

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)

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.

Requirements for the preparation of graduates of the specialty. Graduates of the specialty will be able to:

- apply the acquired knowledge in practice in their profession;
- competently use and apply fundamental knowledge from the fields of mathematics, informatics, and information technologies;
- master and apply modern educational technologies;
- apply information technologies in the educational process;
- conduct independent research activities, model real processes, and create computer applications to support learning;
- conduct pedagogical experiments.

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.

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.

Those who have acquired the professional qualification "Teacher of Mathematics, Informatics, and Information Technologies" should possess competencies in the following areas:

- **Teaching** – adapting knowledge in mathematics and informatics to students' age-specific characteristics and cognitive development levels; applying a competency-based approach to teaching through a variety of methods and technologies; motivating students to develop a responsible and conscious attitude towards learning, both during the educational process and independently; stimulating and maintaining students' interest in the learning content; applying diverse approaches, methods, and strategies to foster interdisciplinary connections and integration in teaching; diagnosing gaps in mastering the learning content and implementing a consultative approach in various activities for additional student support; utilizing information and communication technologies in synchronous remote e-learning or blended learning environments; and more.
- **Relationships with Students** – applying a student-centered approach; recognizing manifestations of mental processes and states in student behavior and responding appropriately; motivating students for learning and achievements in mathematics and informatics; adapting approaches and methods based on age-specific characteristics, as well as the psychological, intellectual, personal, and social development of students; adapting approaches in communicating with and teaching children with special educational needs and chronic illnesses; adapting approaches in communicating with and teaching gifted children in mathematics and informatics; and more.
- **Relationships with Other Pedagogical Specialists** – fostering effective relationships with the principal and vice-principals, teachers, and other pedagogical specialists, aimed at adhering to regulated norms for pedagogical work both within and outside the school; maintaining effective relationships with other teachers for mutual information exchange and discussing opportunities to support student learning and behavior; establishing effective relationships with the pedagogical advisor, psychologist, social worker, resource teacher, and speech therapist, in support of students needing assistance with emotional states and problematic behavior; adhering to professional ethics and maintaining constructive professional relationships in communication with other pedagogical specialists; and more.
- **Leadership** – creating and convincingly presenting a clear vision for the personal development of each student; identifying areas where efforts should focus on developing students' strengths; providing support through mentorship and coaching in students' personal self-development process; managing the class as a learning and developing community; utilizing imagination and applying a creative approach in generating ideas preceding decision-making related to educational activities; developing and implementing original and unconventional ideas when possible, applicable, and likely to lead to better results within the classroom; and more.
- **Working with Parents and the Family Community** – recognizing key characteristics of the family environment that influence a child's development and upbringing; diagnosing the impact of specific family types on children's development and upbringing; recognizing the impact of relationships within the family environment on a child's personal development; establishing effective relationships with parents and representatives of the family community regarding mastering learning content and student

behavioral manifestations; interacting with representatives of parents and the family community to prevent the risk of dropping out of the educational system; motivating parents and representatives of the family community for their active involvement in school-organized activities and interest-based activities; and more.

- **Educational Work** – implementing educational activities and situations for the formation and development of personal qualities and social competence in students; applying educational activities aimed at developing competencies for students' personal growth; applying educational principles and substantive directions of educational work depending on set goals, tasks, social, and personal needs; organizing a suitable working learning atmosphere in which each student can optimally develop their abilities and have opportunities for their expression; applying methods and techniques for prevention and management of conflict situations in the classroom and other areas of the school; and more.
- **Working in a Multicultural and Inclusive School Environment** – adapting pedagogical approaches, methods, and tools depending on individual and socio-culturally determined student needs; applying regulatory documents related to the implementation of inclusive, intercultural, and civic education in practical pedagogical activities; applying methods, techniques, and tools for fostering qualities such as tolerance, respect, empathy, goodwill, etc.; humanely resolving problematic situations arising in a multicultural and inclusive educational environment; actively involving all students, regardless of their differences, in classroom, extracurricular, and out-of-school activities to achieve common educational and upbringing goals; and more.

Professional Realization

A specialist who has completed the Master's program "Technologies of Teaching Mathematics and Informatics" is eligible to work as:

- A teacher of mathematics, informatics, and information technologies.
- A computer lab manager in a school.
- A system administrator in an educational institution.
- A lecturer in the field of mathematics, informatics, and information technologies in corporate training centers and vocational training centers.
- A methodologist or expert in mathematics, informatics, or information technologies at Regional Inspectorates of Education (RIOs) and the Ministry of Education and Science (MES).
- An e-learning material designer.
- A consultant on the application of information technologies in education.
- A mathematics specialist.
- An informatics and information technologies specialist.

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			
<u>First Semester</u>	Credits	<u>Second Semester</u>	Credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
High School Mathematics Course	5	Algebra and Number Theory	4.5
Practicum on Problem Solving in School Mathematics	2	High School Informatics and Information Technology Course	4.5
Introduction to Information Systems and Technologies	3	Mathematics Teaching Methodology – 1 part	3
Introduction to Programming	5	Sitting in on Mathematics classes	1.5
Psychology	5	Pedagogy	4.5
Pedagogical Researches Methodology and Methods	2	Inclusive Education	2
Modeling in Mathematics Education	2	Competency-Based Approach and Innovations in Education	3
Elective course from I.A (group 1)	3	Elective course from I. A(group 2)	3
Elective course from I.B (group 2)	3	Elective course from II.	2
		Elective course from II.	2
<u>Elective course from I.A (group 1)</u>		<u>Elective Courses – I. A (group 2)</u>	
Fundamentals of Arithmetic	3	Polynomials in One and Several Variables	3
Fundamentals of Geometry	3	MATLAB Mathematical Modelling Practical Course	3
Fundamentals of Modeling	3	Teaching Mathematics Specialized Software	3
Mathematical Structures	3	Dialogic Teaching Software in Mathematics Development Metodology	3
Functional Equations in Extracurricular Mathematics Activities	3		
History of Mathematics	3		
<u>Elective course from I.B (group 1)</u>		<u>Elective course from II.</u>	
Programming with Java Script	3	Developing Lessons for E-Learning Environments	2
Specialized Statistical Software	3	Digital Competence and Digital Creativity	2
Interactive Multimedia Technology	3	Communication Skills in Educational Settings	2
Internet Programming	3	Pedagogical Interaction in a Multicultural Environment	2
Information Systems Development	3	Management of Educational Institutions	2
Event-Driven Programming	3	Inclusive Education for Children and Students with Special Educational Needs	2
		Civic Education	2
		STEM Educational Technologies in	2

