teacher to obtain a stable vocational training and to look at school geometry from a higher perspective.

Course Objectives: Students must acquire knowledge and skills for rigorously axiomatic construction of mathematical discipline.

Teaching Methods: Lectures, seminar exercises, consultations, coursework and tests.

Requirements/Prerequisites: Basic knowledge of analytical geometry and a school geometry course are required.

Assessment: Continuous control during the semester, including homework and coursework, and a written exam on the content of the seminars and lectures.

Registration for the course: it is necessary to apply to the department at the end of the sixth Semester.

Registration for the exam: In agreement with the teacher and the department of student education.

DISCRETE MATHEMATICS

Semester: 5 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures and 1 hour exercise

ECTS credits: 4 credits

Assessment: exam

Lecturer: Assist. Prof. Margarita Todorova, PhD

e-mail: todorova@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, phone: 073 / 588 532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: Basic sections of:

- combinatorics;
- graph theory;
- theory of discrete functions;
- finite state machines and formal languages.

In terms of structure and content, the course coincides with similar courses at several reputable universities around the world.

Discrete structures and their properties are closely related to the issues of the design and operation of modern computers. For this reason, the whole course emphasizes the methods of applying discrete mathematics in computer science.

Course Objectives: The course aims to provide students with knowledge of the basic sections of discrete structures that are very widely used in modern computers.

Teaching Methods: Extensive theoretical material is given in four lecture hours. From a methodological point of view, it is preferable that the lectures take place at the beginning of the week (Monday and Tuesday). In the exercises, students are prepared to solve specific practical problems related to theory. The lecture course is provided for free reading by the students on the departmental web site www.cs.swu.bg/courses/online.htm. The classes are held in seminar rooms and in the computer labs.

Requirements/Prerequisites: Basic knowledge of algebra course and graph theory is required.

Assessment: written exam.

Students are required to successfully complete two tests during the semester. The two grades from the tests make up 40% of the final semester grade. After the end of the semester, a written examination and interview are conducted, after which the final assessment.

Registration for the course: it is necessary to apply to the department at the end of втория Semester

Registration for the exam: in agreement with the teacher and the department of student education.

MATHEMATICAL STRUCTURES

Semester: 5 Semester

Course type: lectures/ lab

Hours per week: 2 hours lectures + 1 hour exercise

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Vasil Grozdanov

e-mail: vassgroz@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The discipline of mathematical structures aims at students acquiring fundamental knowledge of basic mathematical structures – natural, integer, rational and real numbers, and their specific realization as basic algebraic systems. To build as a unified and harmonious system the preparation of students-future teachers in this most important mathematical question - mathematical structures and their teaching. To shape the world of future teachers in terms of the contemporary achievements of abstract mathematics.

Course content: In the course, mathematical structures present logically, consistently and fully, the theory of basic numerical systems taught in school - natural numbers, integers, rational numbers and real numbers. The theory of the field of complex numbers is presented in view of the completeness and completeness of the preparation of students. These numerical systems are constructed using the terminology and basic results of modern mathematics. This makes it possible not only to construct numerical systems constructively but also to interpret them meaningfully as semigroups, groups, semigroups, rings, and fields. The theory of real numbers is constructed as Dedekind sections, as a Cantorian complement to the ordered field of rational numbers, as decimal and systematic fractions, and finally as chain fractions. Basic algebraic systems are presented not only in terms of principal operations but also in terms of their principal relations, in particular linear and complete ordinals, as well as the basic laws relating to principal operations and principal relations. Some basic information about the theory of numbers are presented, such as division by private and residual, largest common divisor and least Total multiple, and Euclid's algorithm.

Teaching Methods and Assessment: The training consists of a lecture course, seminars and the organization and control of students' extracurricular activities. During the lecture course students are taught the theoretical material in this discipline, during the seminars students solve problems on the relevant topics, and during the self study they learn the material independently, prepare control works and homework. Assessment consists of ongoing control and homework assessments and a written assignment and development of theoretical questions. There are procedures and rules for exams, exemptions during the written exam. A point system is in place that objectively evaluates each component of student activity.

Registration for the course: it is necessary to apply to the department at the end of the fourth Semester.

Registration for the exam: in agreement with the teacher and the department of student education.

SEMIGROUP THEORY

Semester: 7.0 Semester

Course type: lectures

Hours per week: 3 hours lectures

ECTS credits: 4.0 credits

Lecturer: Assoc. Prof. Ph.D. Ilinka Dimitrova

e-mail: ilinka_dimitrova@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” – Blagoevgrad, Phone: 073/ 588557

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The concept of semigroups originated in the early twentieth century, but the development of semigroup theory began in the late 1920s. By the 1960s, semigroup theory became a dynamically developing field of modern algebra with a wealth of problems and diverse applications. During these years, the first books on the theory of semigroups appeared. Today, both in Bulgaria and many well-known mathematical centers abroad work in this field. Semigroup theory finds application in several mathematical disciplines, such as automation theory, coding theory, differential equations, functional analysis, mathematical linguistics, and many other fields. The course begins with the study of basic concepts, properties and examples of semigroup theory. Ideals and congruences are discussed, as well as theorems for homomorphism and isomorphism of semigroups. Particular attention is given to Green's relations and the symmetric semigroup. Several symmetric semigroups with specific properties are studied, such as semigroups of transformations preserving or inverting, semigroups of transformations preserving or reversing, symmetric semigroups of partial transformations.

