Master's Program *Analysis and Synthesis of Information Systems*

CORE COURSES

B.l.C.3.Information Systems Design

Course Aim

Students will possess necessary theoretical knowledge and practical skills of information systems design.

Course Description

The course is delivered in modules. Students are expected to possess knowledge to determine the purpose and tasks of information systems design, pre-project survey of the subject area and to use information technologies in design. Students will obtain the skills of using information technologies in design, methods of information systems modeling, using different approaches to design.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- clearly define the goals and objectives of research and design work, monitor the work process, motivate and concentrate the efforts of team members;
- possess the skills of organization of research and design works, management of the team of project developers;
- know the features of information systems hardware;
- use computer equipment in professional activities;
- formulate requirements for the information system, set the goals of information systems design;
- use the world practice of strategies for designing information systems of various scales;
- know and choose the methods and methodologies of information systems design;
- have skills in the conceptual design of information systems
- know and use the basic technologies of information systems design
- have the skills to assess the risks of the project, reduce project risks;

Credit hours

Learners are expected to earn 10 credits for doing 360 hours of work.

In-class training: 126 hours, including 36 hours of lectures and 90 hours of laboratory work.

Independent work: 198 hours.

Progress Evaluation

Pass/fail exam, 2nd semester.

Exam, 3rd semester.

Course project, 3rd semester

B.1.C.4. Fundamentals of Scientific Research

Course Aim

Students will acquire skills of defining a research problem, they will know theoretical concepts and have practical skills of solving various research, scientific and engineering problems.

Course Description

The course is delivered in modules. Students are expected to possess knowledge of defining a research problem, collecting available information and using information technologies. They will be able to formulate research objectives, forecast the results of studies, develop research programs. Students will obtain skills of using information technologies, methods of modeling, different methods of solving problems, processing experimental and theoretical data, the logic of scientific knowledge development and the choice of alternative options.

Learning Outcomes (Competences)

On completion of the course students will be able to:

– analyze the available data based on the problem under study; generalize, highlight the main issues; plan activities in accordance with the goals; evaluate the result obtained and to substantiate the findings;

– use information technology to search and analyze data to gain new knowledge and skills

– compile and submit information in the form of analytical reviews with valid conclusions and recommendations

– conduct an analysis of the subject area, use new knowledge to design information systems

– know and apply methods and means of obtaining, storing, processing and broadcasting information using modern computer technologies, including global computer networks.

Credit Hours

Learners are expected to earn 5 credits for doing 180 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 54 hours of laboratory work.

Independent work: 54 hours.

Progress Evaluation

Exam, 1st semester.

ADDITIONAL COURSES

Compulsory Courses

B.1.A.CC.1. Information Security and Protection

Course Aim

The course focuses on information security, requirements for protection level of information objects, methods for ensuring information protection: software, hardware, cryptographic.

Course Description

The course focuses on the notion of national security, types of security, the analysis of terms and definitions of information security, standards and information security specifications. Students learn about the specific features of information warfare, a variety of information wars, the basic principles of information security systems development, information protection mechanisms in management systems, requirements for a comprehensive information security system. The course will consider the threats to information security in automated systems, malicious software and destroying program impacts, ways and means of information protection, software and hardware means of information protection, cryptographic information protection, encryption standards, electronic signature, electronic signature standards.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- use software and hardware to protect the components of information systems.

Students will know:

- basic methods of organization of information protection;
- content of the standards regulating information protection of professional activity objects;

Credit Hours

Learners are expected to earn 5 credits doing 180 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 54 hours of laboratory work.

Progress Evaluation

Exam, 1st semester.

Continuous assessment: reports, interviews, laboratory work.

B.1.A.CC.2 Intelligent Information Systems

Course Aim

The course focuses on theoretical and practical issues of intelligent information systems creation.