		Science, Mathematics, and Informatics Education	
Total:	30	Total:	30
Second year			
<u>Third Semester</u>	Credits	<u>Fourth Semester</u>	Credits
<u>Compulsory Courses</u>		<u>Compulsory Courses</u>	
Extremum Problems and Modelling in School Mathematics Course	3	Stochastic models in the pedagogical researches	3
Selected Topics from the School Mathematics Curriculum	5	e-Learning Technologies and Methodologies	3
Selected Topics from the School Informatics and Information Technology Curriculum	3	Mathematics Internship	3
Mathematics Teaching Methodology – 2 part	5	Informatics and Information Technology Internship	3
Current Pedagogical Practice in Mathematics	2.5	Elective course from II. (group 2)	3
Information and Communication Technologies in Education and Work in a Digital Environment	2.5	Voluntary Course	
Informatics and Information Technology Teaching Methodology	5	Graduation	15
Sitting in on Informatics and Information Technology Classes	1.5		
Current Pedagogical Practice in Informatics and Information Technology	2.5		
Total:	30	Total:	30
<u>Elective Courses – I. B (group 2)</u>		<u>Voluntary Course</u>	
Computer Design of Print and Advertising Materials	3	State Educational Standards	2
Web Design	3	Modern Tools for Assessment of Mathematics Knowledge	2
Computer Programming Learning Environments for Children Development	3	Computer Design	2
Information Technology in Teaching Students with Special Educational Needs	3	Norms and Standards for Information Security	2
Computer Educational Games in Mathematics and Informatics Education	3		
		The aforementioned voluntary courses are examples. Students may enroll in any academic discipline taught at the university as a voluntary course, regardless of the faculty where the instruction is organized. At least one voluntary course with a minimum of 15 hours is mandatory.	
TOTAL FOR 2 STUDY YEARS: 120 CREDITS			

COMPULSORY COURSES

HIGH SCHOOL MATHEMATICS COURSE

Semester: 1st semester

Course type: Lectures and seminars

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

Credits: 5.0 credits

Assessment: An exam

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

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 \mathbb{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 \mathbb{Z} , the half-field of fractions \mathbb{Q}_t and finally to the field of rational numbers \mathbb{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 extensions, along with use successfully

the methods for solving equations, inequalities and systems of equations and inequalities in these extensions.

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.

PRACTICUM ON PROBLEM SOLVING IN SCHOOL MATHEMATICS

Semester: 1st semester

Course Type: Seminar exercises

Hours (per week): 2 hours seminar exercises

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The course "Practicum on Problem Solving in School Mathematics" involves solving problems related to the topics outlined in the curriculum, as well as analyzing and generalizing problem-solving methods. This problem-solving practicum provides students—future teachers—with an understanding of the system of problems in the school mathematics curriculum for algebra, analysis, and geometry. More specifically: algebra (identical transformations of expressions, equations, inequalities, and systems); analysis (numerical sequences, functions—limits, derivatives, extrema); geometry (geometric transformations in the plane, vectors, loci of points, polygons, lines and planes in space, geometric solids).

For each topic discussed, a brief theoretical and methodological generalization is provided under the direct guidance of the lecturer. Students have the opportunity to independently develop sets of problems with varying degrees of complexity, systematize them, and clarify the main methods for solving the problems under consideration.

Teaching Methods: Seminar exercises, consultations, homework, course assignments, control checks.

Preliminary Enrollment Conditions: Students are expected to have a good knowledge of the high school mathematics curriculum.

Assessment: Assessment is conducted through attendance control at seminar exercises, 2 control tests, and the development of a course paper.

Course Registration: Automatic (compulsory discipline).

Exam Registration: Students coordinate with the lecturer for desired exam dates within the announced calendar schedule for 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: 3.0 credits

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

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.

INTRODUCTION TO PROGRAMMING

Semester: 1st semester

Course Type: Lectures and laboratory exercises

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

Credits: 5.0 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The course "Introduction to Programming" is an introductory course for students in the “Technology of Teaching Mathematics and Informatics” specialty, covering the fields of programming, programming languages, and algorithms. As such, it includes topics on information representation in computers, algorithm description and properties, syntax and semantics of programming languages, fundamental language constructs and their usage, and tools for program development and testing.

Visual Basic.NET has been chosen as the working programming language for the course. In addition to a general presentation of individual syntactic constructs, data types, code organization, and programming paradigms, the course also examines Visual Basic.NET's specific means for declaration and methods of using data types, variables, expressions, arrays, procedures, and functions, as well as object-oriented and event-driven programming.

Illustrative examples are selected from various subject areas and real-life scenarios. The course applies a life cycle scheme: real problem → formal (mathematical) model → implementation using programming language tools (including user interface). Classical algorithms from the field of programming are also discussed, with attention paid to built-in language implementations of these algorithms.

Significant emphasis is placed on techniques and tools for preventing and detecting errors in programs. To this end, serious attention is given to data types, means for their description and use, as well as the type system and mechanisms for type checking and consistency. The structural and object-oriented approaches to programming are presented sequentially.

Course Aims and Objectives: The aim of the course is for students to acquire fundamental knowledge in the field of programming and master the basic principles of programming.

Teaching Methods: Lectures, discussions, exercises.

Preliminary Enrollment Conditions: None (introductory course).

Assessment:

- Current control – 50% of the grade;
- Written exam – 50% of the grade.

Course Registration: Automatic (compulsory discipline).

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

PSYCHOLOGY

Semester: 1st semester

Course Type: Lectures and seminar exercises

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

Credits: 5.0 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: Psychology holds an important place in the overall preparation of students. It reveals essential patterns and psychological conditions for the functioning of the individual's psyche. This discipline provides knowledge in **general psychology**, **developmental psychology**, and **pedagogical psychology**.

Psychology indicates the forms of cooperation between various academic disciplines, which leads to the formation of qualities of thinking, will, emotions, temperament, and character, fostering an integrated, harmonious personality. Simultaneously, instruction in this discipline guides future teachers towards individualizing development, in accordance with the unique natural capacities of each student.

Psychology brings to the forefront the study of previously neglected issues of **self-awareness**, **self-regulation**, **self-assessment**, **self-development**, **reflection**, and students' "self-images". In doing so, it contributes to a decisive shift in the teacher's position within the educational process—from influence to interaction, from upbringing to self-upbringing, from development to self-development.

Through the practical orientation of the seminar exercises, students develop interest and skills for implementing a research approach to the educational process. By solving, processing, and analyzing tests regarding personality traits, anxiety, and character, students learn about themselves and prepare to study their own pupils.

The lecture course aims to educate students in general, developmental, and pedagogical psychology, which will enable them to enhance their educational and professional competence.

Course Aims and Objectives: The goals and objectives of psychology education are related to the study of the cognitive, emotional-volitional, and behavioral spheres of human mental activity. The course explores new formations in the human psyche from an ontogenetic and phylogenetic perspective.