Course Objectives: The purpose of this course is to acquaint students with basic results in the theory of semigroups, as well as the applications of this apparatus in other mathematical disciplines. The volume of material studied enables students to further study semigroup theory on their own, to be able to take other courses using semigroup theory, to attend specialized scientific seminars in algebra, and to read articles and books in the relevant field.

Teaching Methods: lectures, consultations and a course work.

Requirements/Prerequisites: Basic knowledge of higher algebra is required.

Assessment: Ongoing control during the semester, including coursework, and a written exam on the lecture material.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

GEOMETRY OF CIRCLES

Semester: 7 Semester

Course type: lectures and lab

Hours per week: 2 hours lectures + 1 hour exercises

ECTS credits: 4.0 credits

Lecturer: Assoc. Prof. Ph.D. Nikolay Kitanov

e-mail: nkitanov@abv.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description:

Discipline training involves the study of bundles of circles and some transformations related to circles.

Course Objectives:

Students need to gain new knowledge of circles.

Teaching Methods: Lectures, seminar exercises, consultations, coursework, and tests.

Requirements/Prerequisites: Knowledge of school geometry course required.

Assessment: Written exam on the topics of seminars and lectures.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

NUMERICAL METHODS MONTE CARLO

Semester: 7 Semester

Course type: lectures

Hours per week: 2 hours lectures / 1hour exercise

ECTS credits: 4.0 credits

Lecturer: Assoc. Prof. Ph.D. Vasil Grozdanov

e-mail: vassgroz@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073/ 588557

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course includes the study of elements of probability theory as the basis of Monte Carlo methods of financial mathematics. The basic components of this discipline are also studied – the Brownian movement, the technique of variation reduction, stochastic methods of these problems, and applications for the study of American Options.

Course Objectives: To learn the basic concepts and methods for stochastic study of random variables.

Teaching Methods: Lectures, exercises, consultations, homework, coursework, ongoing tests.

Requirements/Prerequisites: good knowledge of mathematical analysis, probability theory, differential equations and other fields.

Assessment: Written exam on the lecture material.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

NUMERICAL METHODS FOR EXTREMUM PROBLEMS

Semester: 7 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1hour exercise

ECTS credits: 4.0 credits

Lecturer: Assoc. Prof. Ph.D. Stefan Stefanov

e-mail: stefm@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Course Objectives: Purpose and the main objective of the course Numerical Methods for Extremum Problems is to provide students with knowledge of the basic numerical methods for solving different classes of optimization (extreme) problems.

The topics of algorithm, algorithmic image, composite image and convergence of algorithmic images is considered. The basic methods for one-dimensional minimization are presented: the splitting method, the gold section method, the Fibonacci method, the Newton method, the parabola method. The basic unconditional optimization methods are also envisaged: zero-order methods (coordinate descent method, Hook and Jeeves method, Rosenbrock method), first-order (gradient methods: fastest descent method), second-order (Newton method, method modifications) as well as conjugate methods (conjugate gradient method: Fletcher-Reeves method, Pollock-Ribier method; quasi Newtonian methods: Davidson-Fletcher - Powell method). Methods of conditional optimization are considered – methods of possible directions (of Zoitendijk, of Rosen, of the reduced gradient), methods of penal (fining) and barrier functions. Particular attention is paid to the basics of non-smooth analysis and methods of non-differentiable (non-smooth) optimization. The study of basic results and methods of stochastic optimization is envisaged. Numerical methods are presented for solving separable optimization problems. The basics of the dynamic optimization method and the R. Belman principle are studied. Vector (multicriteria) optimization and Pareto optimization are considered.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

PRACTICAL COURSE IN MATHEMATICAL MODELLING IN MATLAB

Semester: 8 Semester

Course type: lectures + labs

Hours per week: 1hour lecture + 2 hours lab

ECTS credits: 4,0 credits

Lecturer: Assist. Prof. Ph.D. Boyana Garkova

e-mail: big@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” – Blagoevgrad, Phone: 073/ 588 557,

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course is included as an elective in the curriculum and is intended for students with a keen interest in mathematical modeling and the numerical implementation of mathematical models through software products, in particular – the Matlab software environment. It introduces students to the rich capabilities of Matlab, which is a solid base for performing analytical and numerical calculations in a number of fields, as well as creating their own software packages.

Course Objectives: The course discusses the basic functions of the Matlab kernel and how to create new programs (m-files). Particular attention is paid to programming and creating custom programs to solve mathematical models. The purpose of the laboratory exercises is to acquaint the students with the graphical environment for simulation of Simulink systems and the rich possibilities of Matlab for calculating boundaries, derivatives, integrals, study of functions and actions with complex numbers or most Total in the application of the environment in mathematical modeling.

Teaching Methods: Lectures, labs, consultations, tests.

Requirements/Prerequisites: Basic knowledge of the school's course in mathematics and subjects, such as "Linear Algebra", "Analytical Geometry", and "Mathematical Analysis" is required. If a programming language is known, it is also an advantage.

Assessment: Continuous control during the semester, including two tests, and a written exam on laboratory exercises and lecture material.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

COMPUTER MODELS IN NATURAL SCIENCES

Semester: 8 Semester

Course type: lectures and labs

Hours per week: 1 hour of lectures and 2 hours of laboratory work.