Course Description

The topics of the course cover the main theoretical and practical issues of intelligent information systems creation, as well as the use of ready-made software products: basic terms and definitions of artificial intelligence and information systems; general classification of intellectual

systems, the concept of self-learning and adaptive systems; expert and accounting and logical systems; artificial neural networks; building and training a neural network; systems with genetic algorithms; multi-agent systems; characteristics, architecture of multi-agent systems; multi-agent systems for information retrieval; natural language systems. Students will study logical calculi: predicate logic and descriptive logic, propositional logic, Stoic logic.

Graduates will possess knowledge of bases of data intellectual analysis, realization of data intellectual analysis in the form of automated information systems, decision support systems, areas of their application; basic technologies, shells and technical implementation of systems; methodology of design and operation of intelligent information systems.

Learning Outcomes (Competences)

On completion of the course students will be able to:

– apply concepts, methods and models of artificial intelligence in terms of implementing information systems for solving applied problems;

– develop conceptual and theoretical models and methods of solved problems, conduct in-depth analysis of problems, set and justify the tasks of the project activity;

– select and use the necessary computer facilities (mathematical and software facilities) to develop intelligent information systems.

Graduates will know:

– basic approaches, methods and models of knowledge representation and operation, including inaccurate, incomplete and inconsistent information (both on data and knowledge);

– the possibilities of applying methods, models and basic tools for intelligent information systems design for various subjects (problem areas);

– computer tools for the implementation of intelligent information systems.

Credit Hours

Learners are expected to earn 4 credits doing 144 hours of work.

In-class training: 54 hours, including 18 hours of lectures, 54 hours of laboratory work.

Independent work: 18 hours.

Progress Evaluation

Exam, 2nd semester.

B.1.A.CC.3. Management of IT-projects

Course Aim

The course focuses on ability to organize interaction between the teams of the developer and

the customer of the IT project, make managerial decisions in the context of different opinions, and find a compromise between the various requirements (cost, quality, timeframe) for the IT project for both long-term and short-term planning.

Course Description

Graduates will study the basic concepts of project management; methodological basis of IT project management, functional and process approaches to management, application of the process approach in management improvement; IT-infrastructure; methods of organizing the work of IT-services; library ITIL (IT Infrastructure Library), management of IT-services; service approach in the organization of work; service support; Service Desk: goals, objectives, ways of organizing; Help Desk : organization of the dispatch service, a single point of reception of all incoming events; feasibility study of the cost of software systems; methods of estimating the effort to develop a software system; quality of the software product; documenting the software product.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- organize the implementation of an IT-project in conditions of triple limitations;

- manage IT-projects at all stages of the life cycle, evaluate the effectiveness and quality of the project;

- apply methods and software tools for managing IT-projects.

Graduates will know:

– basic standards and methodologies for managing IT-projects;

– basic procedures for managing IT-projects in accordance with the chosen methodology;

– basic principles for managing IT-projects priorities, providing resources, setting deadlines, identifying risks and reacting to them, criteria for estimating the cost of the developed project;

– information, technical, software and regulatory support, used in the management of IT-projects.

Credit hours

Learners are expected to earn 5 credits doing 180 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 54 hours of laboratory work.

Independent work: 72 hours.

Progress Evaluation

Exam, 3rd semester.

B.1.A.CC.4. Technologies of Database Design

Course Aim

The course focuses on theoretical and practical basis of information and software tools development for databases implementation.

Course Description

The course is delivered in four modules. The first module describes questions of the theory of databases; basic concepts of databases; modern database management systems, technologies and database architectures; designation and main components of database systems; data models; relational data model; notations for constructing relational models; relational algebra. The second module deals with design and optimization of databases, semantic modeling of data; modeling of information objects and domain relations; design using the entity-relationship method; modeling of information objects through relationships; languages for data description and manipulation; relational database design; using of CASE-tools, the theory of normalization, indexing of data. The third module covers problems of database programming; using the SQL language. We consider common operator constructions, restrictions on values and input methods, operators for adding new data to the table and changes to existing ones, integrity mechanisms, using of SQL for indexing data, implementation of queries in SQL and QBE, view, stored procedures and triggers.

