QUALIFICATION CHARACTERISTIC

of

"TECHNOLOGY OF TEACHING MATHEMATICS AND INFORMATICS" Master's degree programme

in 1.3. "Pedagogy of Education in..." vocational area

"Teacher in Mathematics, Informatics and Information Technology" Vocational Qualification

2 years (four semesters)

I. Vocational Qualification and Competences Requirements for Students Candidates

In "Technologies of Teaching Mathematics and Informatics" Master's degree programme can be admitted students with Bachelor's or Master's degree.

II. Vocational Qualification and Competences Requirements for Students Graduated This Major

In the "Technologies of Teaching Mathematics and Informatics" Master's degree programme competences of students, future teachers in Mathematics, Informatics and Information technology are upgraded and expanded in compliance with tendencies in curriculum development in subjects studied in the secondary school and in line with the 2012 European Commission's Education Strategy and UNESCO ICT Competency Framework for Teachers. Students also acquire thorough competencies in the field of:

- pedagogical research modern methods and technologies;
- e-learning;
- specialized learning software for Mathematics and Informatics learning.

Students develop an affinity and capacity for independent scientific and research work in methodology of teaching Mathematics, Informatics and Information technology in school. The education received provides a solid foundation for continuing their education in Doctoral degree in the same vocational field.

III. Preparation Requirements for Students Graduated This Major

Graduate students should be able to:

- put into practice the acquired knowledge in their profession;
- use and apply competently basic knowledge in the field of Mathematics, Informatics and Information Technology;
- apply modern educational technologies;
- apply Information Technology in learning process;

- carry out independent research, model real processes and create computer applications to support learning;
- conduct pedagogical experiments.

A specialist who has graduated from SWU, the "Technologies of Teaching Mathematics and Informatics" Master's degree programme, is eligible to work as:

- a teacher in Mathematics, Informatics and Information Technology;
- a head of computer cabinets at school;
- a system administrator at an educational institution;
- a lecturer in Mathematics, Informatics and Information Technology at corporate learning and vocational qualification centers;
- a methodologist or expert in Mathematics, Informatics or Information Technology at the Regional Education Inspectorate and Ministry of education and science;
- a designer of e-learning materials;
- an Information Technology consultant in training;
- a specialist in Mathematics;
- a specialist in Informatics and Information Technology.

Qualification characteristic of the "Technologies of teaching Mathematics and Informatics" Master's degree programme for "Master" educational qualification degree with "Teacher in Mathematics, Informatics and Information Technology" vocational qualification is a main document-guideline for the development of courses curriculum and content. It complies with the Higher Education Act, with the Public Specialty Requirements, and with the SWU "Neofit Rilski" Regulations.

CURRICULUM STRUCTURE

"Technology of Teaching Mathematics and Informatics" Master's degree programme

First year			
First Semester	Credits	***Second Semester***	Credits
Compulsory Courses		***Compulsory Courses***	
High School Algebra and Analysis Course	9	High School Geometry Course	9
Multimedia Technologies	5	Mathematics Teaching Methodology – 1 part	5
Pedagogical Researches Methodology and Methods	3	Sitting in on Mathematics classes	3
Introduction to Information Systems and Technologies	5	High School Informatics and Information Technology Course	9
Elective course from I.A (Mathematics)	4	Elective course from II. (group 1)	4
Elective course from I.B (Informatics)	4		
Elective course from I.A (Mathematics)		***Elective Courses – II (group 1)***	
Fundamentals of arithmetic	4	Intercultural Education	4
Fundamentals of geometry	4	Computer systems for mathematical calculations	4
Discrete Mathematics	4	Mathematics Teaching Specialized Software	4
Numerical Methods Monte Carlo	4	DialogicTeaching Software in Mathematics Development Metodology	4
Symmetric Inverse Semigroup Theory	4	Practical Course in MATLAB Mathematical Modelling	4
Geometry of Circles	4	Practicum for Solving School Course mathematical Problems	4
Mathematical Structures	4		
Elective course from I.B (Informatics)		***Courses for Non-specialists***	
Computer Security	4	Psychology	5
Object-oriented and Distributed Databases	4	Linear Algebra and Analytical Geometry	8
Web Systems and Technologies	4	Mathematical Analysis	7
Specialized Statistical Software	4	Fundamentals of Programming	5
Applied Statistics	4	Pedagogy	5
Web design and Internet Programming	4	Algebra	8
Interactive Multimedia Technology	4	Object-oriented Programming	6
Object Pascal and Delphi Programming	4	Number Theory	4
C++ Builder Programming	4	Probability and Statistics	6
Event-Driven Programming	4	Information and Communication Technology for Teaching and Working in Digital Environment	3
Mathematical Foundations of Computer Graphics	4	Inclusive Education	3
Total:	**30**	**Total:**	**30**
Second year			

Third Semester	Credits	***Fourth Semester***	Credits
Compulsory Courses		***Compulsory Courses***	
Extremum Problems and Modelling in School Mathematics Course	4	e-Learning Technologies and Methodologies	3.5
Mathematics Teaching Methodology – 2 part	6	Stochastic models in the pedagogical researches	3.5
Current Pedagogical Practice in Mathematics	4	Mathematics Internship	4
Informatics and Information Technology Teaching Methodology	6	Informatics and Information Technology Internship	4
Sitting in on Informatics and Information Technology Classes	2	Graduation	15
Current Pedagogical Practice in Informatics and Information Technology	4		
Elective course from II. (group 2)	4		
Total:	**30**	**Total:**	**30**
Elective Courses - II (group 2)			
History of Mathematics	4		
Computer Educational Games in Mathematics and Informatics Teaching	4		
Information Systems Development	4		
Curricular and Extracurricular Work in Mathematics Contents and Methodic	4		
		Total for 2 study years:	**120**

TOTAL FOR 2 STUDY YEARS: 120 CREDITS

COURSES FOR NON-SPECIALISTS

There are students who haven't covered the following courses in their education:

1	Psychology	w. (I)
2	Linear Algebra and Analytical Geometry	w. (I)
3	Mathematical Analysis	w. (I)
4	Fundamentals of Programming	w. (I)
5	Pedagogy	s. (II)
6	Algebra	s. (II)
7	Object-oriented Programming	s. (II)
8	Number Theory	w. (III)
9	Probability and Statistics	s. (IV)
10	Information and Communication Technology for Teaching and Working in Digital Environment	s. (IV)
11	Inclusive education	s. (IV)

These students should be taught in the respective courses of the "Pedagogy of Mathematics, Informatics and Information Technology" Bachelor's degree programme of the Faculty of Mathematics and Natural Sciences, according to the semester in which the courses are held – winter or summer. Information about the courses can be found on the university website in the respective "Pedagogy of Mathematics, Informatics and Information Technology" Bachelor's degree programme information pack.

HIGH SCHOOL ALGEBRA AND ANALYSIS COURSE

Semester: 1st semester
Course type: Lectures and seminars
Hours (per week): 3 hours lectures, 3 hours seminars
Credits: 9.0 credits
Lecturer: Assoc. Prof. Kostadin Samardzhiev, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: k_samardzhiev@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: Constructing and developing a concept of number are difficult processes both in their mathematical and philosophical aspect, but also in their learning and teaching aspect. Following the well-known from the Arithmetic concept of number construction, this course (for master students in Mathematics and Informatics) begins with basic algebraic laws formulation – communicative, associative, non-idempotent elements in the actions of addition and multiplication, along with distributive law combining the two operations of the natural numbers N. Based on addition and multiplication actions, corresponding regulations are also defined. Basic features of the linear ordinary are listed – bounded below by each set of natural numbers, Archimedes, etc., along with the method of mathematical ordinary associated with the two ordinaries. The question of 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 natural numbers have no solutions, the need to extend the half-ring respectively to the ring of integers Z, the half-field of fractions Qt and finally to the field of rational numbers Q, is clarified. For each of these structures, the validity of the basic features of the ordinaries introduced in the semicircle of natural numbers is emphasized. All of this is illustrated with relevant examples and problems. Most of the time spent in the study hours is in the field of real numbers and corresponding problems in this field – quadratic equations and inequalities, systems of equations and inequalities, including such with irrational expressions, and such equivalents with the participation of special functions such as exponential, logarithmic, trigonometric and other.