Teaching Methods: Lectures, seminar exercises, consultations, tests, term paper development.

Assessment: The final grade for the "Psychology" discipline is formed by evaluating students' answers to a written question on one topic from the syllabus and considering the results of ongoing assessment (i.e., independent work) in a 6:4 conditional ratio.

Course Registration: Automatic (compulsory discipline).

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

PEDAGOGICAL RESEARCHES METHODOLOGY AND METHODS

Semester: 1st semester

Course type: Lectures and seminars

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

Credits: 2.0 credits

Assessment: An exam

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

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.

MODELING IN MATHEMATICS EDUCATION

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 2.0 credits

Assessment: an exam

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

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

Brief Description: Mathematical modeling finds widespread application in the study of various processes and phenomena, especially in the fields of natural sciences and engineering. Methods related to modeling are incorporated into different branches of school mathematics (geometry, algebra, probability theory, various types of word problems). This course has theoretical and practical significance for introducing students to the relevant approaches.

Course Aims and Objectives: To acquaint students with the fundamentals of mathematical modeling and develop their skills in applying modeling to solve word problems from the school mathematics curriculum.

Teaching Methods: Lectures and lab exercises

Assessment: Continuous assessment, Current grade and Exam.

Course Registration: Automatically (a compulsory course)

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

ALGEBRA AND NUMBER THEORY

Semester: 2nd semester

Course Type: Lectures and seminar exercises

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

Credits: 4.5 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The course examines fundamental concepts in three parts: number theory (Part One), theory of algebraic structures (Part Two), and algebraic polynomials (Part Three). Instruction begins with a review of basic concepts such as sets, set operations, relations, operations, and mappings. Part One introduces core number theory concepts: divisibility, congruences, prime numbers, and the fundamental theorem of arithmetic. It covers residue classes modulo a natural number and first-degree congruences with one unknown. Part Two discusses algebraic structures with one binary operation (semigroups and groups) and with two binary operations (rings and fields). The material includes definitions supported by numerous examples, along with specific algebraic structures and substructures. The polynomial section addresses classical topics such as the division algorithm with quotient and remainder, Euclid's algorithm for finding the greatest common divisor of polynomials, polynomial roots, Horner's method, Vieta's formulas, and symmetric polynomials.

Course Aims and Objectives: The aim of this course is for students to master fundamental concepts, theorems, and methods from elementary number theory, basic algebraic structures—semigroups, groups, rings, and fields—and polynomials of one and several variables.

Teaching Methods: Lectures, seminar exercises, consultations, homework, control checks.

Preliminary Enrollment Conditions: Basic knowledge of elementary mathematics and linear algebra is required.

Assessment: Current control during the semester, including homework and tests, and a written exam covering seminar exercises and lecture material.

Course Registration: Automatic (compulsory discipline).

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

SCHOOL COURSE IN INFORMATICS AND INFORMATION TECHNOLOGIES

Semester: 2nd semester

Course Type: Lectures and laboratory exercises

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

Credits: 4.5 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This course aims to broaden the preparation of future teachers of mathematics, informatics, and information technologies in the area of school informatics and information technology curricula, in line with rapidly changing technologies in informatics and its applications.

Topics studied in optional and specialized informatics and information technology courses are included. It covers issues related to structured texts and automated content creation in word processing programs, processing large volumes of data in spreadsheets, interactive presentations with VBA, software project development and management, and more.

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 for developing and documenting software projects.

Teaching Methods: Lectures, discussions, exercises.

Preliminary Enrollment Conditions: Students must have completed the courses Introduction to Information Technologies, Introduction to Programming, Pedagogy, and Psychology.

Assessment:

- Current assessment – 50% of the grade;
- Written exam-test – 50% of the grade. The course is considered successfully completed with a minimum of 53% of the maximum possible score.

Course Registration: Automatic (compulsory discipline).

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

MATHEMATICS TEACHING METHODOLOGY – I PART

Semester: 2nd semester

Course type: Lectures

Hours (per week): 2 hours lectures

Credits: 3.0 credits

Assessment: An exam

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

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: 1.5 credits

Assessment: Current testing

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

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.

PEDAGOGY

Semester: 2nd semester

Course Type: Lectures and seminar exercises

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

Credits: 4.5 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This curriculum offers specialized pedagogical knowledge, differentiated into two main modules: "Theory of Upbringing" and "Theory of Education." It is designed for students in the “Pedagogy of Teaching...” field, which implies its reduced profile and type, without sacrificing the opportunity to provide an in-depth reading of pedagogical knowledge.

Course Aims and Objectives: The goal of this discipline is to acquire knowledge and develop competencies for its pedagogical application. The discipline offers a wide range of knowledge in the sphere of pedagogical phenomena, events, and situations related to upbringing and didactics, as well as educational design connected with new information and communication technologies.

Teaching Methods:

1. Orientation in pedagogical issues and mastering the conceptual apparatus of the science of pedagogy.
2. Developing a set of professional competencies for pedagogical qualification and professional creative thinking.
3. Broad-profile and specialized pedagogical competence through situated and reflective thinking in the sphere of pedagogical knowledge and its applied aspects.

Course Content: The content of the discipline includes 30 hours of lectures and 30 hours of seminar exercises, the main problematic framework of which is related to the issues of upbringing and education as a professional task in specialized social institutions like schools, as well as the broad social resonance they can have in society. Both classical pedagogical ideas and updated or avant-garde ones, dictated by the change of scientific paradigms in the 20th century, are utilized.

Instructional Technology: Classical, heuristic, and interactive teaching methods for students are used, such as: Socratic dialogue and seminar, casuistry (case study), educational theater, project method, business games, morphological analysis, koans, autogenic training, psychodrama, lateral thinking methods, and others.

Assessment: Ongoing assessment during the semester, including homework and tests, and a written exam on the seminar exercises and lecture material.

Course Registration: Automatic (compulsory discipline).

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

INCLUSIVE EDUCATION

Semester: 2nd semester

Course Type: Lectures and practical exercises

Hours (per week): 1 hour lectures, 1 hour practical exercises

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This discipline expands and enriches students' pedagogical preparation with key issues concerning the development of students with special educational needs and the specifics of their education. Students will become familiar with optimal approaches for content-based and procedural implementation of education for students with special educational needs, depending on their abilities and needs.

Course Aims and Objectives: Students should acquire sufficient competence regarding the main characteristics of students with special educational needs, the pathways and means, forms and methods of corrective-pedagogical interaction with them, their socio-pedagogical problems, and the conditions that expand the opportunities for these students to actively participate in the educational process and successfully cope with assigned learning tasks.

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

Assessment: Written exam.

Course Registration: Automatic (compulsory discipline).