The fourth module reveals the essence of the distributed DBMS problem, transaction management, protection and database security management, data integrity and reliability, query optimization, database server performance monitoring and optimization.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- develop and study information models of professional activity objects in various subject areas;
- design databases;
- work with database design tools;
- manipulate these SQL tools;
- create queries using SQL;
- administer database applications.

Graduates will know:

- methods and tools for database design;
- the capabilities of the SQL when working with databases.

Credit Hours

Learners are expected to earn 8 credits doing 288 hours of work.

In-class training: 90 hours, including 36 hours of lectures and 54 hours of laboratory work.

Independent work: 144 hours.

Progress Evaluation

Exam, 1st semester.

Coursework, 2nd semester.

B.1.A.CC.5. Research and Modeling Methods of Information Processes and Systems

Course Aim

The course focuses on theoretical and practical aspects of development and research of models of information systems and processes, models of subject areas.

Course Description

The course is devoted to the study of the fundamentals of system analysis and modeling of information systems. The course considers the concepts of the general systems theory; information support of system analysis; application of system analysis methods in the study and modeling of information processes and technologies; system modeling, methods of systems behavior description: structural-parametric, functional-operator, information, target management; decision-making process, application of queuing theory, game theory; questions of computer modeling, construction rules and ways of implementing models of information processes, systems and technologies; principles of modeling algorithms construction; creation of simulation models; basic stages and principles of constructing mathematical models; Petri nets; Markov random processes; queuing systems; aggregation of a universal mathematical scheme for systems description.

Graduates acquire knowledge, allowing to evaluate the quality of modeling information processes and technologies; the effectiveness of the information system, process, technology; perform verification and debugging of simulation programs.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- develop models of subject areas;
- conduct research based on characteristics of components and information systems in general;
- use methods of development of information systems mathematical models.

Graduates will know:

- formal models of systems;
- subject areas model of information systems;
- models of discrete objects and phenomena of real and virtual worlds;
- mathematical models of information processes.

Credit hours

Learners are expected to earn 4 credits doing 144 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 36 hours of laboratory work.

Independent work: 36 hours.

Progress Evaluation

Exam, 1st semester.

Elective Courses

B.1.A.EC.1.1. Object-oriented Programming in Web Development

Course Aim

The course focuses on theoretical and practical aspects of design, modeling and development of software tools for Web technologies implementation.

Course Description

The course is delivered in two modules. The first module focuses on learning different languages for Web applications development. Students will study the structure and principles of the WWW; Internet application protocols; HTML5 basics; CSS3 basics; client programming in JavaScript; the fundamentals of AJAX applications; installation and configuration of the Web development software, the PHP programming language and the OOP paradigm in PHP 5; PHP and database interaction.

The second module deals with the main approaches to the development of Web-based applications: software, based on templates and on object environments, organizing web-content development; content management system (CMS), methods of client optimization.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- develop information systems and web-applications using an object-oriented approach.
- install and configure basic parameters and modules of the server environment for web development.

Graduates will know:

– principles of operation and types of web-servers;

– basis of client-server interaction

– basis of the object-oriented approach in programming

– basis for language development of server applications;

– the main tools for developing the server part of web applications.

Credit Hours

Learners are expected to earn 3 credits doing 108 hours of work.

In-class training: 90 hours, including 36 hours of lectures and 54 hours of laboratory work.

Independent work: 18 hours.

Progress Evaluation

Pass/fail exam, 2nd semester.

B.1.A.EC.1.2. Technologies of Device Applications Development

Course Aim

The course focuses on theoretical and practical aspects of design, modeling and development of software tools for mobile applications.

Course Description

The course is delivered in three modules. The first module describes the basics of communication technology. Students will learn Wi-Fi technology and the organization of wireless networks; software platform Android, Java 2 Micro Edition (J2ME), types and architecture of mobile applications.

The second module is devoted to the development of mobile applications on the J2ME platform. Students will possess skills of using configurations and profiles of J2ME, the process of developing MIDP applications, interacting with the network

The third module provides the skills to work with the main tools for developing mobile applications based on ANDROID. Students will be able to create virtual devices for Android (AVD), create a user interface, develop services.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- develop information systems and web-applications using an object-oriented approach;
- install and configure basic parameters and modules of the server environment for web development.