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Mihail Kolev

e-mail: mkkolev@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description:

The course offers a wide range of topics including in the natural sciences. The course provides the basic knowledge required in the activities of each student studying natural sciences and their applications. It offers separate modules for computer experiments. For each experiment computer color animations, graphs, numerical results, tasks, tests are presented. The course covers over 100 computer experiments in the fields of Mechanics, Thermodynamics and Molecular Physics, Oscillations and Waves, Electricity and Magnetism, Optics, Quantum Physics and more. In addition, a package of basic courses in higher mathematics, adapted primarily for the natural sciences – with a greater practical focus and visualization, is presented. For each section there are appropriately selected examples and tasks for the exercises. There is a possibility to change the parameters of the task, initial conditions, etc. In most of the tasks, automatic control (or self-control) is provided, which is well thought-out test related to the specific task and the theory for it.

Course Objectives: The proposed course aims to provide students with a modern science-related orientation and to increase their interest in the interactive study of processes and their modeling.

Teaching Methods: Lectures and labs/with multimedia/.

Requirements/Prerequisites: School presentations and knowledge of natural sciences and mathematical subjects of I and II year are enough to attend the course

Assessment: : written examination / it is allowed to increase the grade from the exam by 1 mark of ongoing control - in control work with grade 4 and participation in the work during the semester /

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

INTRODUCTION TO CODING

Semester: 8 Semester

Course type: lectures

Hours per week: 2 hours lectures / 1hour exercises/lab

ECTS credits: 4.0 credits

Lecturer: Assist. Prof. Ph.D. Margarita Todorova

e-mail: todorova@swu.bg

Department: Department of Electrical Engineering and Automation, Faculty of Technologies, SWU “Neofit Rilski” – Blagoevgrad, Phone: 073/ 588532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The basic concepts of coding theory are introduced - codes, error correction, Hamming distance, code parameters, code equivalence. The necessary algebraic base (finite fields and vector spaces over finite fields) is constructed and coding and decoding with linear codes, syndrome decoding are considered. Important classes of codes are introduced, as well as the foundations of the theory of cyclic codes.

Course Objectives: The objective of the course is to provide students with knowledge of the theoretical foundations and practical applications of error correction code theory, to develop skills for working with (linear) codes over finite fields, emphasizing their algebraic and combinatorial properties.

Teaching Methods: The teaching methods are classical: lectures, discussions, discussions, and practical verification of the work of the codes in question, examples of solving problems.

Requirements/Prerequisites: Basic knowledge of higher and linear algebra is required.

Assessment: According to the curriculum.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

ORAL AND WRITTEN COMMUNICATION

Semester: 8 Semester

Course type: lectures

Hours per week : 2 hours lectures / 1 hour exercises/lab

ECTS credits: 4.0 credits

Lecturer:.....

e-mail:

Department: Department of Linguistics, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course consists of 30 hours of lectures and the number of extra-curricular hours is 60.

The training is carried out according to a syllabus in one module, which is a lecture. It includes a set of major topics specifically selected in the field of spelling and legal in contemporary Bulgarian literary language. It is the obligation of the teacher for each subsequent lesson to set a topic and literary sources related to it, and it is the obligation of the student in the time for extra-curricular employment to prepare independently on the cases of this topic.

Course Objectives: To form in students the ability to use correctly the spelling and legal rules, operating in the modern Bulgarian literary language. To form in students the ability to explain the mechanism of the admitted spelling or legal inaccuracy and the reasons that led to it - assimilation or dissimilation process, dialect influence, etc. To cultivate respect for the creative genius of the Bulgarian, embodied in the Bulgarian language.

Expected results Students will master the spelling and legal rules of the modern Bulgarian literary language to the degree that allows them to successfully pass their semester exam in this discipline and to successfully apply this knowledge in the process of their practical realization on the labor market. . To master the norms of spelling and jurisprudence in order to realize themselves as full-fledged specialists in the system of every sphere, which requires proper handling of the spelling and legal norms in the modern Bulgarian literary language. Obtain the credits for the discipline.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

COMPUTER SECURITY

Semester: 5 Semester

Course type: lectures and labs

Hours per week: 2 hours lectures and 1 hour lab

ECTS credits: 4 credits

Lecturer: Assist. Prof. Ph.D. Ivo Damyanov

e-mail: damianov@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” – Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: This course introduces you to computer security. The contemporary risks of storing and exchanging information and methods for protecting it (hardware and software) from breaking and unauthorized access are considered. The course provides a brief theoretical introduction to debugging codes and cryptographic systems. The main focus is on software and technical tools and methods for controlling access, computer security at various levels - personal, network and corporate, including security on social networks and cloud platforms.

Course Objectives: To provide students with the necessary basic knowledge of computer security and to acquire knowledge and skills to identify possible risks in specific systems and to apply various means of protection. The acquisition by students of additional advanced specialized training in the protection of information and computer systems in general.

Teaching Methods: Talk, demonstration, project work and teamwork.

Requirements/Prerequisites: Knowledge of computer architecture, discrete mathematics, network and system administration, programming, operating systems.

Assessment: Written exam

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

OBJECT-ORIENTED AND DISTRIBUTED DATABASES

Semester: 5 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1hour exercise

ECTS credits: 4,0 credits

Assessment: exam

Lecturers: Assoc. Prof. Ph.D. Velin Kralev

e-mail: velin_kralev@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description:

The course is a natural extension of the Databases course and looks at the main trends in the development of database technology and related non-traditional applications. Theoretically and practically, topics related to distributed databases, object-oriented modeling and transaction processing are discussed. Special attention is paid to the new datawarehousing business, which provides the means to work with large data conglomerates to support the decision-making process. There are also some current trends in storage management (Oracle DB).