Extracurricular activity includes homework, course papers, work in libraries and computer rooms, consultations, tests preparation, understanding and learning the lectures material and more.
Course Aims and Objectives: Students should learn and understand the basic concepts, actions and regulations of the number concept various extentions, along with use successfully the methods for solving equations, inequalities and systems of equations and inequalities in these extentions.
Teaching Methods: Lectures, seminars, consultations, homework, course papers and tests
Preliminary Enrollment Conditions: Students are expected to have good knowledge of "High School Mathematics" course.

Assessment: A written exam on the seminars and lectures material.
Exam Registration: Students agree with the lecturer the desired dates within the announced calendar for the exam sessions.

MULTIMEDIA TECHNOLOGY

Semester: 1st semester
Course type: Lectures and lab exercises
Hours (per week): 1 hour lectures, 2 hours lab exercises
Credits: 5.0 credits
Lecturer: Assist. Prof. Boyana Garkova, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: big@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course offers specialized practical education in the fields of multimedia, computer design, three-dimensional modelling and computer graphics. The education is carried out in three main areas – development and integration of multimedia applications, three-dimensional modelling and design, computer animation. The content and structure of the lectures reflect the latest trends in the development of relevant technologies.

Extracurricular activity includes projects, practical assignments, course papers.

Teaching Methods: Lectures and lab exercises
Preliminary Enrollment Conditions: Basic knowledge of numerical methods and mathematical optimization is required.
Assessment: A written exam on two topics of the syllabus, randomly drawn (60% weight); current testing: two course papers (40% weight).
Course Registration: Automatically (a compulsory course)
Exam Registration: In agreement with the lecturer and the Student office.

PEDAGOGICAL RESEARCHES METHODOLOGY AND METHODS

Semester: 1st semester
Course type: Lectures and seminars
Hours (per week): 1 hour lectures, 1 hour seminars
Credits: 3.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Itska Derizhan, Ph.D.
Department: Pedagogy, Faculty of Pedagogy, SWU "Neofit Rilski"– Blagoevgrad, Phone: 0882/540 168, e-mail: popkochev@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The "Pedagogical Researches Methodology and Methods" course introduces students to the essence and different aspects of the research process in upbringing and school education.

Course Aims and Objectives: The course aim is to provide students with knowledge of:

- designing scientific pedagogical research;
- methods of research and evaluation of pedagogical phenomena and processes;
- using mathematical and statistical methods for quantitative processing of empirical pedagogical information;
- structure of research text;

It also forms in students the skills to: build conceptual foundations of pedagogical research; design experimental pedagogical methodologies; analyze essential aspects of empirical pedagogical information.

Teaching Methods: Lectures, seminars, consultations and tests

Assessment: The final grade is formed on the basis of an exam and current testing. The current testing includes: test of the lectures material, two tests (current tests) on the seminars material, homework.

Exam Registration: Students agree with the lecturer the desired dates within the announced calendar for the exam sessions.

INTRODUCTION TO INFORMATION SYSTEMS AND TECHNOLOGIES

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 5.0 credits

Lecturer: Prof. Daniela Tuparova, Ph.D.

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is an introduction to information systems and technologies. Basic and theoretical concepts of Information Technology – information, information activities, informatics and information technology, basic functions of operating systems, word processing systems, data processing systems, multimedia information presentation to 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 technology.

The course is a natural continuation of the "High School Informatics and Information Technology" courses.

Course Aims and Objectives: Students should acquire knowledge of:

- basic concepts in information technology;

- types of basic and application software and its application;
- the most popular services on the global Internet;
- information protection and legal and ethical aspects when using information technology.

Teaching Methods: Lectures, discussions, lab exercises and project work
Preliminary Enrollment Conditions: None (double course)
Assessment:

- Current testing – 50% of the grade;
- a written exam – 50% of the grade.

The course is considered to be successfully completed with a minimum of 51% of the maximum score.
Course Registration: Automatically (a compulsory course)
Exam Registration: In agreement with the lecturer and the Student office.

HIGH SCHOOL GEOMETRY COURSE

Semester: 2nd semester
Course type: Lectures and seminars
Hours (per week): 3 hours lectures, 3 hours seminars
Credits: 9.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Kostadin Samardzhiev, PhD
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: k_samardzhiev@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course covers the following geometric transformations: equality, similarity, affinity. Basic topics, related to a face of a polygon and a volume of a tetrahedron are considered.
Course Aims and Objectives: Students should acquire theoretical and practical background needed to teach geometry in schools.
Teaching Methods: Lectures, seminars, consultations, homework, tests
Preliminary Enrollment Conditions: Basic knowledge of the "High School Geometry" material is required.
Assessment: A written exam on the seminars and lectures material.
Exam Registration: In agreement with the lecturer and the Student office.

MATHEMATICS TEACHING METHODOLOGY – I PART

Semester: 2nd semester
Course type: Lectures

Hours (per week): 2 hours lectures
Credits: 5.0 credits
Assessment: An exam
Lecturer: Prof. Ilia Gyudzhenov, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: iliadgl@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course includes problems from the common methods of Mathematics teaching such as teaching mathematical concepts, theorems, proofs in the "School Mathematics" course, different forms of problem solving skills.
Course Aims and Objectives: The main aim is to prepare students to be able to teach Mathematics at school. Achieving this aim is accomplished by solving the following objectives:

1. Mastering methods and tools that provide effective mastering of basic mathematical information – concepts, axioms, theorems, proofs of theorems, problems and their solutions.
2. Familiarize with the organization specific of Mathematics learning process, according to specific structure of mathematical knowledge.

Teaching Methods: Lectures and seminars
Preliminary Enrollment Conditions: Knowledge of high-school Mathematics along with knowledge of psychology and pedagogy is required.
Assessment: A written exam
Exam Registration: In agreement with the lecturer and the Student office.

SITTING IN ON MATHEMATICS CLASSES

Semester: 2nd semester
Course type: Seminars
Hours (per week): 1 hour seminars
Credits: 3.0 credits
Assessment: Current testing
Lecturer: part-time lecturer Daniela Kitova
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: dg34@mail.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course provides practical training for students. Mathematics classes are held at high-school level. Under the practice leader guidance, lessons observations and analysis are carried out at high school level. Each lesson observed is discussed, along with positive aspects and mistakes made.

Course Aims and Objectives: Developing skills for analyzing pedagogical activity observed in a real environment with respect to: defining the lesson topic, aims and objectives; defining pedagogical activity principles, forms, methods and means; pedagogical activity logistics; pedagogical interaction with students.

Teaching Methods: The main way to practice Mathematics is by observing Mathematics lessons and is combined with different pedagogical situations and activities analysis. The lecturer who is the practice leader determines in advance the topic and didactic assignments for each observation. Students keep notes of each lesson observed and analyze 3 of the letter. All notes of the lessons are submitted when the assessment is finalized.

Preliminary Enrollment Conditions: Students should be familiar with the "Mathematics Teaching Methodology" and "School Mathematics" courses contents: what course material is taught and at what level.

Assessment: Assessment of students for results achieved in the learning process is in accordance with the Ordinance № 21/30.09.2004 requirements for implementing the system for credit transfer and accumulation. The total number of credits for "Sitting in on Mathematics classes" is 3.0. The current grade is based on:

- students participation during conferencing the lessons observed (20%);
- notes made (20%);
- analyzes of 3 lessons learned (60%).

Excellent	100%-92%
Very Good	91%-76%
Good	75%-60%
Satisfactory	59%-52%
Poor	Above 52%

With a positive evaluation and 100% attendance a student receives a certificate of practice in the student's booklet.