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

COMPETENCY-BASED APPROACH AND INNOVATIONS IN EDUCATION

Semester: 2nd semester

Course Type: Lectures and practical exercises

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

Credits: 3.0 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The course in this discipline acknowledges the importance of the competency-based approach in educational theory and practice, as well as the significance of innovation processes in the field of education. Attention is focused on processes related to improving the pedagogical environment and enhancing the effectiveness and productivity of functioning educational structures. Within the framework of this discipline, emphasis is placed on the role and essence of the competency-based approach in education, types of competencies, fundamental methodological approaches for forming key competencies, and the development of an innovation culture among students in specialties that prepare future teachers. During the learning process, students have the opportunity to acquire knowledge, build skills, and competencies for adequate actions and behavior in the specific conditions of innovation in contemporary schools. The focus is on new ideas implemented in specific

pedagogical environments and their technological dimensions in new approaches, forms, methods, didactic, and educational tools.

The course aims to stimulate students' creativity and foster their professional and personal readiness to perceive, understand, and support innovations, as well as to successfully integrate an innovation culture into the overall structure of the modern teacher's professional pedagogical competence for applying strategies, didactic technologies, and methodological approaches and forms for building and developing students' key competencies in the educational process.

Course Aims and Objectives: The goal of this discipline is for students to comprehend the issues related to the competency-based approach and innovation processes in the educational environment, as well as their specificity in school education. It also aims to build an innovation culture as a complex construct that includes not only knowledge, skills, and attitudes for innovative activity, but also a readiness to perceive and evaluate innovative ideas, and the ability to assist in the implementation of innovations with a predicted positive effect in the pedagogical environment.

Teaching Methods: Exposition, discussion, debate, conducted in interactive and dialogical settings, team-based activity organization, development of educational research projects, application of various interactive methods, case solving, and others.

Assessment: At the end of the semester, students receive a grade from an exam. This grade is based on students' activity during lectures and seminar exercises, control tests (quizzes) during the seventh week of the semester and at the end of the semester, and the quality of developed term papers and individual academic projects.

Course Registration: Automatic (compulsory discipline).

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

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: 3.0 credits

Assessment: An exam

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

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, brachistochron 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.

SELECTED TOPICS FROM THE SCHOOL MATHEMATICS CURRICULUM

Semester: 3rd semester

Course Type: Lectures and seminar exercises

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

Credits: 5.0 credits

Assessment: Exam

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

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

Brief Description: The construction and development of the concept of number is a complex process, both in its mathematical and philosophical essence, and in its educational and teaching nature. Following the familiar construction of the concept of number from the fundamentals of arithmetic, the course on "Selected Topics from the School Mathematics Curriculum" for Master's degree students in Mathematics and Informatics begins with the formulation of the fundamental algebraic laws: commutative, associative, idempotent (neutral) elements in addition and multiplication operations, as well as the distributive law, which

unifies the two operations on natural numbers (\mathbb{N}). Based on the operations of addition and multiplication, corresponding orders are also defined. The main properties of linear order are enumerated—boundedness from below for every set of natural numbers, Archimedean property, etc., as well as the method of mathematical induction related to both orders. The issue of divisibility of natural numbers and the concept of prime number are also discussed. All of this is illustrated with concrete examples. The course also addresses the representation of a given natural number in different numeral systems.

After demonstrating that for any two natural numbers a, b , the equations $a+x=b$ and $a \cdot x=b$ in the semi-ring of natural numbers (\mathbb{N}) have no solutions, the necessity of extending the semi-ring \mathbb{N} to the ring of integers (\mathbb{Z}), the semi-field of fractions (\mathbb{Q}^+), and finally to the field of rational numbers (\mathbb{Q}) is clarified. For each of these structures, the validity of the fundamental properties of the order relations introduced in the semi-ring of natural numbers is emphasized. All of this is illustrated with corresponding examples and problems. The largest portion of the course hours is dedicated to the field of real numbers and corresponding problems within this field—quadratic equations and inequalities, systems of equations and inequalities, including those with irrational expressions, as well as those equivalent to them involving special functions such as exponential, logarithmic, trigonometric, and others.

The extracurricular workload for the discipline includes homework, course assignments, work in libraries and computer labs, consultations, preparation for tests, assimilation of lecture material, and more.

Course Aims and Objectives: Students should assimilate and comprehend the fundamental concepts, operations, and order relations in the various extensions of the concept of number, and successfully utilize methods for solving corresponding equations, inequalities, and systems of equations and inequalities within these extensions.

Teaching Methods: Lectures, seminar exercises, consultations, homework, course assignments, control checks.

Preliminary Enrollment Conditions: Students are expected to have a good knowledge of the high school mathematics curriculum.

Assessment: Written exam covering seminar exercises and lecture material.

Course Registration: Automatic (compulsory discipline).

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

SELECTED TOPICS FROM THE SCHOOL COURSES IN INFORMATICS AND INFORMATION TECHNOLOGIES

Semester: 3rd semester

Course Type: Lectures and laboratory exercises

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

Credits: 3.0 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This course is designed to broaden the preparation of future teachers of mathematics, informatics, and information technologies in the area of school informatics and information technology curricula, in line with rapidly changing technologies in informatics and its applications. Topics studied in optional and specialized informatics and information technology courses are included.

It covers issues related to structured texts and automated content creation in word processing programs, processing large volumes of data in spreadsheets, interactive presentations with VBA, software project development and management, and more.

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 for developing and documenting software projects.

Teaching Methods: Lectures, discussions, exercises.

Assessment:

- Current assessment – 50% of the grade;
- Written exam-test – 50% of the grade. The course is considered successfully completed with a minimum of 53% of the maximum possible score.

Course Registration: Automatic (compulsory discipline).

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

MATHEMATICS TEACHING METHODOLOGY – II PART

Semester: 3rd semester

Course type: Lectures and seminars

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

Credits: 5.0 credits

Assessment: An exam

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

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: 2.5 credits

Assessment: A current grade

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

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.

INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION AND WORK IN A DIGITAL ENVIRONMENT

Semester: 3rd semester

Course Type: Lectures and laboratory exercises

Hours (per week): 1 hour lectures and 1 hour exercises

Credits: 2.5 credits

Assessment: Exam

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

Discipline Curriculum Status: A compulsory discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This curriculum focuses on mastering modern tools and technologies applicable in education. It examines the main characteristics and applications of software packages in Informatics and IT education. Emphasis is placed on using various multimedia products for teaching and utilizing internet technologies for searching and developing supplementary learning materials.

Learning is supported by educational materials published in the e-learning system maintained by the Research Laboratory for E-learning at the Faculty of Mathematics and Natural Sciences: www.e-learning.swu.bg.

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

- Master the principles of using software products in Informatics education.
- Acquire knowledge and skills for working with tools for presenting educational materials and creating interactive tests.
- Understand trends in the development of multimedia technologies in education.
- Create their own multimedia educational materials that support the learning process.