Course Objectives:

Upon completion of the course, students should be able to:

- design and implement a small distributed information system;
- work with transactions;
- work with object-relational database systems.

Teaching Methods: lecture, discussion, exercises

Requirements/Prerequisites: Students must have studied the course "Databases"

Assessment:

- course work – 30% of the assessment
- written exam test – 70% of the grade

The course is considered as successfully completed with a minimum of 65% of the maximum score.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

WEB SYSTEMS AND TECHNOLOGIES

Semester: 5 Semester

Course type: Seminar exercises and labs

Hours per week: 1hour exercises and 2 hours labs

ECTS credits: 4.0 credits

Lecturer: Assist. Prof. Ph.D. Radoslava Kraleva

e-mail: rady_kraleva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 / 588532

Course Status:

Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description:

The proposed curriculum addresses issues and techniques in the field of modern web systems and technologies. Techniques related to building static and dynamic web pages and integrating them into complete web sites are presented. The following topics are covered: Introduction to Web Technologies; Introduction to HTML. Structure of HTML documents; Types of characters and their formatting. Structuring and formatting of texts. Lists; Using multimedia objects in HTML and formatting with CSS. Logo design; Creation and layout of HTML and CSS tables; Working with containers. Object positioning. Object alignment; Color selection. Color schemes. Fonts and typography. Textures; Creating web forms; Hyperlinks. Image Cards. Anchors. Menus; JavaScript and JQuery. XML; Creating web graphics in a browser; Responsive Web Design. Web interface design principles; Web services, blogs and social networks. Databases on the web; Semantic Web and Metadata.

Course Objectives: The aim of the course is to provide students with a comprehensive understanding of the structure and capabilities of modern web technologies. Free to use terminology and have hands-on experience in developing static websites.

Upon completion of the course, students should be able to:

- use HTML, XHTML, and CSS languages to create websites;
- know about current web development environments.

Teaching Methods: seminars, demonstrations, exercises and project work.

Requirements/Prerequisites: Basic knowledge of IT required.

Assessment: The assessment of the student is done according to the six-point system. During the labs the student receives n-marks on current tasks – CT1 - CTn and at the end of the semester defends an individual course project – CP. The final grade – FG is calculated as the arithmetic mean of these grades and the score obtained on the final test - FT, according to the formula:

$$FG = (((CT1 + \dots + CTn) / n + CP) / 2 + FT) / 2$$

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

SPECIALIZED STATISTICAL SOFTWARE

Semester: 5 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1hour exercises

ECTS credits: 4.0 credits

Lecturer: Assoc. Prof. Ph.D. Elena Karashtranova

e-mail: helen@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588532

Course Status:

Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description:

The Specialized Statistical Software course is aimed at a thorough study of statistical modeling and its modern applications combined with the use of computer technology. Basic principles for modeling of

empirical data and the capabilities of modern technologies for their realization (MS EXCEL, SPSS and STATISTICA, etc.) are included in the course.

Courses Objectives:

- to give students theoretical knowledge of contemporary application programs, as well as the specifics of their use;
- to give students the knowledge to create correct statistical models and develop skills for their application;
- to introduce students to modern technologies for statistical data analysis;
- to prepare students for their future research work.

Teaching Methods: seminar, discussion, exercises, simulations

Requirements/Prerequisites: Students must have studied Probability and Statistics and Information Technology

Assessment:

- course work – 30% of the assessment;
- written exam – 30% of the grade;
- performing current tasks 40% of the assessment.

The course is considered to be successfully completed with a minimum of 50% of the maximum score.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

APPLIED STATISTICS

Semester: 5 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1hour exercise

ECTS credits: 4.0 credits

Assessment: ongoing assessment

Lecturer: Assoc. Prof. Ph.D. Elena Karashtranova

e-mail: helen@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course is designed as an upgrade of the base course in probability and statistics.

The purpose of the course is to acquaint students with the nature and numerous applications of non-parametric statistical methods, as well as the possibilities for implementing part of these procedures with the tools of Information Technology (MS-Excel, VBA, Mathlab, etc.).

The structure and content of the course are in accordance with the students' knowledge of computer science and probabilities and statistics obtained in the respective courses. The subject matter of the syllabus is related to all disciplines in which the analysis of empirical data is required.

Course Objectives:

Upon completion of the course, students should be able to:

- apply non-parametric statistics methods;
- implement specific applications using various technological tools.

Teaching Methods: lectures, exercises, discussions, exercises

Requirements/Prerequisites: Students must have studied Probability and Statistics and Information Technology

Assessment:

- course work – 30% of the assessment
- Written exam – 70% of the grade

The course is considered as successfully completed with a minimum of 50% of the maximum score.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: in agreement with the teacher and the department of student education.

DATA PROCESSING AND ANALYSIS IN MSEXEL AND VBA

Semester: 6 Semester

Course type: lectures and labs

Hours per week: 1 hour lectures and 2 hours labs

ECTS credits: 4.0 credits

Assessment: exam

Lecturers: Prof. Ph.D. Daniela Tuparova

e-mail: ddureva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 588 532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description:

The course is an introduction to programming with Visual Basic for Application. The basic principles and concepts of event programming, object models of MS Office applications and creation of a graphical user interface are discussed.

Course Objectives:

Students must acquire knowledge of:

- Programming a graphical user interface with VBA.
- Object models of MS Word, MS Excel and MS Power Point.
- Designing and developing interactive applications in MS Office.

Teaching Methods: lectures, labs, discussions and problem solving.

Requirements/Prerequisites: Knowledge of word processing, spreadsheets and computer presentation systems is required.