HIGH SCHOOL INFORMATICS AND INFORMATION TECHNOLOGY COURSE

Semester: 2nd semester
Course type: Lectures and lab exercises
Hours (per week): 3 hours lectures, 3 hours lab exercises
Credits: 9.0 credits
Assessment: An exam
Lecturer: Prof. Daniela Tuparova, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is designed to expand the preparation of future teachers in Mathematics, Informatics and Information Technology in the field of the "School Informatics and Information Technology" courses in line with rapidly changing technologies in Informatics and its applications. Topics studied in elective and extracurricular Informatics and Information Technology courses are included.

Topics about: structured texts and automatic content creation in word processing programs, spreadsheet processing of large volumes of data, interactive presentations with VBA, development and management of software projects, etc., are discussed.

Course Aims and Objectives: Upon completion of the course, students should be able to:

- process large volumes of data using spreadsheets;
- create interactive presentations using VBA;
- apply approaches to developing and documenting software projects.

Teaching Methods: Lectures, discussions, lab exercises

Preliminary Enrollment Conditions: Students should have studied the "Information Technology" and "Event-driven Programming" courses.

Assessment:

- A current grade – 50% of the grade;
- a written exam-test – 50% of the grade.

The course is considered to be successfully completed with a minimum of 53% of the maximum score.

Course Registration: Automatically (a compulsory course)

Exam Registration: In agreement with the lecturer and the Student office.

EXTREMUM PROBLEMS AND MODELLING IN HIGH SCHOOL MATHEMATICS

Semester: 3rd semester

Course type: Lectures and seminars

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

Credits: 4.0 credits

Assessment: An exam

Lecturers: Corresponding member Prof. Oleg Mushkarov, D.Sc.math.

Department: EEA, Technical Faculty, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: muskarov@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: Extremum problems occupy an important part of the "High School Mathematics" course. Main types of extremum problems that are studied at the "High School Mathematics" course are covered. Extremum problems of Antiquity and other known extremum problems are formulated: Didon's problem, isoperimetric problem, Fermat's problem, Kepler's problem, brachystochron problem, along with extremum problems in nature (especially in optics).

Course Aims and Objectives: The aim and main objective of the "Extremum Problems and Modelling in High School Mathematics" course is to provide students with:

- knowledge of the basic results and methods of solving different classes of extremum problems, which are studied in the "High School Mathematics" course;
- ability to develop mathematical models;
- ability to apply extremum problems in mathematical modeling and elements of approximation theory.

Teaching Methods: Lectures, seminars, consultations, tests, homework

Assessment: The exam is written and consists of two parts:

- Part I – Problems. It consists of two problems.
- Part II – Theory. It consists of two topics from the syllabus, drawn in random manner.

Students who have at least a Satisfactory (3) grade of the Part I are admitted to the second part of the exam. Students who have at least a Very good (4.50) grade as average score of the two current tests on sections 1, 2, 3 and 4 of Part I – are released from the first part of the exam.

The final grade is formed as follows: 30% – the homework grade, 40% – the grade from the Part I test and 30% – the grade from the Part II exam.

Exam Registration: Students agree with the lecturer the desired dates within the announced calendar for the exam sessions.

MATHEMATICS TEACHING METHODOLODY – II PART

Semester: 3rd semester

Course type: Lectures and seminars

Hours (per week): 2 hours lectures and 2 hours seminars

Credits: 6.0 credits

Assessment: An exam

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

Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: k_samardzhiev@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course includes problems from the special methods of Mathematics teaching, 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 Aims and Objectives: The main aim is to prepare students for their future realization as teachers in Mathematics and Informatics.

Teaching Methods: Lectures and seminars

Preliminary Enrollment Conditions: Knowledge of high-school Mathematics along with knowledge of psychology and pedagogy is required.

Assessment: A written exam
Exam Registration: In agreement with the lecturer and the Student office.

CURRENT PEDAGOGICAL PRACTICE IN MATHEMATICS

Semester: 3rd semester
Course type: Practical exercises
Hours (per week): 2 hours practical exercises
Credits: 4.0 credits
Assessment: A current grade
Lecturer: part-time lecturer Daniela Kitova
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– B lagoevgrad, Phone: 073/588 557, e-mail: dg34@mail.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The "Current Pedagogical Practice in Mathematics" course provides practical training for students. Current pedagogical practice is held at school under the guidance of a senior teacher and the practice leader. Each student develops and teaches two lessons – one in a middle class (5 – 8) and one in an upper class (8 – 12), in the presence of a senior teacher, the practice leader, and other students in the group. Each lesson observed is discussed, along with positive aspects and mistakes made.
Course Aims and Objectives: The aim of the course is to provide students with an understanding of a Mathematics lesson structure, to acquire skills to develop a Mathematics lesson, to select and systematize problems offered to students, to assess the work of an individual student and a class as a whole.
Teaching Methods: Practical exercises
Preliminary Enrollment Conditions: Students should be familiar with the "Mathematics Teaching Methodology" and "School Mathematics" courses contents: what course material is taught and at what level.
Assessment: Students present plans of two lessons in Mathematics and three analyzes of lessons observed in written form. The final grade is formed as follows: the grade of thought lessons – 60% and lessons plans and analyzes – 40%.
Exam Registration: In agreement with the lecturer and the Student office.

INFORMATICS AND INFORMATION TECHNOLOGY TEACHING METHODOLOGY

Semester: 3rd semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 2 hours lab exercises
Credits: 6.0 credits

Assessment: An exam
Lecturers: Prof. Daniela Tuparova, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: An analysis of the "School Informatics and Information Technology" course contents is made. Questions concerning didactic methods and principles specificity of manifestation in Informatics and Information Technology teaching are considered. Specifics of an Informatics and Information Technology lesson are discussed.
Course Aims and Objectives: The main aim is to provide didactic teaching for future Informatics and Information Technology teachers.

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

- define main and specific aims of high-school Informatics and Information Technology teaching;
- know and apply appropriate methods and principles of Informatics and Information Technology teaching;
- plan lesson activity;
- develop assignments, problems and tests for assessment;
- analyze Informatics and Information technology lessons.

Teaching Methods: Lectures, lab exercises
Assessment: Current testing grade formation: Current semester testing is based on homework grade (75%) and grade of developing lessons (25%).

Semester tests: Students with current testing grade lower than a Satisfactory (3.00) grade receive certification, but pass their missing components in or out of the session before the written exam date.

Exam grade formation: A written exam-test (computer based, in case of technical problems it can be printed on paper) and developing a written Informatics and Information Technology lesson plan.

Final grade formation: The grade is formed using the following scheme: the current testing – 40% and final test – 20% and developing a lesson – 40%.
Exam Registration: In agreement with the lecturer and the Student office.

SITTING IN ON INFORMATICS AND INFORMATION TECHNOLOGY CLASSES

Semester: 3rd semester
Course type: Seminars
Hours (per week): 1 hour seminars
Credits: 2 credits
Assessment: A current grade
Lecturer: part-time lecturer Katerina Marcheva

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: kmarcheva@gmail.com, k_marcheva@hotmail.com

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: It provides practical training for students. Lessons observation is carried out under the guidance of the lecturer-observation leader at upper secondary and high school levels of school education. It is directly related to the Current Mathematics and Informatics teaching practice courses. The main emphasis in the observations is on implementing learning principles, methods and organizational structure of a lesson, communication between teachers and students, etc. Before each observation, students are divided into groups who observe a specific lesson component. After the observation, each group presents an analysis of the component observed. The positives and negatives of the lessons are discussed.

Course Aims and Objectives: The aim of the course is to develop skills for observing and analyzing Informatics and Information Technology lessons.

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

- analyze the classroom lessons observed;
- identify lesson type and didactic methods and principles of teaching used.

Teaching Methods: The training is conducted in a real work environment at school and the topics of lessons observed depend on the particular class and school where the lesson is held.