Teaching Methods: Lectures, laboratory exercises, discussions, and solving practical problems.

Preliminary Enrollment Conditions: No special knowledge is required beyond what is acquired in high school Informatics and Information Technologies courses.

Assessment: A grade from current control and a written exam (test).

Course Registration: Automatic (compulsory discipline).

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

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: 5.0 credits

Assessment: An exam

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

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: 1.5 credits

Assessment: A current grade

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

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: 2.5 credits

Assessment: A current grade

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

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.

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 credits

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

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 structure and content of the course 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 modelling methods;
- implement specific applications using various technological tools.

Teaching Methods: Seminar, discussion, 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 School office.

E-LEARNING TECHNOLOGIES AND METHODOLOGIES

Semester: 4th semester

Course type: Lectures and lab exercises

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

Credits: 3 credits

Assessment: An exam

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

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 taught 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.

MATHEMATICS INTERNSHIP

Semester: 4th semester

Course type: Practical exercises

Hours (per week): 3 hours practical exercises

Credits: 3.0 credits

Assessment: A current grade

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

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

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

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

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 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

GROUP I. Interdisciplinary and Applied-Experimental Disciplines, Focused on Key Competencies and Related to Teachers' Professional-Pedagogical Realization

Group MATHEMATICS

FUNDAMENTALS OF ARITHMETIC

Semester: 1st semester

Course type: Lectures and seminars

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

Credits: 3.0 credits

Assessment: An exam

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

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: 3.0 credits

Assessment: An exam

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

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.

FUNDAMENTALS OF MODELING

Semester: 1st semester

Course type: Lectures and seminars

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

Credits: 3.0 credits

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

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

Brief Description: Mathematical modeling stands as one of the most widely utilized tools in contemporary science. This discipline encompasses the traditional foundational material of mathematical modeling. Students will acquire an understanding of what a model is and the essence of modeling. A classification of mathematical models is presented, and a significant number of elementary models from diverse fields such as physics, chemistry, biology, medicine, and economics are examined. Topics such as static and dynamic modeling are also included.

Course Aims and Objectives: The aim of this course is to introduce students to the essence of mathematical modeling and to some basic models from various scientific domains.

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

Preliminary Enrollment Conditions: Basic knowledge of differential and integral calculus is required.

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.

MATHEMATICAL STRUCTURES

Semester: 1st semester

Course type: Lectures and seminars

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

Credits: 3.0 credits

Assessment: An exam

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

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 Cantorian complement to the ordered field of rational numbers, as decimal and systematic fractions, and finally as chain fractions. Basic algebraic systems are presented not only in terms of principal operations but also in terms of their principal relations, in particular linear and complete ordinals, 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 analysis 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.

FUNCTIONAL EQUATIONS IN EXTRACURRICULAR MATHEMATICS ACTIVITIES

Semester: 1st semester

Course type: Lectures

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

Credits: 3.0 credits

Assessment: An exam

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

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

Brief Description: The aim of this discipline is to familiarize students with various methods for solving certain functional and differential equations, as well as the formulation of such equations derived from a range of physical, geometrical, algebraic, and other problems.

Course Aims and Objectives: To master the fundamental concepts and methods for solving certain functional and differential equations.

Teaching Methods: Lectures, seminars, homework, consultations, control checks.

Preliminary Enrollment Conditions: Strong knowledge in the fields of mathematical analysis and differential equations is required.

Assessment: Current control throughout the semester and a written exam.

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.

HISTORY OF MATHEMATICS

Semester: 1st semester

Course type: Lectures

Hours (per week): 3 hours lectures

Credits: 3.0 credits

Assessment: An exam

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

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.

POLYNOMIALS OF ONE AND SEVERAL VARIABLES

Semester: 2nd semester

Course Type: Lectures and seminar exercises

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

Credits: 3.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective course in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The elective course "Polynomials of One and Several Variables" deepens and expands students' knowledge acquired in the Algebra and Number Theory course. The course begins with an overview of fundamental concepts such as polynomials of one variable, operations with polynomials, roots of polynomials, and polynomial factorization. The algebraic closure of the field of complex numbers is proven. Some essential consequences of D'Alembert's theorem are examined. The factorization of polynomials with real and complex coefficients is studied. Students are introduced to Cardano's formulas for solving cubic and quartic equations. Definitions and examples of cyclotomic (circle) polynomials and matrix polynomials are provided. The section on polynomials of several variables first reviews basic concepts and statements related to symmetric polynomials, after which power sums are introduced and Newton's formulas for the relationship between power sums and elementary symmetric polynomials are presented. The concepts of discriminant and resultant of polynomials are discussed. Attention is paid to solving nonlinear algebraic systems of equations using the resultant.

Course Aims and Objectives: The aim of this course is for students to acquire deeper knowledge and skills concerning polynomials of one and several variables, as well as the applications of this apparatus for the algebraic solvability of certain special types of equations.

Teaching Methods: Lectures, seminar exercises, consultations, homework, control checks.

Preliminary Enrollment Conditions: Basic knowledge from the Linear Algebra and Algebra and Number Theory courses is required.

Assessment: Current control during the semester, including homework and tests, and a written exam covering the seminar exercises and lecture material.

Course Registration: An application must be submitted to the Student Office.

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

MATLAB MATHEMATICAL MODELLING PRACTICAL COURSE

Semester: 2nd semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

Assessment: Exam

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

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 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.

TEACHING MATHEMATICS SPECIALIZED SOFTWARE

Semester: 2nd semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

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

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 METODOLOGY

Semester: 2nd semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

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

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 “Teaching Mathematics 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.

Group INFORMATICS**PROGRAMMING WITH JAVASCRIPT**

Semester: 1st semester

Course Type: Lectures and laboratory exercises

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

Credits: 3.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective course in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This course is designed as an introduction to programming with JavaScript, one of the most popular programming languages on the internet. It covers topics related to both the basic concepts of the language and **object-oriented programming** using JavaScript. Students will become familiar with some of the most widely used technological solutions in the field of client-side interface development for web-based information systems. Extracurricular activities for this discipline include a course assignment, work in the library, and computer-based tasks.

Course Aims and Objectives: As a result of this course, students will:

- Understand the specifics of a modern technology used for developing web-based information systems.
- Be able to design the structure and implement a JavaScript program.

Teaching Methods: Lectures, discussions, exercises.

Preliminary Enrollment Conditions: Students must have completed the "Introduction to Programming" discipline.

Assessment:

- Current control – 50% of the final grade.
- Written exam-test – 50% of the final grade. The course is considered successfully completed with a minimum of 51% of the maximum possible score.

Course Registration: An application must be submitted to the Student Office.