Assessment: Assessment of course project (35%), ongoing control (30%) and written exam (test) (30%). The course is considered to as completed with at least 65% of the total points.

Registration for the course: it is necessary to apply to the department at the end of second semester

Registration for the exam: in agreement with the teacher and the department of student education

INTRODUCTION TO LATEX-2e

Semester: 6 Semester

Course type: labs, exercises

Hours per week: 1hour lab / 2 hours exercises

ECTS credits: 4,0 credits

Lecturer: Assist. Prof. Ph.D. Ivo Damyanov

e-mail: damianov@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status:

Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description:

The course aims to provide students with knowledge of the philosophy and history of Latex 2e, a computer program created by Donald E. Knuth and designed for word processing and mathematical formulas.

The course includes the following sections:

- Scripting and visual word processing;
- Document classes, packages and styles;
- A set of mathematical formulas;
- Special features, mathematical graphics in Latex 2e;
- Latex 2e settings;
- BEAMER class for Latex 2e presentations.

In terms of structure and content, the course coincides with similar courses at a number of reputable universities around the world.

The exercises are conducted in the computer labs.

Courses Objectives: the course emphasizes the practical assimilation of the material, based on numerous examples.

Teaching Methods: The four lectures give extensively theoretical material, provided with numerous examples, which are realized in different variations during the seminars.

The exercises are conducted in the computer labs of the university.

Assessment: Students are required to successfully complete two tests during the semester. The two grades from the tests make up 40% of the final semester grade. After the end of the semester, a written exam and interview are held, followed by a final assessment.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

WORKSHOP ON DATABASES

Semester: 6 Semester

Course type: exercises and labs

Hours per week: 1 hour exercises and 2 hours labs

ECTS credits: 4.0 credits

Lecturer: Assoc. Prof. Ph.D. Velin Kralev

e-mail: velin_kralev@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 / 588 532

Course Status:

Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description:

The course involves studying the basics of database management systems and related issues, such as: introduction to database management systems, nature, requirements, architecture and basic principles of operation; a comparative feature of the most widely used DBMSs; fundamentals of planning, installing, configuring and managing the components of a DBMS and its instances; tools for working with database management systems, familiarization with SQL Server Management Studio and IBConsole tools; designing relational databases and creating a physical database schema in a DBMS environment; creating and modifying database tables, using types, expressions and functions; defining keys and restrictions when creating relationships between tables, creating and using indexes, working with DBMS diagrams; working with SQL statements INSERT, DELETE and UPDATE when inserting, deleting and updating data; working with the SQL statement SELECT when retrieving data; work with connections to retrieve information from multiple tables, create and use views; creation and operation of stored procedures in the database, defining user functions; work with transactions and locks in the database; creation and use of triggers in the database; DBMS security system, work with logins, roles and users, authentication and authorization; export and import of data, DBMS capabilities for archiving and restoration of databases;

Course Objectives:

Students should gain knowledge of database management systems and how to use them.

Teaching Methods: seminars and laboratory exercises

Requirements/Prerequisites: Basic knowledge of databases

Assessment: written exam

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

GRAPHIC DESIGN OF PRINTED AND PROMOTIONAL MATERIALS

Semester: 6 Semester

Course type: Seminar exercises and labs

Hours per week: 1 hour exercises and 2 hours labs

ECTS credits: 4.0 credits

Lecturer: Assist. Prof. Ph.D. Radoslava Krалеva

e-mail: rady_kraleva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone: 073 / 588 532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course is a hands-on introduction to publishing systems. Students are introduced to good practices in the development of printed and electronic materials such as brochures, leaflets, posters, magazines, newspapers and more. The principles of working with software products used in publishing are studied. Typical publishing and advertising tasks are discussed. The course prepares students for the future development of various types of designs for promotional materials, websites and more.

Course Objectives: This course aims to provide students with in-depth knowledge and additional preparation for theory and practice in publishing systems. They will be introduced to digital image processing methods, vector graphics creation methods, and prepress for different purpose advertising materials.

Teaching Methods: seminar, demonstration, project work and teamwork.

Requirements/Prerequisites: Basic knowledge of operating systems, information technology, and work with image editors and multimedia files is required.

Assessment: The assessment of students is carried out according to the six-point system - 2, 3, 4, 5, 6. Assessment from the ongoing control is obtained by taking the arithmetic mean of the assessment from a course project and abstract. Students who do not have a minimum grade point average of (3) ongoing control are not allowed to sit for the regular session. They must submit additional developments and, after receiving a grade of at least average (3), be admitted to a written examination in a corrective or liquidation session. The final grade is obtained from the arithmetic mean of the results of the ongoing control and the assessment of the written exam.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

WORKSHOP ON WEB DESIGN

Semester: 6 Semester

Course type: seminar and lab exercises

Hours per week: 1hour seminar and 2 hours labs

ECTS credits: 4.0 credits

Assessment: exam

Lecturers: Assist. Prof. Ph.D. Radoslava Krалеva

e-mail: rady_kraleva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course deals with questions and techniques related to how content is organized and displayed on the web. Techniques related to building static and dynamic pages and integrating them into complete sites are presented. Up-to-date web development software products are reviewed. An introduction to HTML, XHTML, and CSS is also provided for those students who have not studied Web Systems and Technologies. During the labs, a web site will be developed using the languages and technologies HTML, CSS, JavaScript, C# and ASP.Net MVC. The course will allow students to develop and refine their ability to create website designs and concepts, to use appropriate fonts on the web, to create and process vector and bitmaps suitable for building web content.

