VILNIAUS KOLEGIJA | HIGHER EDUCATION INSTITUTION
FACULTY OF ELECTRONICS AND INFORMATICS

**Address:** J. Jasinskio str. 15, LT- 01111, Vilnius, Lithuania.
**Erasmus+ Coordinator at the Faculty of Electronics and informatics:** Monika Matulevičiūtė, Email: m.matuleviciute@eif.viko.lt , Room No 217.
It is brought to your kind notice that information which is below could be changed according to unforeseen circumstances.

**2026/2027 study year, SPRING SEMESTER**

| CODE | COURSE TITLE | ECTS CREDITS | SUMMARY |
|---|---|---|---|
| **Study programme SOFTWARE ENGINEERING** | | | |
| **S190B394** | Professional Communication | 5 | Theories of business communication are introduced. Principles of effective communication are examined. Types of communication, their advantages and disadvantages are analyzed. Knowledge is provided on how to properly collect, analyze, systematize and present information necessary for professional activities, in order to achieve business communication competence. |
| **S120B001** | Sustainable Environment and Human | 3 | The course teaches students to examine the legal regulations of safe work organization in order to strengthen the protection of young workers' interests and to investigate the causes of youth vulnerability to occupational safety and health threats and risks. Students learn to analyse the sources of harmful factors, assess their impact on humans and the environment, and select and apply preventive measures for occupational risk. |
| **P175B253** | Algorithms and Data Structures | 5 | In the C/C++ programming language, abstract data types are implemented: stack, queue, deque, tree, and linked list using dynamic memory. The course covers algorithms related to various data structures (graph, tree, array, queue, stack, deque, etc.): shortest path finding, search algorithms, depth-first search, breadth-first search, and sorting algorithms. Recursive and iterative algorithms are compared and implemented. To determine algorithm complexity, algorithm analysis is reviewed from various perspectives, such as execution time or memory usage. Algorithms are described using pseudocode and represented graphically with flowcharts. |

| | | | |
|---|---|---|---|
| **P110B006** | Discrete Mathematics | 3 | The course on Discrete Mathematics consists of the following main parts: mathematical logic, elements of combinatorics, graph theory, and algorithms. Students are introduced to the concepts and theories of discrete mathematics. Problem-solving is practiced using mathematical software (such as MS Excel and others). |
| **P175B254** | Database Design | 5 | The Database Design course is intended to introduce the role of databases within information systems, elements of database theory, methodologies and principles of database design, as well as principles of software implementation. Students design and create databases, modify their structures, and perform data processing. The course also covers aspects of database security and data control. |
| **P175B241** | Computer Graphics | 3 | To introduce students to the standards for the preparation of technical documentation, to teach drawing and reading drawings; to represent a complex three-dimensional object on a plane, to imagine a spatial model based on the given images and to solve spatial problems; to develop imagination, to introduce students to the methodology of working with automated design systems, to form skills in preparing design documentation. To provide basic knowledge about the properties of graphic objects. |
| **P175B242** | Python Programming | 3 | During the course, students will gain knowledge and practical skills in working with Python language syntax, basic data structures, control structures and functions. The principles of object-oriented programming will be explored and their application in creating structured and maintainable programs will be explored. Students will learn to work with asynchronous programming, use Python libraries and frameworks, such as Flask and Django, when developing web applications. |
| **P175B243** | Structured Programming Practice | 3 | The Structured Programming Practicum is designed to give students a theoretical understanding of algorithms and data structures, with the opportunity to apply this knowledge in practice to the development of a functional game system. During the course, students implement a game content generator system, create and integrate various game subsystems: inventory, treasure, store, achievement and ranking systems. The course focuses on the proper selection of algorithms and data structures, their efficient application, modular code organisation, data serialisation and deserialisation. Students learn how to design interactive console interfaces, develop random generation algorithms, implement search and sorting operations, and integrate the different parts of the system into a coherent application. At the end of the placement, students produce technical documentation and demonstrate the project they have |