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

SPECIALIZED STATISTICAL SOFTWARE

Semester: 1st semester

Course type: Lectures, lab exercises

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

Credits: 3 credits

Assessment: Exam

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

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.

INTERACTIVE MULTIMEDIA TECHNOLOGY

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

Assessment: An exam

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

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. The main features of authoring environments for creating interactive multimedia content are discussed. Basic technologies for creating interactive mobile applications and virtual reality are also discussed. 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.

INTERNET PROGRAMMING

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

Assessment: An exam

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

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.

INFORMATION SYSTEMS DEVELOPMENT

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

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

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.

EVENT-DRIVEN PROGRAMMING

Semester: 1st semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

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

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

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

Topics 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 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 School office.

COMPUTER DESIGN OF PRINT AND ADVERTISING MATERIALS

Semester: 4th semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

Department: Informatics, PMF, SWU “Neofit Rilski”– Blagoevgrad

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

Brief Description: This course provides a practical introduction to **publishing systems**. Students will become familiar with best practices for developing print and electronic materials, such as advertising brochures, flyers, posters, magazines, newspapers, and more. The principles of working with software products used in publishing are studied. Typical tasks in the field of publishing and advertising are reviewed. The course prepares students for the future development of various types of designs for advertising materials, websites, and so forth.

Course Aims and Objectives: This course aims to provide students with in-depth knowledge and additional preparation regarding the theory and practice of publishing systems. They will learn about methods for processing digital images, techniques for creating vector graphics, and the prepress preparation of advertising materials for various purposes.

Teaching Methods: Discussion, demonstration, project-based work, and teamwork.

Preliminary Enrollment Conditions: Basic knowledge of operating systems, information technologies, and experience with graphic editors and multimedia files are required.

Assessment: Student assessment is conducted using the six-point grading system (2, 3, 4, 5, 6). The current control grade is obtained by taking the arithmetic mean of the course project grade and the term paper grade. Students who do not achieve a minimum current control grade of "satisfactory" (3) are not permitted to take the exam during the regular session. They must submit additional assignments, and upon receiving a grade of at least "satisfactory" (3), they will be allowed to take a written exam during the make-up or liquidation session. The final grade is calculated as the arithmetic mean of the current control results 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.

WEB DESIGN

Semester: 4th semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

Department: Informatics, PMF, SWU “Neofit Rilski”– Blagoevgrad

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

Brief Description: This course examines the issues and techniques related to the organization and visualization of content on the web. It presents approaches for building static and dynamic pages and integrating them into complete websites. Current software products for website development are reviewed. An introduction to HTML, XHTML, and CSS languages is provided. During laboratory sessions, a website will be developed using HTML, CSS, JavaScript, C#, and ASP.Net MVC languages and technologies. The course will enable students to develop and refine their skills in creating designs and concepts for websites, using appropriate web fonts, and creating and processing vector and raster images suitable for building web content.

Course Aims and Objectives: This course aims to provide students with in-depth knowledge and additional specialized training in the theory and practice of responsive web design. They will become familiar with methods and techniques for building a conceptual model of a website, selecting and utilizing multimedia objects, aligning and positioning them based on device type, and publishing a website and maintaining a web server.

Teaching Methods: Discussion, demonstration, project-based work, and teamwork.

Preliminary Enrollment Conditions: Basic knowledge of operating systems, information technologies, and experience with graphic editors and multimedia files are required.

Assessment: Student assessment is conducted using the six-point grading system (2, 3, 4, 5, 6). The current control grade is obtained by taking the arithmetic mean of the course project grade and the term paper grade. Students who do not achieve a minimum current control grade of "satisfactory" (3) are not permitted to take the exam during the regular session. They must submit additional assignments, and upon receiving a grade of at least "satisfactory" (3),

they will be allowed to take a written exam during the make-up or liquidation session. The final grade is calculated as the arithmetic mean of the current control results 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.

COMPUTER PROGRAMMING LEARNING ENVIRONMENTS FOR CHILDREN DEVELOPMENT

Semester: 4th semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

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

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 Informatics and Information Technology teachers in the field of applying computer programming learning environments for children.

Topics related to common features of computer programming learning environments for children are considered. Specific features of Scratch, Kodu, Tynker, etc., block programming environments. Game-based online training resources for programming are also considered. Methodical aspects of teaching children in elementary and upper secondary education are also discussed.

Course objectives and Expected Results: Upon completion of the course, students should be able to:

- program in a block programming environment;
- use online game-based programming environments;
- select appropriate resources and programming training assignments appropriate to age characteristics of students.

Teaching Methods: Lectures, laboratory exercises, consultations, course assignments

Preliminary Enrollment Conditions: Basic knowledge of the “Teaching Methodology in Informatics”, “Teaching Methodology in Mathematics”, “Pedagogy”, “Psychology”, “Information Technology in Teaching Students with Special Educational Needs” courses is required.

Assessment: The exam includes defending developed projects and providing a practical assignment solution on the spot.

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

INFORMATION TECHNOLOGY IN TEACHING STUDENTS WITH SPECIAL EDUCATIONAL NEEDS

Semester: 4th semester

Course type: Lectures and lab exercises

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

Credits: 3.0 credits

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

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 Informatics and Information Technology teachers in the field of applying Information and Communication Technology in teaching and working with children with special educational needs (SEN).

Topics related to hardware and software assistive technologies for various types of disruption and educational needs are considered.

The course was developed with the assistance of Assoc. Prof. Lyudmila Yashkova from the Department of Informatics Teaching at Komenski University, Bratislava and assistants from the Assistive Technology Center at Komenski University, Bratislava, Slovakia. With the Slovak Academic Information Agency financial support.

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

- identify appropriate teaching technologies for students specific educational difficulties;
- adapt educational resources for students with different educational needs;
- use game-based teaching;
- select appropriate resources and technologies for teaching special educational needs persons.

Teaching Methods: Lectures, lab exercises, discussions, a course paper on a selected topic from the seminars

Preliminary Enrollment Conditions: Basic knowledge of the “Pedagogy”, “Psychology” and “Information Technology in Teaching Students with Special Educational Needs” courses is required.

Assessment: The exam includes presenting and defending a developed course paper.

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

COMPUTER EDUCATIONAL GAMES IN MATHEMATICS AND INFORMATICS EDUCATION

Semester: 4th semester

Course Type: Lectures and laboratory exercises

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

Credits: 3.0 credits

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

Discipline Curriculum Status: An elective course in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The discipline “Computer Educational Games in Mathematics and Informatics Education” is part of the curriculum and comprises 8 generalized topics. Current control and an exam are envisaged as forms of assessment. The content of the program covers key issues related to the theoretical, methodological, and technical preparation for the creation and utilization of computer educational games in mathematics and informatics. Students who successfully pass the exam in “Computer Educational Games in Mathematics and Informatics Education” will acquire the necessary minimum knowledge for both creating prototypes of elementary educational games and identifying ways to integrate them into the educational process. During practical exercises, students are trained in developing scenarios, creating educational games, and determining the place and role of computer games in the mathematics and informatics educational process.