Course Objectives: This course aims to provide students with in-depth knowledge and additional special preparation for theory and practice in responsive web design. They will become familiar with the methods and methods for building a conceptual model of a website, the selection and use of multimedia objects, their alignment and position depending on the type of device, and how to publish a website and maintain a web server.

Teaching Methods: seminar, demonstration, project work and teamwork.

Requirements/Prerequisites: Basic knowledge of operating systems, information technology, and work with image editors and multimedia files is required.

Assessment: The assessment of students is carried out according to the six-point system - 2, 3, 4, 5, 6. The assessment from the ongoing control is obtained by taking the arithmetic mean of the assessment from the course project and the tasks solved during the semester. Students who do not have a minimum grade point

average of (3) ongoing control are not allowed to sit for the regular session. They must submit additional developments and, after receiving a grade of at least average (3), be admitted to a written examination in a corrective or liquidation session. The final grade is obtained from the arithmetic mean of the results of the ongoing control and the assessment of the written exam.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

INTERACTIVE MULTIMEDIA TECHNOLOGIES

Semester: 7 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1 hour exercise

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Prof. Ph.D. Daniela Tuparova

e-mail: ddureva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone 073 588 532

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description: The course in Interactive Multimedia Technologies is intended for students in the fields of Informatics and Mathematics and Computer Science at the Faculty of Mathematics and Mathematics.

It is aimed at mastering basic principles and technologies for creating, processing and integrating various multimedia objects. The practical implementation is related to the design and development of interactive educational games (serious games, educational computer games). In recent years, there has been an increase in trends in the development of so-called "serious games" applicable to various degrees of formal and corporate education and training. The acquired knowledge and skills can be actively used in the field of multimedia advertising and web design.

Questions related to basic concepts in interactive multimedia are included. The main features of authoring environments for creating interactive multimedia content are discussed. Basic technologies for creating interactive mobile applications and virtual reality are also discussed.

Various training methods are used. It focuses on problem solving and project based learning.

Courses Objectives and Expected results

Upon completion of the course, students should be able to:

- Create, edit and integrate various multimedia objects;
- Apply basic principles and technologies for designing and creating interactive multimedia content.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

WEB DESIGN AND INTERNET PROGRAMMING

Semester: 7 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1 hour exercise

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assist. Prof. Ph.D. Nadezhda Borisova

e-mail: nborisova@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course is designed as an introduction to the development of Web-based information systems using the widespread and accessible JavaScript, CSS and PHP / MySQL technologies. It covers topics related to the design and implementation process of Internet / Intranet information systems. The course introduces students to the syntax and semantics of JavaScript and PHP, the correct design of database-related databases, and the rules for building effective applications. Questions have also been raised related to improving the reliability and security of information systems in the context of the global information infrastructure.

Course Objectives: After completing the course, students should be able to:

- design on Web-based information systems with client-server architecture;
- implement web-based information systems using PHP / MySQL technology.

Teaching Methods: lecture, discussion, exercises

Requirements/Prerequisites: Students must have studied the courses "Databases" and "Web Design Workshop".

Assessment:

- course work – 30% of the assessment
- Written exam – 70% of the grade

The course is considered as successfully completed with a minimum of 50% of the maximum score.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

PROGRAMMING IN OBJECT PASCAL AND DELPHI

Semester: 7 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1hour exercise

ECTS credits: 4.0

Assessment: exam

Lecturer:

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073 588 532

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: to introduce students to the methods and tools of object-oriented programming in a Delphi visual programming environment. To do this, you need basic knowledge of programming in the object Pascal algorithmic language. It is assumed that students have successfully completed the courses

in Programming and Data Structures and Object-Oriented Programming (in SWU these courses are based on the C ++ language) and are familiar with the basic techniques and algorithms in programming. This gives the opportunity to learn other widely used modern programming language on another platform, focusing on visual programming.

Course Objectives: The objectives of the course are the following for students:

- to learn algorithmic thinking;
- to master the data structures that can be processed using computer;
- to master the methods and means of object-oriented programming in an environment for visual programming;
- to logically shape the individual steps in the development of individual tasks;
- to master the syntax in another programming language (in the case of Object Pascal and Delphi);
- to be able to use basic programming techniques;
- to master some of the already classic algorithms and create their own
- own algorithms;
- to get used to good programming style;
- to learn the basic principles of application software development.

Teaching Methods: Lectures illustrated with study boards, slides, presentations, multimedia projector and labs using the available computer equipment located within the faculty and separated into several computer rooms. Available computer technology meets the modern requirements and is sufficient for the normal conduct of all labs.

Requirements/Prerequisites: Students should have studied the courses Introduction to Programming and Object-Oriented Programming.

Assessment: Current control is carried out during the laboratory classes during the semester by means of control tests and two course assignments - the first set by the Lecturer, the second selected and formulated by the student according to his interests (1/3 of the final grade). The course ends with a written exam on the course material (2/3 of the final grade).

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

PROGRAMMING IN C++ BUILDER

Semester: 7 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1hour exercise

ECTS credits: 4.0 credits

Lecturer:

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone 073 8889132

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description:

The course is designed to introduce students to the methods and tools of object-oriented programming in a visual design and event-oriented programming environment with C ++ Builder. This requires basic knowledge of C ++ programming language programming. It is assumed that the students have

successfully completed the courses in Programming and Data Structures and Object-Oriented Programming (in SWU these courses are based on the C ++ language) and are familiar with the basic techniques and algorithms in programming.