Assessment: The grade is based on students' participation in lessons discussions (30%), notes made and analysis of the lessons observed (50%) and developments of an Informatics lesson (10%) and an Information Technology lesson (10%). The points received by the components of the assessment are equal to 100. Scheme for rating:

Excellent	100%-92%
Very Good	91%-76%
Good	75%-60%
Satisfactory	59%-52%
Poor	Above 52%

With a positive grade and 100% attendance a student receives a certificate of practice in the student's booklet.

Exam Registration: In agreement with the lecturer and the Student office**.**

CURRENT PEDAGOGICAL PRACTICE IN INFORMATICS AND INFORMATION TECHNOLOGY

Semester: 3rd semester

Course type: Practical exercises

Hours (per week): 2 hours practical exercises

Credits: 4.0 credits

Assessment: A current grade
Lecturer: part-time lecturer Katerina Marcheva
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: kmarcheva@gmail.com, k_marcheva@hotmail.com

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The "Current Pedagogical Practice in Informatics and Information Technology" course prepares students for their future profession. It is conducted after the "Informatics and Information Technology Teaching Methodology" lectures and "Sitting in on Informatics and Information Technology Classes" seminars, and meets the requirements for practical training of students who receive a teacher qualification. Full implementation of the current practice provides the basis for successful undergraduate pedagogical practice in Informatics.
Course Aims and Objectives: The main objective of the course is to acquire skills for an Informatics and Information Technology lesson planning, preparation and implementation in a specific learning environment. Each student should prepare and teach a minimum of 2 lessons per class. The rest of students in the group prepare a lesson plan for themselves, observe the lesson and participate in discussion. Thus, there is an opportunity to compare planned and realized lessons, to defend the proposed lesson plans and to generate new ideas.
Teaching Methods: Practical exercises
Preliminary Enrollment Conditions: Students should be familiar with the "Informatics and Information Technology Teaching Methodology" and the "School Informatics" courses contents: what course material is taught and at what level.
Assessment: Students present in written form plans of two lessons in Informatics and Information Technology and two analyzes of lessons observed. The final grade is formed as follows: from the grade of thought lessons – 60% and from the presented plans and analyzes of lessons – 40%.
Exam Registration: In agreement with the lecturer and the Student office.

E-LEARNING TECHNOLOGIES AND METHODOLOGIES

Semester: 4th semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 2 hours lab exercises
Credits: 3.5 credits
Assessment: An exam
Lecturer: Prof. Daniela Tuparova, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Brief Description: The course is designed to provide training for future Mathematics, Informatics and Information technology teachers in e-learning technologies.

Topics related to the nature of e-learning, technologies for creating e-learning content are covered. Psychological and pedagogical aspects of e-learning are discussed. Using the Moodle e-learning environment is thaught in detail.

Course Aims and Objectives: Upon completion of the course, students should be able to:

- describe technologies for creating e-learning content;
- create self-contained e-learning modules in an e-learning environment;
- administer users in an e-learning course.

Teaching Methods: Lectures, lab exercises, discussions

Preliminary Enrollment Conditions: Students should have studied the "Psychology", "Pedagogy" and "Information Technology" courses.

Assessment:

- A current grade on the topics developed in the e-learning environment. (70% of the final grade);
- an exam: defending developed electronic content (30% of final grade).

In case of a Poor (2) grade from the current testing, a student should additionally cover the requirements for a Satisfactory (3) grade of the current testing in order to be admitted to the exam.

Course Registration: Automatically (compulsory course)

Exam Registration: In agreement with the lecturer and the Student office.

STOCHASTIC MODELS IN PEDAGOGICAL RESEARCHES

Semester: 4th semester

Course type: Lectures and lab exercises

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

Credits: 3.5 credits

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

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: helen@swu.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

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

The aim of the course is to introduce students to the nature and numerous applications of nonparametric statistical methods, along with the possibilities for implementing part of these procedures with the tools of Information Technology (MS-Excel, VBA, SPSS, etc.).

The course structure and content are consistent with the students' computer skills and their knowledge of probability and statistics acquired in respective courses. The subject matter of the syllabus is related to all disciplines in which the analysis of empirical data is required.

Course Aims and Objectives: Upon completion of the course, students should be able to:

- apply statistical modeling methods;
- implement specific applications using various technological tools.

Teaching Methods: Seminars, discussions, lab exercises

Preliminary Enrollment Conditions: Students should have studied "Probability and Statistics" and "Information Technology".

Assessment:

- A course paper – 30% of the grade;
- a written exam – 70% of the grade.

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

Course Registration: Automatically (a compulsory course)

Exam Registration: In agreement with the lecturer and the Student office.

MATHEMATICS INTERNSHIP

Semester: 4th semester

Course type: Practical exercises

Hours (per week): 3 hours practical exercises

Credits: 4.0 credits

Assessment: A current grade

Lecturer: part-time lecturer Daniela Kitova

Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: dg35@mail.bg

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The "Mathematics Internship" course prepares students for their future profession. With the Rector's Order, students are allocated to a 10-week practice at school. They teach three lessons each week and observe their colleagues for two hours. They should teach 15 upper and 15 mid-course lessons throughout the practice. School teachers assist in lessons development and control students' work at school. If a student is not prepared for a lesson, a senior teacher and a principal have the right to request a practice termination.

Course Aims and Objectives: The aim of the course is to prepare students for their chosen profession – to acquire an understanding of Mathematics lessons structure and skills for developing different types of Mathematics lessons, to select and systematize problems offered to students, to assess the work of an individual student and a class in general.

Teaching Methods: Practical exercises

Preliminary Enrollment Conditions: Students should be familiar with the "Mathematics Teaching Methodology" and the "School Mathematics" courses content: what course material is taught and at what level.

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

INFORMATICS AND INFORMATION TECHNOLOGY INTERNSHIP

Semester: 4th semester
Course type: Practical exercises
Hours (per week): 3 hours practical exercises
Credits: 4.0 credits
Assessment: A current grade
Lecturer: part-time lecturer Katerina Marcheva
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: kmarcheva@gmail.com, k_marcheva@hotmail.com

Discipline Curriculum Status: A compulsory course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The "Informatics and Information Technology Internship" course is included as compulsory one in the "Technology of Teaching Mathematics and Informatics" curriculum. It is conducted after the "Informatics and Information Technology Teaching Methodology" lectures and "Sitting in on Informatics and Information Technology classes" seminars, and meets the requirements for the practical training of students who receive a teacher qualification. Full implementation of the current practice provides the basis for successful professional realization as a teacher in Informatics.
Course Aims and Objectives: The main aim of the course is acquisition of competencies for preparation and organization of full and effective training in Informatics and Information Technology.

During the internship, students complete almost all activities of Informatics teacher. This allows, in addition to taking a number of lessons, to familiarize themselves with teaching documentation and to engage in various extracurricular student activities.

The Informatics internship prepares students for the practical exam (teaching a lesson) before a committee determined by the Rector's order.
Teaching Methods: Practical exercises
Preliminaryenrollment Conditions: Students should be familiar with the "Informatics and Information Technology Teaching Methodology" and the "School Informatics" courses contents: what course material is taught and at what level.
Assessment: Students present in written form Informatics and Information Technology lessons plans. The final grade is formed from the grade of 2-3 thought lessons /observed by the teacher practice trainer/ – 60%, and from the presented lessons plans – 40%.