| | | | |
|---|---|---|---|
| | | | developed, demonstrating their ability to independently apply the principles of structured programming to solve complex problems. |
| **S190B225** | Management | 3 | This program is meant for students of non-management and focuses on developing general management skills, such as appropriate decision-making procedures, employee relations and management subtleties and nuances of motivation theories implementation perception. |
| **T120B103** | Computer Architecture and Networks | 6 | This course provides foundational knowledge about computer and network organization and operating principles, and network OS features. Students will learn to use manuals and technical documentation, search for information about computers and components, analyze their distinctive features and performance impact. The course forms skills for evaluating computer and network parameters and practical work in networks. It also covers selecting computer systems for specific tasks and installing small network computers and hardware. |
| **P175B018** | Web Services | 6 | Web services can be seen as an outgrowth of work on distributed information systems. Web services attempt to solve problems, such as service coordination and service composition, that distributed information systems have addressed in various ways in the past. The course introduces basic technologies used for the creation of Web services. The course includes an introduction to XML syntax, namespaces, XML Schema, and WSDL before exploring Web Service client or server-side development. |
| **P175B081** | Human-Computer Interaction | 6 | Subject considers the human computer interaction importance and factors affecting it. Detailed attention is given to the graphical user interface design, development, testing and efficacy analysis, the appropriate selection of elements and their layout on the screen. |
| **P000B201** | Software Engineering, KD | 3 | The course introduces software systems engineering, focusing on key methods of the software development process, including Agile, requirements engineering, modeling and specification language (UML), architectural solutions, design and development principles, implementation, and testing. Emphasis is placed on practical skills that enable students to design reliable software systems and prepare appropriate documentation for the developed system. |
| **P176B015** | Artificial Intelligence Methods | 3 | This subject provides students with in-depth knowledge of fundamental artificial intelligence methods and their application in real-world scenarios. The course covers concepts of intelligent agents, search algorithms, constraint satisfaction problems, |

| | | | |
|---|---|---|---|
| | | | probabilistic models, optimization techniques, knowledge representation, strategic decision-making, and automated planning. Fuzzy logic models and their practical applications are also examined in detail. Students will gain both theoretical knowledge and practical skills, enabling them to apply AI methods to solve problems across various domains. |
| **P175B114** | Web Technologies Practice | 3 | The Web Technologies Practice is designed to apply theoretical knowledge and practical skills in the development of web systems. During the practice, user requirements are analyzed, a solution plan is created, and responsive user interfaces are designed and developed using HTML, CSS, and Bootstrap. Server-side functionalities are programmed using PHP and the Laravel framework, including the implementation of authentication, interaction with databases via MySQL, form validation, and data encryption. The practice involves developing a dynamic website that includes CRUD functionalities, different user roles, and the creation of an API service. |
| **P176B001** | Artificial Intelligence | 6 | Artificial intelligence methods and algorithms are one of the informatics science trends, whose objective is<br>development of software tools. Such tools enable users to solve the up risen tasks. This course surveys<br>mindset and behavior modelling principles. Under consideration are taken solution search, artificial<br>intelligence methods, and knowledge representation principles. Course introduces fuzzy logic elements, the<br>way of valuing fuzzy knowledge methods, implementation methods of artificial intelligence on intelligence<br>and expert systems, the way of expert systems acts. Also models of semiotics are taken under consideration |
| **P000B233** | Software Development Management | 3 | During the studies of the subject the theoretical background of software development management – systems development life cycle model is represented. Students gain the knowledge about classical and iteration system lifecycle model and their practical implementations. Team work, project management and risk management competences are developed. Teamwork based exercises help to develop practical teamwork and management skills. |