Self-study involves working in a library and with a computer and two coursework - the first set by the teacher, the second selected and formulated by the students according to their interests.

Course Objectives:

The objectives of the course are the following for students:

- to learn algorithmic thinking;
- to master the data structures that can be processed using computer;
- to master the methods and means of object-oriented programming in an environment for visual programming;
- to logically shape the individual steps in the development of individual tasks;
- to master the syntax in another programming language (in the case of C++);
- to be able to use basic programming techniques;
- to master some of the already classic algorithms and create their own
- own algorithms;
- to get used to good programming style;
- to learn the basic principles of application software development.

Requirements/Prerequisites: Students must have studied the Programming and Data Structures courses.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

MATHEMATICAL FOUNDATIONS OF COMPUTER GRAPHICS

Semester: 7 Semester

Course type: lectures and lab.

Hours per week: 2 hours lectures, 1hour exercise

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Ivan Trenchev

e-mail: trenchev@swu.bg

Department: EEA, TF, SWU "Neofit Rilski" - Blagoevgrad, Phone 073 588557

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Courses Objectives:

The main objective of the course is to prepare students:

- to design and construction of models through visual images;
- to designing techniques through which one can interact with the image;
- to creating techniques for presenting models;
- to design ways to create the image;
- to learn basic methods of computer graphics;
- to obtain practical knowledge and skills by working with specialized software products.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

HISTORY OF MATHEMATICS

Semester: 7 Semester

Course type: lectures

Hours per week: 3 hours lectures

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Kostadin Samardzhiev

e-mail: k_samardzhiev@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone 073/588 557

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description: The course includes the main stages of the development of mathematical knowledge until the end of the 19th century

Course Objectives: To acquaint the students with the basic stages in the development of mathematical knowledge by the end of the 19th century and to give them an idea of how this knowledge can be used in their future work as mathematics teachers.

Teaching Methods: Lectures and consultations.

Requirements/Prerequisites: Knowledge of the school mathematics course.

Assessment: Written exam on the theory

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

EDUCATIONAL COMPUTER GAMES IN MATHEMATICS AND INFORMATICS

Semester: 7 Semester

Course type: lectures, exercises

Hours per week: 2 hours lectures, 1 hour exercises

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Prof. Ph.D. Daniela Tuparova

e-mail: ddureva@swu.bg

Department: Department of Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski" - Blagoevgrad, Phone 073/588 532

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description: The course "Educational Computer Games in Mathematics and Informatics" is part of the curriculum and includes 8 summarized topics. Current controls and exam are provided as a form of control.

The content of the program covers the main issues related to theoretical, methodological and technical preparation for the creation and use of educational computer games in mathematics and informatics.

Those who successfully passed the Educational Computer Games in Mathematics and Informatics' exam will acquire the necessary minimum of knowledge both to create prototypes of elementary educational games and to find ways to implement them in the learning process.

In practical exercises, students are trained in scenario development and educational games. Finding the place and role of computer games in the mathematics and informatics learning process.

Course Objectives: The purpose of the course "Educational Computer Games in Mathematics and Informatics" is to develop knowledge and skills to create scenarios and prototype educational computer games and apply them in the learning process

Expected results:

Upon completion of the course, students should be able:

- to create educational computer game scenarios for elementary school students;
- to create prototypes of elementary educational games with various technological means;
- to plan lesson activities;
- to implement educational computer games in the learning process.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

CURRICULUM AND TEACHING METHODS IN OPTIONAL AND EXTRACURRICULUM MATHEMATICS COURSES

Semester: 7 Semester

Course type: lectures and lab

Hours per week: 2 hours lectures and 1 hour exercise

ECTS credits: 4 credits

Lecturer: Prof. Ph.D. Oleg Mushkarov

e-mail: muskarov@math.bas.bg

Department: EEA, TF, SWU "Neofit Rilski" - Blagoevgrad, 073/588 557

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description:

The course includes the following major topics for optional and extracurricular work in mathematics:

- Algebraic inequalities
- Methods for finding geometric extrema
- Partial variation method
- The principle of contact
- Isoperimetric problems
- Extreme points in triangle and tetrahedron
- "Malfatti's problems"
- Extremely combinatorial-geometric problems
- Applications of complex numbers in algebra and geometry

Course Objectives:

The course aims to introduce students to some basic principles in teaching students who have an increased interest in mathematics. They are clarified by developing the specific topics mentioned above.

Teaching Methods: lectures, seminars, consultations, homework, abstracts..

Requirements/Prerequisites: Good command of school algebra and geometry, Mathematical analysis 1 hour and Analytical geometry.

Assessment: Written exam and interview on the developed abstract

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

INTERCULTURAL EDUCATION

Semester: 8 Semester

Course type: lectures and lab.

Hours per week: 2 hours lectures, hour exercise

ECTS credits: 4.0 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Anastasia Nikolaeva Pashova

e-mail: asia_p@swu.bg

Department: Pre-school and Primary School Pedagogy, Faculty of Pedagogy, South-West University "Neofit Rilski"

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology"

Short Description:

1. The training course consists of 30 hours of lectures, 15 hours of exercises and 75 hours of extracurricular work.
2. The course is one of the first attempts to find alternative solutions for intercultural education at the university level and in particular for the preparation of bachelors, teachers of mathematics and informatics.
3. The course includes knowledge of the philosophy, subject, objectives and objectives of intercultural education. Clarifies the terminological apparatus used in the discipline. The content of the curriculum addresses the issues of intercultural education and pedagogy. Various theories of culture and ethnicity are discussed and the connection between them is sought. The psychological aspects of intercultural interactions are discussed. Students are provided with information about interculturalism – its nature, cultural misunderstandings and conflicts, the factors for effective intercultural interactions; models for assessing students' needs and problems of differences.