ELECTIVE COURSES

FUNDAMENTALS OF ARITHMETIC

Semester: 1st semester
Course type: Lectures and seminars
Hours (per week): 3 hours lectures, 1 hour seminars
Credits: 4.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Ilinka Dimitrova, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: ilinka_dimitrova@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The main aim of the comprehensive "High School Algebra" course is to construct a concept of number and related operations and relation of ordinary, 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 an aim of the course. The basis of the course is theoretical-multiple. 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 to the term natural number, to the operations of addition and multiplication of two natural numbers and the laws which satisfy them, and to the inequality between 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 ordinaries, as extensions of the already established in the half-ring of natural numbers. The course ends with the review of real and complex numbers.
Course Aims and Objectives: It is introducing students to the modern theoretical ideas and presentation of the comprehensive "High School Algebra" course.
Teaching Methods: Lectures, seminars, consultations, course papers and tests
Preliminary Enrollment Conditions: Basic knowledge of higher algebra and number theory is required.
Assessment: Current testing during the semester, including course papers and tests, and a written exam on the seminars and lectures contents.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

FUNDAMENTALS OF GEOMETRY

Semester: 1st semester
Course type: Lectures and seminars
Hours (per week): 2 hours lectures, 1 hour seminars

Credits: 4.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Nikolay Kitanov, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: nkitanov@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: Three of the Euclidean geometry's axiomatics are outlined: D. Hilbert's axiomatics, Kagan-Birchov-Kolmogorov's metric axiomatics, and H. Weil's axiomatics, and their equivalence are proved. Particular attention is paid to the fact that in metric axiomatics the concept of a real number is taken as a primary object, which is why complete metric axiomatics contains in addition the six geometric axioms and axioms for real numbers. This necessitates, in the proof that the Hilbert's axioms follow the axioms of metric axiomatics, to prove that the axioms of real numbers follow the Hilbert's axioms, 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 acquire a solid professional training and to look at "School Geometry course" from a higher perspective.
Course Aims and Objectives: Students should acquire knowledge and skills for rigorous axiomatic method of constructing mathematical discipline.
Teaching Methods: Lectures, seminars, consultations, course papers and tests
Preliminary Enrollment Conditions: Basic knowledge of "Analytical geometry" and "School Geometry" course is required.
Assessment: Current testing during the semester, including homework and tests, and a written exam on the seminars and lectures contents.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: Students agree with the lecturer the desired dates within the announced calendar for the exam sessions.

DISCRETE MATHEMATICS

Semester: 1st semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 1 hour lab exercises
Credits: 4 credits
Assessment: An exam
Lecturer: Assist. Prof. Margarita Todorova, PhD
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: todorova@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course aim is to provide students with knowledge of the basic sections of discrete structures that are very widely used in modern computers. Basic sections of:

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

are considered.

In terms of structure and content, the course coincides with similar courses at a number of reputable universities around the world. Discrete structures and their properties are closely related to the issues of modern computers design and operation. For this reason, the whole course emphasizes the methods of applying discrete mathematics in Informatics.

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

The expected results are expressed in developing methods for the application of discrete mathematics in Informatics.

Teaching Methods: In compliance with the educational course specifics and achieving the aims, objectives and expected results in organizing extracurricular employment, the following forms of independent work are considered:

- homework preparation;
- knowledge and skills tests preparation;
- work in a library;
- consultations;
- exam preparation.

Extensive theoretical material is given in two 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). For the lab exercises students are prepared to solve specific practical problems related to theory. The classes are held in seminar rooms and in computer labs.

Preliminary Enrollment Conditions: Basic knowledge of “Algebra” course and graph theory is required.

Assessment: Students are required to complete successfully 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 an interview are conducted, after which the final grade is formed.

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

MONTE CARLO NUMERICAL METHODS

Semester: 1st semester

Course type: Lectures and seminars

Hours (per week): 2 hours lectures, 1 hours seminars

Credits: 4.0 credits

Lecturer: Assoc. Prof. Vasil Grozdanov, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/ 588557, e-mail: vassgroz@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief 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, technique of variation reduction, stochastic methods of these problems, and applications for the study of American Options.
Course Aims and Objectives: Students should acquire knowledge of the basic concepts and methods for stochastic study of random variables.
Teaching Methods: Lectures, seminars, consultations, homework, current tests
Preliminary Enrollment Conditions: Good knowledge of mathematical analysis, probability theory, differential equations and other fields.
Assessment: A written exam on the lectures material.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: Students agree with the lecturer the desired dates within the announced calendar for the exam sessions.

SYMMETRIC INVERSE SEMIGROUP THEORY

Semester: 1st semester
Course type: Lectures
Hours (per week): 3 hours lectures
Credits: 4.0 credits
Lecturer: Assoc. Prof. Ilinka Dimitrova, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/ 588557, e-mail: ilinka_dimitrova@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The concept of semigroups originated in the early XX century, but the development of semigroup theory actually began in the late 1920s. By the 1960s, the 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 semigroup theory appeared. Today, both Bulgarian once and many well-known mathematical centers abroad work in this field. The semigroup theory finds application in a number of 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 the semigroup theory. Ideals and congruences are discussed, along with theorems for homomorphism and isomorphism of semigroups. Particular attention is given to Green's relations and symmetric inverse semigroup. A number

of symmetric inverse semigroups with specific properties are studied, such as semigroups of transformations preserving or inverting, semigroups of transformations preserving or reversing, symmetric inverse semigroups of partial transformations.
Course Aims and Objectives: The aim of this course is to acquaint students with the basic results in the semigroup theory, along with the applications of this apparatus in other mathematical disciplines. The volume of material studied enables students to further study the semigroup theory on their own, to be able to take other courses using the semigroup theory, to attend specialized scientific seminars in algebra, and to read articles and books in the relevant field.
Teaching Methods: Lectures, consultations, a course paper
Preliminary Enrollment Conditions: Basic knowledge of higher algebra is required.
Assessment: Current testing during the semester, including a course paper, and a written exam on the lectures material.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: Students agree with the lecturer the desired dates within the announced calendar for the exam sessions.

GEOMETRY OF CIRCLES

Semester: 1st semester
Course type: Lectures and seminars
Hours (per week): 2 hours lectures, 1 hour seminars
Credits: 4.0 credits
Lecturer: Assoc. Prof. Nikolay Kitanov, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: nkitanov@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: Discipline education involves the study of bundles of circles and some transformations related to circles.
Course Aims and Objectives: Students should acquire new knowledge of circles.
Teaching Methods: Lectures, seminars, consultations, a course paper and tests
Preliminary Enrollment Conditions: Knowledge of "School Geometry" course is required.
Assessment: A written exam on the seminars and lectures contents.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

MATHEMATICAL STRUCTURES

Semester: 1st semester
Course type: Lectures and seminars

Hours (per week): 2 hours lectures, 1 hours seminars
Credits: 4.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Vasil Grozdanov, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: vassgroz@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The "Mathematical structures" course aims to provide students with 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.

In the "Mathematical structures"course the theory of basic numerical systems taught in school is logically, consistently and fully presented – natural numbers, integers, rational numbers and real numbers. The theory of complex numbers is presented in view of the completeness of students' preparation. 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, semirings, rings, and fields. The theory of real numbers is constructed as Dedekind sections, as a cantorial 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 ordinaries, along with 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: Lectures, seminars, consultations, homework, course papers, control tests
Preliminary Enrollment Conditions: Knowledge of higher algebra, number theory and mathematical analisys is required.
Assessment: Current testing during the semester (test) and a written exam.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

COMPUTER SECURITY

Semester: 1st semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures and 1 hour lab exercises
Credits: 4.0 credits

Lecturer: Assist. Prof. Ivo Damyanov, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: damianov@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: This course introduces students to computer security. 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 Aims and Objectives: It is 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. Students should acquire additional advanced specialized training in information protection and computer systems in general.
Teaching Methods: Talk, demonstration, project work and teamwork
Preliminary Enrollment Conditions: Knowledge of computer architecture, discrete mathematics, network and system administration, programming, operating systems is required.
Assessment: A written exam
Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

OBJECT-ORIENTED AND DISTRIBUTED DATABASES

Semester: 1st semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 1 hour lab exercises
Credits: 4.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Velin Kralev, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: velin_kralev@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course introduces students to object-oriented and distributed databases developing methods through object-oriented environments for visual design and event-oriented programming. Different aspects of distributed databases design and the use of different objects are considered: data sets, field-type objects, data-related controls, etc. Different data access applications are developed depending on their architecture: object-oriented and distributed (client / application server / server). Various data access technologies

are studied, such as: ADO, ADO.NET, dbExpress, IBExpress, DataSnap, Cloud applications and others.