Graduates will know:

– principles of operation and types of web-servers;

– basis of client-server interaction;

– basis of the object-oriented approach in programming;

– basis for language development of server applications;

– the main tools for developing the server part of web applications.

Credit Hours

Learners are expected to earn 3 credits doing 108 hours of work.

In-class training: 90 hours, including 36 hours of lectures and 54 hours of laboratory work.

Independent work: 18 hours.

Progress Evaluation

Pass/fail exam, 2nd semester.

B.1.A.EC.2.1. Operating systems

Course Aim

The course focuses on learning and gaining practical skills in working with various operating systems, ensuring their security.

Course Description

The course describes basic principles of OS construction: operation modes of OS; universal OS; special purpose of OS; modular structure of OS construction and their portability; the core of OS; task management in OS; multitasking; basic algorithms for task planning; dispatching and synchronization of processes; memory management in OS; memory fragmentation; memory sharing; memory protection; the mechanism for implementing virtual memory; virtual memory management strategies; segmentation of virtual address space of the process; methods of data organization in OS; methods of access to data; I / O system in OS; buffering; file systems; options for organizing files.

Learning Outcomes (Competences)

On completion of the course students will be able to:

– solve typical problems of system programming in operating systems;

– create specific configurations of operating systems;

– solve the problem of ensuring the operating systems protection;

– work with different operating systems and administer them;

– use the programming tools for operating systems.

Graduates will know:

– basics of construction and computer architecture

– the basic principles of the organization of operating systems, architecture, internal device and algorithms of operation of the main components of the operating system;

– technologies for the development of algorithms and programs, methods for debugging and solving problems in various modes, the basis of the object-oriented approach to programming.

Credit Hours

Learners are expected to earn 3 credits doing 108 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 54 hours of laboratory work.

Independent work: 36 hours.

Progress Evaluation

Pass/fail exam, 3rd semester.

B.1.A.EC.2.2 Fundamentals of System Programming

Course Aim

The course focuses on learning and gaining practical skills in system applications development using an object-oriented approach.

Course Description

The course describes basic principles of system programming; computer memory; work with memory; virtual memory; execution of programs in the operating system environment; native programming languages; placing programs in virtual memory; return addresses; collection of elements and their representation in virtual memory; work with memory when calling functions; recursion; interaction with the operating system; work with the program from the console; environment variables; work with the file system; basic concepts of object-oriented application architecture and object-oriented approach to software development, classes; inheritance; polymorphism.

Learning Outcomes (Competences)

On completion of the course students will be able to:

– solve typical problems of system programming in operating systems;

– create specific configurations of operating systems;

– solve the problem of ensuring the operating systems protection;

– work with different operating systems and administer them;

– use the programming tools for operating systems.

Graduates will know:

– basics of construction and computer architecture

– the basic principles of operating systems organization, architecture, internal device and algorithms of operation of the main components of the operating system;

– technologies for the development of algorithms and programs, methods for debugging and solving problems in various modes, the basis of the object-oriented approach to programming.

Credit Hours

Learners are expected to earn 3 credits doing 108 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 54 hours of laboratory work.

Independent work: 36 hours.

Progress Evaluation

Pass/fail exam, 3rd semester.

B.1.A.EC.3.1. Foundations of Data Mining

Course Aim

The course focuses on the basic principles of using data mining modern technologies for the development of expert-analytical systems to support the adoption of optimal solutions.