Course Objectives: Its main purpose is to formulate in students summarized ways of independently analyzing the philosophical and pedagogical dimensions of culture, ethnicity and intercultural education and to provide students with mastery of intercultural competences that will allow them to be more effective Teachers in cultures other than their own The content of the course will address the major problems of intercultural interactions and students will master approaches to work in a different intercultural environment.

Teaching Methods: In the course, the lecture part is designed as multimedia presentations. Independent research activity of the students themselves is strongly advocated in the training. The training is illustrated with literature and photo material.

Expected results:

- to stimulate students' educational and research activities
- to learn the conceptual apparatus related to intercultural education and pedagogy and to critically and creatively interpret and use it when defending a scientific thesis.
- to acquire skills to relate theoretical concepts to the language and problems of working with minority children.

- to motivate critical attitude to pedagogical theories and to build technology for management and decisions in educational practice when working in different ethno-cultural environment.
- to introduce a wide range of teaching strategies for working with minority students and parents;
- to gain knowledge of the ethno-cultural specificity and cultural identity of the students;
- to be exposed to opportunities to acquire skills for analyzing and adapting different programs and study documentation when working in an intercultural environment;
- to adopt attitudes towards: sensitivity to "the other" and "the other culture", tolerance for ambiguity, which is greater in multicultural.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

TRAINING AND DEVELOPMENT OF STUDENTS WITH SPECIAL EDUCATIONAL NEEDS

Semester: 8 Semester

Course type: lectures, lab

Hours per week: 2 hours lectures, 1 hour lab

ECTS credits: 4 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Pelagia Mihailova Terziyska

e-mail: pelagia.terziyska@swu.bg

Department: Management of Education and Social Pedagogy, Faculty of Pedagogy, SWU "Neofit Rilski" - Blagoevgrad

Course Status: Elective discipline in the curriculum of the specialty "Pedagogy of Teaching of Mathematics, Informatics and Information Technology".

Short Description: The course "Training and development of students with special educational needs" extends and enriches the pedagogical preparation of students with basic problems of the development of students with special educational needs (SEN) and the specifics of their education. Students become acquainted with the optimal approaches for meaningful and procedural realization of the education for students with special educational needs, depending on their capabilities.

Course Objectives: to provide students with sufficient competence for the basic characteristics of students with SEN, for the ways and means, forms and methods of correction and pedagogical interaction with them, for their socio-pedagogical problems, for the conditions that empower these students for active participation in the educational process and successful coping with the assigned learning tasks.

Teaching Methods: Lectures, stimulating active debate in subgroups, didactic games, case studies, planning and conducting mini-experiments for analyzing the behavior of students with special educational needs at different moments of the lesson and extra-curricular activities, etc.

Expected results: Students' knowledge of modern pedagogical technologies and models for organizing the pedagogical process with students with SEN, strategies for working with both parents and all specialists working with these students in the mainstream Total Educational and Vocational School. Formation of teamwork skills, creation of supportive environment for students with special educational needs, identification and satisfaction of their educational needs, etc.

Registration for the course: it is necessary to apply to the department at the end of the previous semester.

Registration for the exam: In agreement with the teacher and the department of student education.

HIGH SCHOOL MATHEMATICS WORKSHOP

Semester: 8 Semester

Course type: lectures

Hours per week: 1 hour lectures + 2 hours lab

ECTS credits: 4 credits

Assessment: exam

Lecturer: Assoc. Prof. Ph.D. Kostadin Samardzhiev

e-mail: k_samardzhiev@swu.bg

Department: Department of Mathematics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski” - Blagoevgrad, Phone 073/588 557

Course Status: Elective discipline in the curriculum of the specialty “Pedagogy of Teaching of Mathematics, Informatics and Information Technology”

Short Description: The course involves solving problems in the specified topics of the syllabus, analyzing and summarizing the methods of solving them, applying their knowledge of methodology and the subjects learned in the basics of the school course in algebra and the basics of school geometry course.

Course Objectives: The purpose of the workshop is to acquaint students with the types of mathematical tasks in the school course in mathematics (SCM). It also clarifies the goals pursued by solving mathematical problems, systematizes and consolidates the methods learned, thus deepening the students' preparation for their future profession; skills are formed to solve problems from the SCM with the knowledge of students from the relevant age group.

Teaching Methods: seminars, consultations, homework, course work, ongoing tests.

Requirements/Prerequisites: Some knowledge of mathematics teaching methodology and knowledge of mathematics content of V-XII grade (profiled preparation for VIII-XII grade) is required

Assessment: is carried out by controlling the attendance of seminars, 2 ongoing tests and development of course work.

The tests are on the material as follows: first - on modules 1,2, and 3; the second - on modules 4 and 5.

The course work is developed by the students on a given topic from the school mathematics course - without limitations and with maximum exhaustiveness.

Assessment of students' knowledge is carried out through 2 tests (the first test is on modules 1 – 3, and the second – 4 and 5) and the presentation and defense of the student course work. Each test is rated with 20 points, while the course work presentation and defense is rated with 15 points.

Registration for the course: it is necessary to apply to the department at the end of the sixth semester.

Registration for the exam: in agreement with the teacher and the department of student education.