| | | | |
|---|---|---|---|
| **P000B270** | Professional Practice | 12 | Professional practice is aimed at consolidating the acquired theoretical knowledge of programming. Professional practice must be performed in the company. During the professional practice activity the student is aimed to analyse the company‘s performance and software used in the company; to determine software application and measure the quality of software used in the company, to analyse software improvement possibilities; to realize the assigned task by the company‘s practice advisor, to select the most appropriate realization tools and methods; to prepare maintenance plan for software used in the company, to evaluate hardware and software efficiency; to demonstrate skills to work in a group and as a self-learner. |
| **P000B138** | Database Server Management | 3 | Course of management of databases servers is designed to provide basic knowledge on database servers’ complexity and administration aspects. In this course students become familiar with data safety problems, standard settings for most database systems and ability to change them. Comparison of front-end database development systems and also selection the one that satisfies best task specific problem needs are discussed too. |
| **P175B135** | Non-Relational Databases | 3 | Non-relational databases allow for fast processing of large amounts of information. This subject enables an understanding of the principles and architecture of non-relational databases. Various types of non-relational databases are discussed, including their operational principles, how to design them, and principles of data storage. |
| **P175B021** | Web Security | 3 | The Internet is a dangerous place for applications. It is anonymous, uncontrolled, always on, and instantly accessible from anywhere. This course will help the student to understand how web applications are attacked, discover common security vulnerabilities and to learn various web security techniques. |
| **P175B138** | Website Optimization for Search Engines | 3 | After this course, you will be able to create high quality website for search engine optimization. Create the shortest and most understandable content. Customize the most friendly client-side pages and personalize it. |
| **P175B273** | Artificial Intelligence in Interdisciplinary Projects | 6 | The course introduces the principles of artificial intelligence, its tools, and applications in interdisciplinary projects. Students explore the use of AI in creativity, data analysis, problem solving, and innovation development. The course is based on project-based learning, encouraging interdisciplinary collaboration, critical thinking, and responsible use of artificial intelligence. During practical assignments, students develop and implement projects integrating AI solutions within their field of study. |

| Study programme INFORMATION SYSTEMS AND CYBERSECURITY | | | |
|---|---|---|---|
| **S190B396** | Professional Communication | 5 | Theories of business communication are introduced. Principles of effective communication are examined. Types of communication, their advantages and disadvantages are analyzed. Knowledge is provided on how to properly collect, analyze, systematize and present information necessary for professional activities, in order to achieve business communication competence. |
| **S120B001** | Sustainable Environment and Human Safety | 3 | The course teaches students to examine the legal regulations of safe work organization in order to strengthen the protection of young workers' interests and to investigate the causes of youth vulnerability to occupational safety and health threats and risks. Students learn to analyse the sources of harmful factors, assess their impact on humans and the environment, and select and apply preventive measures for occupational risk. |
| **T120B257** | Computer Architecture and Networks | 5 | This course provides foundational knowledge about computer and network organization and operating principles, and network OS features. Students will learn to use manuals and technical documentation, search for information about computers and components, analyze their distinctive features and performance impact. The course forms skills for evaluating computer and network parameters and practical work in networks. It also covers selecting computer systems for specific tasks and installing small network computers and hardware. |
| **P175B257** | Structured Programming and Algorithms, CP | 5 | This course introduces the fundamentals of programming, including conditional statements, loops, functions, and data structures. Students will learn to work with basic data structures such as arrays and dynamic arrays. The course also covers data sorting and searching algorithms. It is focused on developing practical programming skills. |
| **P110B009** | Discrete Mathematics | 3 | The discrete mathematics course consists of the following main parts: mathematical logic, elements of combinatorics, graph and algorithm theory. Students are introduced to concepts and theories of discrete mathematics. Solving problems using mathematical software (MS Excel, etc.). |
| **T120B123** | Information Systems | 6 | In this course, students are introduced to the principles of application and use of information systems, as well as the classification and structure of information systems. The course defines life cycles and their utilization. Domain-specific analysis and modeling methods are applied. Functional and non-functional requirements for information systems are formulated. Methods for requirements gathering, elicitation, documentation, and modeling are reviewed. |

| | | | |
|---|---|---|---|
| **P175B076** | Information Activities Practice | 3 | During the information activity practice, the application of organizational theory, modeling of information flows and business processes, analysis of organizational information needs, practical skills in formulating requirements and cloud technologies, and skills in using a set of office applications are developed. |