Participation in the course requires students to have knowledge of databases and object-oriented programming. It is desirable that students have used visual design environments and event-driven programming, such as RAD Studio and Visual Studio.

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 Aims and Objectives: The aim of this training is the student to be introduced to some of the fundamentals technologies used when developing object-oriented and distributed databases and the ways they are used.

The main objective is, after successful completion of the course, the student to be able to use various technologies when developing object-oriented and distributed databases with different architecture.

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: Lectures, discussions, exercises

- Curricular activity;

The following academic and technical means are necessary for conducting lectures: multimedia projector, screen and a computer.

- Extracurricular activity includes:

- theoretical preparation and work in the library;
- individual work with a computer and individual work on projects.

Preliminary Enrollment Conditions: Students should have studied the “Databases” course.
Assessment: Current testing during the semester (tests) and a written exam.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

WEB SYSTEMS AND TECHNOLOGIES

Semester: 1st semester
Course type: Seminars and lab exercises
Hours (per week): 1 hour seminars and 2 hours lab exercises
Credits: 4.0 credits
Lecturer: Assoc. Prof. Radoslava Kraleva, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU “Neofit Rilski”– Blagoevgrad, Phone: 073/588 532, e-mail: rady_kraleva@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The proposed curriculum addresses topics 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 Aims and Objectives: The aim of the course is to provide students with a comprehensive understanding of the structure and capabilities of modern web technologies. Students should use terminology freely and have practical experience in developing static websites.

Upon completion of the course, students should:

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

Teaching Methods: Seminars, demonstrations, exercises and project work

Preliminary Enrollment Conditions: Basic knowledge of the "Information Technology" course is required.

Assessment: A grade of a student is done according to six-point system. During lab exercises a student receives n-marks on current assignments – CT_1 – CT_n and at the end of the semester defends an individual course project – CP. The final grade – FG is calculated as arithmetic mean of these grades and score obtained on the final test – FT, according to the following formula:

$FG = (((CT_1 + ... + CT_n) / n + CP) / 2 + FT) / 2$

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

SPECIALIZED STATISTICAL SOFTWARE

Semester: 1st semester

Course type: Lectures, lab exercises

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

Credits: 4 credits

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

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: helen@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The "Specialized Statistical Software" course is aimed at a thorough study of statistical modelling and its modern applications combined with the use of computer technology. Basic principles for modelling of empirical data and the capabilities of modern technologies for their realization (MS EXCEL, SPSS and STATISTICA, etc.) are included in the course.

Courses Aims and Objectives: The main aim is:

- to give students theoretical knowledge of contemporary application programs, along with 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: Seminars, discussions, exercises, simulations

Preliminary Enrollment Conditions: Students must have studied "Probability and Statistics" and "Information Technology" courses.

Assessment:

- A course paper – 30% of the grade;
- a written exam-test – 30% of the grade;
- performing current assignments – 40% of the grade.

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

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

APPLIED STATISTICS

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 4.0 credits

Assessment: An exam

Lecturers: Assoc. Prof. Elena Karashtranova, Ph.D.

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: helen@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is designed as an upgrade of the base course in probability and statistics. The course structure and content are in accordance with the students' knowledge of Informatics 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.

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

Course Aims and 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, discussions, exercises

Preliminary Enrollment Conditions: Students should have studied the "Probability and Statistics" and "Information Technology" courses.

Assessment:

- A course paper – 30% of the grade;
- a written exam-test – 70% of the grade.

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

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

INTERNET PROGRAMMING

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 4.0 credits

Assessment: An exam

Lecturer: Assist. Prof. Nadezhda Borisova, PhD

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: nborisova@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief 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 information systems 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 Aims and Objectives: Upon completion of 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: Lectures, discussions, lab exercises
Preliminary Enrollment Conditions: Students should have studied the "Databases" and "Web Design Workshop" courses.
Assessment:

- A course paper – 30% of the grade;
- a written exam-test – 70% of the grade.

The course is considered to be successfully completed with a minimum of 65% of the maximum score.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

INTERACTIVE MULTIMEDIA TECHNOLOGY

Semester: 1st semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 1 hour lab exercises
Credits: 4.0 credits
Assessment: An exam
Lecturer: Prof. Daniela Tuparova, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course is designed to provide training for future teachers in Mathematics, Informatics and Information Technology in the field of application of Information Technology in education, and in particular in the development of multimedia interactive learning content.

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 the development trends 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. Basic features of authoring environments for creating interactive multimedia content are discussed. Basic technologies for creating interactive mobile applications and virtual reality are also discussed. Emphasis is placed on creating interactive presentations using VBA macros for learning purposes.

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;
- develop interactive learning content using MS PowerPoint with VBA;
- apply basic principles and technologies for designing and creating interactive multimedia content.

Teaching Methods: Lectures, discussions, exercises, project based learning

Preliminary Enrollment Conditions: The "Information Technology" course

Assessment:

- A current grade – 60% of the grade;
- a written exam-test – 40% of the grade.

The course is considered to be successfully completed with a minimum of 53% of the maximum score.

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

OBJECT PASCAL AND DELPHI PROGRAMMING

Semester: 1st semester

Course type: Lectures, lab exercises

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

Credits: 4.0 credits

Assessment: An exam

Lecturer: …….

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

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is designed to introduce students to the methods and tools of object-oriented programming in a Delphi visual programming environment. To do this, basic knowledge of programming in the object Pascal algorithmic language is required. It is assumed that students have successfully completed the "Programming and Data Structures" and "Object-Oriented Programming" courses (these courses are based on the C ++ language in SWU) 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 Aims and 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 shape logically the individual steps in the development of individual assignments;
- to master the syntax in another programming language (in this case – Object Pascal and Delphi);
- to be able to use basic programming techniques;
- to master some of the already classic algorithms and create their 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 it is sufficient for the normal conduct of all labs.

Preliminary Enrollment Conditions: Students should have studied the "Programming and Data Structures" course.

Assessment: Current testing 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/her interests (1/3 of the final grade). The course ends with a written exam on the course material (2/3 of the final grade).

Course Registration: It is necessary to apply to the Student office (an elective course).

Exam Registration: In agreement with the lecturer and the Student office.

C++ BUILDER PROGRAMMING

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 4.0 credits

Lecturer: ……

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

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief 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. It is assumed that students have successfully completed the "Programming and Data Structures" and "Object-Oriented Programming" courses (in SWU these courses are based on the C ++ language) and are familiar with the basic techniques and algorithms in programming.

Extracurricular activity involves working in a library and with a computer, and writing two course papers – the first set by the lecturer, the second selected and formulated by the student according to his/her interests.

Course Objectives: It is 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 shape logically the individual steps in individual assignments development;
- 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 algorithms;
- to get used to good programming style;
- to learn the basic principles of application software development.

Teaching Methods: Lectures, lab exercises

Assessment: The current testing is carried out during the seminars and laboratory classes during the semester through control tests and two course assignments (project and abstract) – the first set by the lecturer, the second selected by the student according to his/her interests (1/3 of the final grade).

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

EVENT-DRIVEN PROGRAMMING

Semester: 1st semester

Course type: Lectures and lab exercises

Hours (per week): 2 hours lectures, 2 hours lab exercises

Credits: 5.5 credits

Lecturer: Prof. Daniela Tuparova, Ph.D.

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is an introduction to event-driven programming with Visual Basic (VB).

Issues related to graphical user interface design, operating system connection, and more are discussed.

Course Aims and Objectives: Upon completion of the course, students should be able to:

- work in a specific integrated visual development environment with graphical user interface;
- list and apply basic algorithmic constructs and operators in the VB programming language;
- create basic data structures in the event-driven programming environment and perform basic operations to work with them;
- set up and use objects to create software products in an event-driven programming environment with graphical user interface.