Course Aims and Objectives: The aim of the discipline “Computer Educational Games in Mathematics and Informatics Education” is to develop knowledge and skills for creating scenarios and prototypes of educational computer games and applying them in the educational process.

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

- Create scenarios for computer educational games for the primary school level.
- Create prototypes of elementary educational games using various technological tools.
- Plan lesson activities.
- Apply educational computer games in the educational process.

Course Registration: It is necessary to submit an application to the Student Office.

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

GROUP II. PEDAGOGICAL, PSYCHOLOGICAL, EDUCATIONAL-MANAGEMENT, AND SUBJECT-DIDACTIC

DEVELOPING LESSONS FOR E-LEARNING ENVIRONMENTS

Semester: 2nd semester

Course Type: Lectures

Hours (per week): 2 hours lectures

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective course in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: In the 21st century, teachers are expected to possess not only deep pedagogical knowledge but also high digital literacy. They must be able to integrate the learning process into a digital environment. This isn't always an easy task, as the market is flooded with software products that offer similar functionalities but often require different levels of computer literacy from the user. Moreover, educational resources found online are not always free, reliable, or suitable for the respective age group of students. Therefore, teachers must be able to select appropriate software products to create their own learning resources designed for e-learning. The course concludes with original developments of course projects for each individual topic. Extracurricular activities for the discipline include library work, internet research, and the development of course assignments.

Course Aims and Objectives: The aim of studying this subject matter is for students to acquire theoretical and practical knowledge for creating electronic lessons and learning resources. Upon completion of the course, students are expected to be able to:

- Be familiar with modern technologies for developing electronic learning resources.
- Be able to create original educational content.
- Be able to search for and use learning resources, respecting the copyrights of their creators.
- Be able to freely use all applications from the Microsoft Office suite.

Teaching Methods: Lectures are illustrated with presentations and various practical tasks that demonstrate how to apply the presented learning material.

Assessment: Assessment is conducted with a computer test after the completion of the lecture course. During the course, individual assignments related to the lecture material are given, and their grades contribute to the final grade.

Course Registration: An application must be submitted to the Student Office.

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

DIGITAL COMPETENCE AND DIGITAL CREATIVITY

Semester: 2nd semester

Course Type: Lectures

Hours (per week): 2 hours lectures

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective course in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The "Digital Competence and Digital Creativity" course aims to enhance the knowledge and skills of future educators regarding modern information and communication technologies (ICT) and their application in various subjects they teach. Current trends in digitalization and globalization impose new paces in teaching and learning methods, which in turn requires teachers to have in-depth knowledge and skills in digital technologies.

The discipline consists of two main modules, which are aligned with the DigComp 2.2 framework proposed by the European Union, according to which an individual should possess knowledge in all spheres of modern digital technologies. Digital competence includes various knowledge, skills, and attitudes in several areas, including the creative use of digital technologies, safe and responsible use, and data provision. All of this is relevant not only for learners but also for educators, and contributes to the confident and competent use of digital technologies in education, in the workplace, and even in everyday life. According to DigComp, digital competence consists of 21 skills divided into 5 categories, called "key competence areas," which are: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), internet safety and cybersecurity, intellectual property, solving various problems, and critical thinking. Digital creativity is related to the ability to use digital technologies for various creative activities.

To study the "Digital Competence and Digital Creativity" course, basic knowledge and skills for working in a digital environment and using various types of digital devices (tablet, laptop, smartphone, printer, digital camera, etc.) are necessary.

Course Aims and Objectives: The main goal of the "Digital Competence and Creativity" discipline is for students to acquire knowledge and skills for using modern information and computer technologies, enabling them to use various software products and databases, search for reliable and trustworthy information on the internet (which they can properly cite and analyze), develop their own electronic portfolio and website, communicate and collaborate with others through various web platforms (including social networks), understand and identify potential online risks, create various electronic learning materials that can be printed or transferred to other media, process images, or create original graphic objects.

Teaching Methods: Lectures are illustrated with presentations and various practical tasks that demonstrate how to apply the presented learning material.

Assessment: Assessment is conducted with a computer test after the completion of the lecture course. During the course, individual assignments related to the lecture material are given, and their grades contribute to the final grade.

Course Registration: An application must be submitted to the Student Office.

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

COMMUNICATION SKILLS IN EDUCATIONAL SETTINGS

Semester: 2nd semester

Course Type: Lectures

Hours (per week): 2 hours lectures

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective course in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The proposed course clarifies and analyzes the teacher's communicative competence as a primary resource for achieving effective pedagogical interaction. In terms of content, emphasis is placed on specific means from the field of communicative behavior (speech culture, verbal communication, paralinguistic expression) that optimize pedagogical communication towards: (1) educational relationships as a result and condition for effective pedagogical interactions with students; (2) mutual knowledge, understanding, influence, and self-knowledge in communication (verbal and non-verbal); (3) inclusion, interaction, and cooperation with parents as active partners in the educational process.

Course Aims and Objectives: The main goal of the course is to familiarize students with the theoretical foundations, characteristics, and functions of communication, and to develop skills for their application in pedagogical practice with a view to optimizing the educational environment.

Teaching Methods: Lectures, speech-technical complexes, short communicative tasks, commenting on and analyzing video recordings of verbal presentations and presentations, term papers.

Assessment: The final grade is the result of ongoing assessment and the grade from the semester exam.

Course Registration: An application must be submitted to the Student Office.

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

PEDAGOGICAL INTERACTION IN A MULTICULTURAL ENVIRONMENT

Semester: 2nd semester

Course Type: Lectures

Hours (per week): 2 hours lectures

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This academic discipline provides bachelor's degree students with knowledge about the specificities of pedagogical interaction in a multicultural environment. It

has an interdisciplinary character, as it combines knowledge from various scientific fields (pedagogy, culturology, social psychology, ethnology, etc.).

The educational content clarifies the essence, characteristics, and specificities of pedagogical interaction in a multicultural environment, problematizes issues of cultural difference in terms of their manifestations in the school environment, argues the importance of intercultural education for harmonizing cultural differences in the educational space and the intercultural upbringing of adolescents, and discusses specific problems in the process of educational integration of children and students from minority ethnocultural groups. Based on this, pedagogical strategies, approaches, and methods for achieving effective pedagogical interaction in a multicultural environment are outlined.

Course Aims and Objectives: The main goal of studying this discipline is for students to master competencies for effective pedagogical interaction in a multicultural environment.

