

FACULTY OF MATHEMATICS AND INFORMATICS

COURSE	PROFESSOR	SEMESTER	LANGUAGE LEVEL	ECTS CREDITS	STUDY LEVEL	COURSE DESCRIPTION
*Object-Oriented Programming	Prof. Elena Somova, PhD	1 or 2	B1	7	Bachelor	The course presents the main topics in object-oriented programming - class, inheritance, encapsulation, polymorphism, etc. Students will acquire practical programming skills in C#.
*Algorithms and Data Structures	Prof. Elena Somova, PhD	1 or 2	B1	6	Bachelor	The course presents base algorithms for searching and sorting arrays, recursion, main algorithms on dynamical data structure, etc. The special attention of the course is pointed to the data structures: list, queue, stack, tree, and graph. Students will acquire practical programming skills in C#.
*Modeling and Management of Business Processes	Prof. Elena Somova, PhD	1 or 2	B1	6	Bachelor	The course presents the main standards and specifications for modeling business processes. The notation BPMN is studied in detail. Students will acquire practical skills in modeling different kinds of BPMN diagrams using some software like Bizagi, etc.
*Information Technologies in Education	Prof. Elena Somova, PhD	1 or 2	B1	5	Bachelor or Master	The course presents the main concepts in the domain of e-learning. The course gives practical knowledge on how to design one e-learning course and its elements. Students will acquire skills in the development of e-learning courses and different kinds of e-learning materials and activities in the e-learning environment Moodle. Special attention is paid to the gamification of e-learning and game-based learning.
*Web programming	Prof. Elena Somova, PhD	1 or 2	B1	5	Bachelor	The course presents HTML, CSS, and JS. Students will acquire practical skills in how to develop web pages and sites.

*Introduction to Computer Science (C++)	Prof. Elena Somova, PhD	1 or 2	B1	8	Bachelor	The course presents the basic concepts in Computer Science. Students will acquire initial practical programming skills in C++ and algorithm coding.
*Metric Spaces	Prof. Dr. Sci. Boyan Zlatanov	1 or 2	B1	6	Bachelor or Master	The course aims to provide a basic introduction to the theory of metric spaces, and functional analysis and to show its connection with the geometry of Banach spaces. To address some basic concepts in metric spaces, such as convergence, continuity, and compactness. The idea is to show, through a series of applications, the connection of how basic concepts from real analysis can be generalized to metric spaces.
*An Introduction to the Mathematics of Money (Financial Mathematics)	Prof. Dr. Sci. Boyan Zlatanov	1 or 2	B1	6	Bachelor	The course aims to provide an introduction to the mathematical foundations of financial mathematics. Basic concepts such as interest, internal rate of return, and cash flow are covered, as an <i>ordinary annuity</i> , and <i>annuity due</i> . The theory of loans, amortization tables, and credit cards is introduced. It presents the concept of bonds, their future value, and their risk.
*Computer Algebra Systems	Prof. Dr. Sci. Boyan Zlatanov	1 or 2	B1	6	Bachelor	The course aims to obtain basic skills in the usage of computer algebra systems for performing mathematical calculations with the help of computers.
*Equilibrium Theory in Noncompetitive Markets	Prof. Dr. Sci. Boyan Zlatanov	1 or 2	B1	6	Bachelor or Master	The course aims to present the theory of noncompetitive markets, i.e. markets where the producer is either a single one or a small number of players so that the change of the policy of one of them reflects the prices in the market. The consumers are so many and each consumes such a small amount of the produced goods that their behavior cannot change the prices in the market. We present the theory of maximizing the payoff functions of the producers. We introduce the concept of response functions for the producer and alter the problem of maximization of the payoff function to the problem of coupled fixed points.
*Calculus of a function of one variable with usage of algebra computer systems	Prof. Dr. Sci. Boyan Zlatanov	1 or 2	B1	6	Bachelor	The course aims to introduce the basic concepts and properties of functions of one variable, and their applications and to illustrate how algebraic computer systems can replace calculations by hand. Properties of convergent series, the concept of function, limit, and continuity of a function, Derivative of a function and its extensions to study properties of functions will be considered: constancy, monotonicity, approximate calculations, convexity, and concavity. Indefinite integral, definite integral, and its applications.

*Calculus of a function of multiple variables with usage of algebra computer systems	Prof. Dr. Sci. Boyan Zlatanov	1 or 2	B1	6	Bachelor	The course aims to introduce the basic concepts and properties of functions of multiple variables, and their applications and to illustrate how algebraic computer systems can replace calculations by hand. A function of multiple variables, limit, and continuity of a function of multiple variables, a derivative of a function of multiple variables. Searching for global and local extremums (maximum or minimum) and conditional ones. Definite integral of a function of multiple variables and its applications.
*Intelligent Data Analysis the Orange Application	Assoc. Prof. Stanka Hadzhikoleva, PhD	2	B1	6	Bachelor	The course aims to acquaint students with the opportunities for extracting knowledge from data through visual programming with the Orange application. It systematically examines the main types of tasks - classification, clustering, prediction, and others. Special attention is given to the main stages of work - understanding the problem area and the data, data preparation, modeling, model evaluation, and model exploitation. The main principles of regression analysis are presented. Various technologies for cluster and classification analysis are discussed. Students become familiar with the possibilities for prediction through machine learning algorithms. The studied material is illustrated with numerous examples using the Orange application.
*Matrix Analysis and Applied Linear Algebra	Assoc. Prof. Marta Teofilova, PhD	2	B1	6	Bachelor	Linear algebra is one of the fundamental branches of mathematics, and the matrix apparatus is widely used in studying discrete processes. The purpose of this course is to learn the basics of linear algebra and matrix analysis with an emphasis on applications to economics, discrete Markov chains, graph theory, social network analysis, web data mining, modeling of population dynamics, and others.
*Differential Geometry of Curves and Surfaces	Assoc. Prof. Marta Teofilova, PhD	2	B1	6	Bachelor	This course introduces the students to the basics of differential geometry of curves and surfaces with application to computer-aided geometric design.
*Intercultural Communication	Assoc. Prof. Vanya Ivanova, PhD	1	B2	6	Bachelor	This course focuses on enhancing cultural awareness and communication skills. Participants will engage in various activities, including preparing and conducting surveys and interviews, analyzing critical incidents, exploring idiomatic expressions, and developing presentation skills. The course encourages independent research, fostering a collaborative environment to enhance cultural awareness and effective cross-cultural communication.