Teaching Methods: Lectures, discussions, lab exercises

Preliminary Enrollment Conditions: Students should have studied the "Information Systems Development" course.

Assessment:

- A current grade – 50% of the grade;
- a written exam-test – 50% of the grade.

The course is considered to have successfully completed at least 53% of the maximum score.

Exam Registration: In agreement with the lecturer and the Student office.

MATHEMATICAL FOUNDATIONS OF COMPUTER GRAPHICS

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 4.0 credits

Assessment: An exam

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

Department: Electronic engineering, electronics and automation, Technical Faculty, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/885 163, e-mail: trenchev@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Courses Aims and Objectives: The main objective of the course is preparing students for:

- design and structuring of models via visual images;
- design of techniques aiding a person's interaction with the image;
- developing models presentation techniques;
- developing ways to create an image;
- acquainting students with some of the basic computer graphics methods;
- practical knowledge and skills through work with specialized software products.

Teaching Methods: Talk, demonstration, project work

Preliminary Enrollment Conditions: Basic knowledge of programming, geometry and mathematical analysis is required.

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

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

INTERCULTURAL EDUCATION

Semester: 2nd semester
Course type: Lectures and seminars
Hours (per week): 2 hours lectures, 1 hour seminars
Credits: 4.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Anastasia Pashova, Ph.D.
Department: Pedagogy, Faculty of Pedagogy, SWU "Neofit Rilski"– Blagoevgrad, Phone: 0882/540 168, e-mail: asia_p@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course consists of 30 hours lectures, 15 hours seminars and 75 hours of extracurricular work.

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.

The course includes knowledge of the philosophy, subject, goals and tasks of the intercultural education. It 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 Aims and Objectives: Its main objective is to form students' generalized ways to analyze independently 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 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: The lecture part is designed as multimedia presentations in the course. Independent research activity of the students themselves is strongly advocated in the course education. It is illustrated with literature and photo material.

Expected Results: It is:

- to stimulate students' educational and research activity;
- to learn the conceptual apparatus related to intercultural education and pedagogy and interpret critically and creatively, and use it reasoned 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 acquire knowledge of students' ethno-cultural specificity and cultural identity;
- to have 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 groups; maintaining a personal cultural identity; patience; interpersonal communication, interest in students and their culture; openness to their problems and openness to the "other culture".

Assessment: Organization of the assessing and the current testing credits earning during the semester. Total credit is 5 (five) units:

- Credits from auditing. 1.5 (one and a half) credits are earned from lectures and seminars attendance and participation degree. Attendees of less than 10 hours do not receive this 1.5 credit.
- Credits from extracurricular activities. 3.5 credits are earned from the current testing during the semester, which checks students' self-study. Student activity at the seminars is assessed, and each student can choose the participation form in them – an abstract, a report, active participation in a discussion on a predefined topic, lessons planning, student publications, and participation in student scientific conferences. A student who has not been active during the seminars is tested.
- Conditions for exam admission. 5 credits are required for exam admission. Students who have not earned 5 credits are not eligible for the semester exam.
- ExamRequirements. Students whose overall average grade from curricular activity and self-study is Excellent (5, 50) are exempt from the exam and the grade is considered final for the semester.
- Assignments for students who are not admitted to the exam due to a Poor (2) grade of curricular activity and/or current testing:
    - making a test;
    - abstracts development on three set topics.

  The total cumulative grade of the three assignments should be no lower than

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

COMPUTER SYSTEMS FOR MATHEMATICAL CALCULATIONS

Semester: 2nd semester

Course type: Lectures and lab exercises

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

Credits: 4.0 credits

Lecturer: Assist. Prof. Margarita Todorova, PhD
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: todorova@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: In the process of providing mathematical education, computer systems for mathematical calculations (CSMC) are implemented more and more successfully. They free the learner from complex and tedious calculations and allow him to focus on analyzing and solving a particular assignment. Unlike programming languages, the dialogue with computer systems for mathematical calculations is in a native language, using traditional notation and formulas. This computer technology is especially effective in solving a variety of application assignments and has sufficient graphical visualization capabilities.
Course Aims and Objectives: The main aim is providing practical skills for working with modern computer systems for mathematical calculations.
Teaching Methods: Lectures, discussions, practical work with mathematical calculus systems, such as Matlab, Mathematika, Maple, MathCad, Derive
Preliminary Enrollment Conditions: Basic knowledge of number theory, algebra, analysis, differential equations, numerical methods and programming is required.
Assessment: The exam: two-part writing – problems and a course paper defense. The grade is formed using the following scheme: 50% a written exam and 50% a course paper defense.

Part I (a course paper defense): A practical assignment should be done using a computer system for mathematical calculations of choice.

A written exam: A written exam is allowed for students with a passing grade at least Satisfactory (3).

Part II (Theory): It is conducted on 2 main topics and, if necessary, additional questions on other topics of the syllabus.

Working time – 2 hours (120 minutes).

Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

MATHEMATICS TEACHING SPECIALIZED SOFTWARE

Semester: 2nd semester
Course type: Lectures and lab exercises
Hours (per week): 1 hour lectures, 2 hours lab exercises
Credits: 4.0 credits
Lecturer: Prof. Daniela Tuparova, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is designed to provide training for future Mathematics, Informatics and Information Technology teachers in applying Information Technology in Mathematics education in accordance with rapidly changing technologies.

Topics related to general characteristics of software applications in Mathematics education, application of general purpose software – spreadsheets, specialized software for dynamic mathematics – Mathematical constructor, Geogebra, Geonect and others are discussed. Methodical aspects in applying software in Mathematics education are also discussed.

Course Aims and Objectives: Upon completion of the course, students should be able to:

- evaluate the capabilities of software products for their application in Mathematics education;
- make use of spreadsheet capabilities in Mathematics lessons;
- use adequately specialized software for dynamic mathematical constructions.

Teaching Methods: Lectures, discussions, lab exercises

Preliminary Enrollment Conditions: None

Assessment:

- A current grade – 60% of the grade;
- a written exam-test – 40% of the grade.

The course is considered to be successfully completed with a minimum of 53% of the maximum score.

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

DIALOGIC TEACHING SOFTWARE IN MATHEMATICS DEVELOPMENT METHODOLOGY

Semester: 2nd semester

Course type: Lectures and lab exercises

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

Credits: 4.0 credits

Lecturer: Prof. Daniela Tuparova, Ph.D.

Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is designed to provide training for future teachers in Mathematics, Informatics and Information Technology in the field of applying Information Technology in Mathematics education in regard to the methodology and technology of interactive learning software development.

Topics related to common features of interactive learning software, structuring and software development applications are discussed. The course allows students to choose

development technology such as: Interactive Presentations with MS Power Point and Visual Basic for Application, Adobe Captivate, Adobe Flash and Java Script.

Course Aims and Objectives: Upon completion of the course, students should be able to:

- design interactive software;
- develop interactive software;
- analyze the functional features of interactive learning software.

Teaching Methods: Lectures, discussions, lab exercises, a project work

Preliminary Enrollment Conditions: The school course in "Information Technology", the school courses in "Algebra" and "Geometry", the "Mathematics Teaching Methodology" course, the "Audio-Visual and Information Technology in Teaching" course

Assessment:

- A current grade – 70% of the grade;
- a written exam-test – 30% of the grade.

The course is considered to be successfully completed with a minimum of 53% of the maximum score.

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

PRACTICAL COURSE IN MATLAB MATHEMATICAL MODELLING

Semester: 2nd semester

Course type: Lectures and lab exercises

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

Credits: 4.0 credits

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

Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/ 588 557, e-mail: big@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course is included as an elective in the "Technology of Teaching Mathematics and Informatics" curriculum and is intended for students with a keen interest in mathematical modelling and mathematical models numerical implementation through software products, in particular – Matlab software environment. It introduces students to the abundant capabilities of Matlab, which is a solid base for performing analytical and numerical calculations in a number of fields, along with creating their own software packages.