Teaching Methods: Lecture, discussion, debate on a pre-set or emerging problem during the lecture, modeling, demonstration, analysis and discussion of problematic situations, analysis of curricula, textbooks, and learning aids, etc.

Assessment: The final grade takes into account the results of ongoing assessment and the grade from the written exam.

Course Registration: An application must be submitted to the Student Office.

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

MANAGEMENT OF EDUCATIONAL INSTITUTIONS

Semester: 2nd semester

Course Type: Lectures

Hours (per week): 2 hours lectures

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: This discipline allows students to enhance their level of professional competence by enriching their administrative and legal literacy. The learning process presents and discusses problems related to: the structure, organization, and philosophy of education; carrying out professional activities in accordance with regulatory requirements and regulations for public participation in the institution's activities; understanding the relationship between the regulatory framework and the institution's autonomy (regarding opportunities for independent decisions in selecting and introducing new aspects in the organization and content of the educational process), based on regulatory documents in the Republic of Bulgaria, which is a prerequisite for lawful, responsible, calm, and secure management of the institution. The course enriches students' professional culture, their knowledge in the field of management, law, and administration of activities in the educational institution, guiding them

towards the necessity of conducting a management process in accordance with regulatory norms and requirements. The training systematizes strategies, approaches, principles of management, horizontal and vertical management, functions, competencies, and management activities of the director, as well as the necessary documents for the institution.

Course Aims and Objectives: To familiarize students with the management of educational institutions and develop competencies regarding knowledge, skills, and attitudes, as follows:

- Consolidating and enriching knowledge and skills for analyzing the results of the institution's activities, for developing, approving, and implementing programs, documents, and mechanisms for the institution's development, and for outlining measures to improve the quality and effectiveness of work.
- Comprehending the functions and competencies of the director to improve skills in planning, motivating, organizing, controlling, etc.
- Enhancing knowledge regarding human resource management and the quality of the educational institution.
- Systematizing knowledge and improving skills for applying the regulatory framework in the field of preschool and school education, state educational standards, and other subordinate legal documents.

Teaching Methods: The main form of organization and implementation of the educational process for this discipline are lectures. Lectures are in an interactive and consultative format for initial immersion into the subject matter of the discipline. During lectures, time is also allocated for solving problems/cases, discussing the process of document development, debating presented problems, and discussing materials prepared by students for extracurricular activities. The educational content is presented through presentations and the use of interactive methods such as: brainstorming, role-playing games, discussions, etc. For extracurricular activities, guidance is provided towards bibliography, internet resources, regulatory documents in electronic format, which can be used for solving independent tasks, developing presentations, creating partnership models, structuring internal institutional documents, etc.

Assessment: Current assessment at the end of the semester and a written exam.

Course Registration: An application must be submitted to the Student Office.

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

INCLUSIVE EDUCATION FOR CHILDREN AND STUDENTS WITH SPECIAL EDUCATIONAL NEEDS

Semester: 2nd semester

Course Type: Lectures

Hours (per week): 2 hours lectures

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The course "Inclusive Education for Children and Students with Special Educational Needs" involves the study of a number of important issues related to the inclusive education of children with special educational needs. Significant attention is paid to the theoretical-content analysis of a number of key concepts. It examines the main forms of integrative and inclusive teaching and education for children with developmental anomalies; various models of such education that have proven effective in countries with established experience; the main prerequisites for creating a system for inclusive education; and the role and significance of special schools and support centers (CSOEDs) in the inclusive process.

Course Aims and Objectives: The aim of this discipline is to provide students with fundamental knowledge on issues related to the inclusion and social adaptation of children with special educational needs; to familiarize them with key international documents addressing these issues; with the regulatory basis of inclusive education in Bulgaria; and with the methodology of teaching in special and mainstream educational institutions for children with special educational needs.

Teaching Methods: Lectures; stimulating active debate in subgroups; planning and conducting mini-experiments for analyzing the behavior of children with special educational needs in different situations and different socio-cultural environments; business games, etc.

Assessment: Current assessment at the end of the semester and a written exam.

Course Registration: An application must be submitted to the Student Office.

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

CIVIC EDUCATION

Semester: 2nd semester

Course Type: Lectures

Hours (per week): 2 hours lectures

Credits: 2.0 credits

Assessment: Exam

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

Discipline Curriculum Status: An elective discipline in the curriculum of the “Technology of Teaching Mathematics and Informatics” specialty.

Brief Description: The course "Civic Education" provides students with the opportunity to acquire knowledge about the essence, principles, approaches, and methods for working with students in the field of civic education.

Course Aims and Objectives: The aim is to enable students to develop and expand their understanding of the links between education and citizenship; to stimulate their critical thinking and active participation; and to expand their competence in democratic culture.

Expected Learning Outcomes: Acquisition of skills for teaching and stimulating critical thinking; skills for building an active civic stance in students; skills for stimulating learning

through action and gaining experience with an orientation towards demonstrating civic behavior.

Teaching Methods: Lectures; stimulating active debate in subgroups; content analysis of learning materials; business games, etc.

Assessment: The final grade takes into account the results of current assessment and the exam grade.

Course Registration: An application must be submitted to the Student Office.

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

STEM EDUCATIONAL TECHNOLOGIES IN SCIENCE, MATHEMATICS, AND INFORMATICS EDUCATION

Semester: 2nd semester

Course type: Lectures and seminars

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

Credits: 2.0 credits

Assessment: An exam

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

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

Brief Description: The main idea of the course is to introduce students to an educational environment – a STEM center – which, through the implementation of innovative technologies and software solutions, will allow for the visualization of various aspects of the learning material in the educational process of future mathematics teachers.

Course Aims and Objectives: The aim of this course is to introduce students to the STEM environment, which will help them foster creativity in working with students and prepare them for successful future realization in various spheres of life, by developing their logical thinking, problem-solving skills, digital literacy, and emotional intelligence.

Teaching Methods: methods for STEM modeling; experimentation and augmented reality in STEM education; mixing virtual data (audiovisual and multimedia content); the STEM research approach; practical work and working with internet simulations; STEM methods for practical activity through the situational method; simulations of real-world problems; and combining traditional/standard teaching methods with STEM methods.

Assessment: The main form of assessing students' knowledge is a written examination. Students' knowledge and skills are evaluated using the six-point grading system, which includes: Excellent (6), Very Good (5), Good (4), Fair (3), Fail (2).

The assessment procedures applied during the education of students in the "Pedagogy of Mathematics, Informatics, and Information Technologies" major are: continuous assessment, current grade, and a final exam.

If a student receives a "Fail" grade from continuous assessment, they must additionally meet the requirements for a minimum "Fair" grade from continuous assessment to be admitted to the final examination.

Course Registration: Automatically (compulsory course)

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