Course Aims and Objectives: The course discusses basic functions of the Matlab core and how to create new programs (m-files). Particular attention is paid to programming and creating custom programs for solving mathematical models. The aim of the laboratory exercises is to acquaint the students with the graphical environment for simulation of Simulink systems and the abundant Matlab capabilities for calculating boundaries, derivatives, integrals, functions study and complex numbers actions or most total with the environment applying in mathematical modelling.

Teaching Methods: Lectures, lab exercises, consultations, tests
Preliminary Enrollment Conditions: Basic knowledge of the "School Mathematics" course and subjects, such as "Linear Algebra", "Analytical Geometry", and "Mathematical Analysis" is required. It is also an advantage if a programming language is known.
Assessment: Current testing during the semester, including two tests, and a written exam on lab exercises and lecture material.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: In agreement with the lecturer and the Student office.

PRACTICUM FOR SOLVING SCHOOL COURSE MATHEMATICAL PROBLEMS

Semester: 2nd semester
Course type: Lectures and seminars
Hours (per week): 1 hour lectures, 2 hours seminars
Credits: 4.0 credits
Assessment: An exam
Lecturer: Assoc. Prof. Kostadin Samardzhiev, Ph.D.
Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: k_samardzhiev@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course includes solving problems in the specified topics from the syllabus, analyzing and summarizing the solving methods, applying students' knowledge of the "Methodology" and the courses learned: "School Algebra basics" and "School Geometry basics" course.
Course Aims and Objectives: The aim of the course is to acquaint students with the types of mathematical problems from the "School Mathematics" course. It also clarifies the aims pursued by solving mathematical problems; it systematizes and consolidates the methodology learned, thus deepen students' preparation for their future profession; it forms skills to solve problems from the "School Mathematics" course with knowledge of students from the relevant age group.

The problem-solving practicum gives students, in their capacity of future teachers, an idea of the tasks system in the school course in algebra, analysis and geometry, and more precisely algebra: identical transformations of expressions, equations, inequalities and systems; analysis: numerical series, functions – boundaries, derivatives, extrema; geometry: geometric transformations in the plane, vectors, locus, polygons, line and plane in space, geometric shapes.

For every topic reviewed a brief theoretical and methodical summary is made under the immediate guidance of the lecturer. Students are able to individually develop groups of tasks of various complexities, basic methods for solving the tasks reviewed are systemized and clarified.
Course objectives:

- Forming skills for solving problems related to the "School Mathematics" course with knowledge of students from the respective age group;
- forming skills for defining objectives, tasks and expected results which solving certain mathematical problem seeks;
- systematization and confirmation of material studied in Mathematics Training Methodic;
- extending and advancing students' training for their future occupation.

Expected results: Every student should be able to develop a didactical system of tasks for certain topic from the school Mathematics curriculum and to clarify the basic methods for solving tasks reviewed.

Teaching Methods: Seminars, consultations, homework, a course paper, current tests

Preliminary Enrollment Conditions: Some knowledge of the "Mathematics teaching methodology" course and knowledge of Mathematics content of V-XII grade (profiled preparation for VIII-XII grade) is required.

Assessment: It is carried out by controlling attendance at seminars, making 2 current tests and writing a course paper.

Tests are on the material as follows: first – on modules 1, 2, and 3; the second – on modules 4 and 5.

A course paper is developed by students on a given topic from the "School Mathematics" course – without limitations and with maximum exhaustiveness.

Each test is rated with 20 points, while the course paper presentation and defence is rated with 15 points.

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.

HISTORY OF MATHEMATICS

Semester: 3rd semester

Course type: Lectures

Hours (per week): 3 hours lectures

Credits: 4.0 credits

Assessment: An exam

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

Department: Mathematics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 557, e-mail: k_samardzhiev@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

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

Course Aims and Objectives: It is to acquaint 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. The "History of Mathematics" course is taught according to the current plan – lectures, grouped in a block of 3 hours per week.
Preliminary Enrollment Conditions: Knowledge from the "School Mathematics" course.
Assessment: A written exam on the theory.
Course Registration: It is necessary to apply to the Student office.
Exam Registration: Students agree with the lecturer the desired dates within the announced calendar for the exam sessions.

EDUCATIONAL COMPUTER GAMES IN MATHEMATICS AND INFORMATICS

Semester: 3rd semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 1 hour lab exercises
Credits: 4.0 credits
Assessment: An exam
Lecturer: Prof. Daniela Tuparova, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: ddureva@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The "Mathematics and Informatics Educational Computer Games" course is a part of the curriculum and includes 8 summarized topics. Current testing and an exam are provided as a form of control.

The syllabus content covers the main topics 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 "Mathematics and Informatics Educational Computer Games" 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 developing a scenario, creating an educational games and finding place and role of computer games in Mathematics and Informatics learning process.
Course Aims and Objectives: The aim of the "Educational Computer Games in Mathematics and Informatics" course is to develop knowledge and skills to create scenarios and prototype of educational computer games and apply them in learning process
Expected Results: Upon completion of the course, students should be able to:

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

Course Registration: It is necessary to apply to the Student office
Exam Registration: In agreement with the lecturer and the Student office.

INFORMATION SYSTEMS DEVELOPMENT

Semester: 3rd semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 1 hour lab exercises
Credits: 4.0 credits
Lecturer: Assoc. Prof. Velin Kralev, Ph.D.
Department: Informatics, Faculty of Mathematics and Natural Sciences, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/588 532, e-mail: velin_kralev@swu.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum
Brief Description: The course is designed to build and summarize the knowledge of students in Informatics, to introduce them to basic categories of software and to development of information systems. Particular attention is paid to organizational aspects in the use and development of information systems.

Extracurricular activity includes a course paper, work in a library and computer work. The course is a natural extension of the "Programming introduction" and "Databases" courses.

Course Aims and Objectives: Upon completion of the course, students should:

- know the main stages and approaches used in software technology;
- be able to develop software products (information systems) in accordance with the principles of software production.

Teaching Methods: Lectures, discussions, lab exercises
Preliminary Enrollment Conditions: Students should have studied the "Databases" course.
Assessment:

- A course paper – 50% of the grade;
- a written exam- test – 50% of the grade.

The course is considered successfully completed with a minimum of 51% of the maximum score.
Exam Registration: In agreement with the lecturer and the Student office.

CURRICULAR AND EXTRACURRICULAR WORK IN MATHEMATICS CONTENTS AND METHODOLOGY

Semester: 3rd semester
Course type: Lectures and lab exercises
Hours (per week): 2 hours lectures, 1 hour lab exercises
Credits: 4.0 credits
Lecturer: Corresponding member Prof. Oleg Mushkarov, D.Sc.math.

Department: Electronic engineering, electronics and automation, Technical Faculty, SWU "Neofit Rilski"– Blagoevgrad, Phone: 073/885 163, e-mail: muskarov@math.bas.bg

Discipline Curriculum Status: An elective course in the "Technology of Teaching Mathematics and Informatics" curriculum

Brief Description: The course includes the study of some basic methods for solving extreme geometric problems: inequality method, geometric transformation method, analytical method, principle of touching, etc. They also solve a number of classic extreme problems, such as Heron's, Schwartz's, Toricelli's, Malfatti's and others' problems. Through seminars, students acquire skills to apply theoretical knowledge and methods to solving problems in mathematical Olympiads and competitions, and to develop topics for extracurricular work in Mathematics.

Extracurricular activity includes homework, work in a library, consultations and a course paper.

Course Aims and Objectives: Students-future teachers should acquire some basic principles when working with students with an increased interest in Mathematics and acquire skills to solve Olympic problems and develop topics for extracurricular Mathematics work.

Teaching Methods: Lectures, seminars, homework, consultations, a course paper

Preliminary Enrollment Conditions: Good knowledge of school algebra and geometry.

Assessment: A written exam on the seminars and lectures and a review of a course paper made.

Course Registration: It is necessary to apply to the Student office.

Exam Registration: In agreement with the lecturer and the Student office.