Course Description

Graduates will study basic concepts of data mining (Data Mining - DM); the concept of a data warehouse; organization of the data warehouse; multidimensional data model; OLAP-system; architecture of OLAP-systems: MOLAP, ROLAP, HOLAP; models and methods of DM; data mining tools; methods for data clustering; basic algorithms for clustering; adaptive methods of clustering; classification and regression; methods for constructing classification rules; methods of mathematical functions construction; forecasting; the main tasks in the problem of pattern recognition; logical-heuristic, statistical methods for the formation of a characteristic space; recognition algorithms based on the calculation of estimates (ABO); the importance of the object in the system; computational algorithms for obtaining information weights and estimating their complexity; the process of training and retraining neural networks; data mining standards: CWM, CRISP, PMML and other standards.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- formulate the tasks of data analysis, choose adequate algorithms for their solution, evaluate the quality of solutions;
- use technology development algorithms and software systems for data analysis.

Graduates will know:

– main tasks and methods of data mining.

Credit Hours

Learners are expected to earn 5 credits doing 180 hours of work.

In-class training: 72 hours, including 36 hours of lectures and 36 hours of laboratory work.

Independent work: 72 hours.

Progress Evaluation

Exam, 3rd semester.

B.1.A.EC.3.2. Data Mining Methods

Course Aim

The course focuses on the basic methods and technologies of data mining for the development of expert-analytical systems to support the adoption of optimal solutions.

Course Description

Graduates will study methods and stages of data mining; the standards CWM, CRISP, PMML; the main characteristics of descriptive statistics; stages of data mining process; methods of classification and prediction: decision trees, support vectors; "nearest neighbor" and Bayesian classification; cluster analysis methods for finding associative rules; visual analysis of data; the market of data mining tools; MDX-scripts sampling and assembling MDX-queries; creation of aggregates.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- formulate the tasks of data analysis, choose adequate algorithms for their solution, evaluate the quality of solutions;
- use technology development algorithms and software systems for data analysis.

Graduates will know:

– main tasks and methods of data mining.

Credit Hours

Learners are expected to earn 5 credits doing 180 hours of work.

In-class training: 72 hours, including 36 hours of lectures and 36 hours of laboratory work.

Independent work: 72 hours.

Progress Evaluation

Exam, 3rd semester.

B.1.A.EC.4.1. Network Technologies

Course Aim

The course focuses on the basic principles of design and protection of hardware and software for the implementation of network information technologies.

Course Description

Students will gain skills of designing a corporate network for a complex of buildings. Graduates will study modular network design; model of the corporate architecture of Cisco; principles, services, the infrastructure of the global network; point-to-point connection; the principle

of the PPP protocol; WAN connection; alternative link layer protocols Frame relay, Token ring; converting IPv4; DSL technology; wireless broadband access; xDSL technology group; PPPoE protocol; documenting the network; basic network indicators; troubleshooting procedures; types of threats and corresponding attacks; destructive software - viruses, worms, zero-hour attack, trojans; ways to protect network equipment from unauthorized access - authentication and authorization of the router and switch; audit of the local computer network; protection of the local network from external threats to information security - filtering traffic through access control lists (ACLs), firewalls on network devices, devices for detecting and preventing intrusions; protection of the local network from internal threats to information security; attacks from the user's workstation: manipulation with MAC addresses, attacks on STP, attacks on VLAN, attacks using broadcast traffic; protection of STP; VLAN protection; protection switching table; protection against replacing arp-answer; virtual private networks; cryptography as a mechanism for ensuring the security of data transmission; digital signatures and certificates.

Learning Outcomes (Competences)

On completion of the course students will be able to:

– design computer networks;

– carry out maintenance and administration of computer networks;

– know the skills of creating local networks:

– administer computer networks.

Graduates will know:

- architecture and operation principles of computer networks;
- ways to maintain and administer networks.

Credit Hours

Learners are expected to earn 5 credits doing 180 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 54 hours of laboratory work.

Independent work: 54 hours.

Progress Evaluation

Exam, 3rd semester.

B.1.A.EC.4.2. Fundamentals of Computer Networking

Course Aim

The course focuses on the basic principles of software design and development for network information technologies.

Course Description

Graduates will study models of interaction of open systems - ISO / OSI, TCP / IP; global networks, local networks, WAN connection; the main protocols of the Internet and the levels at which they work; the basic devices of the network infrastructure; access to the environment; Ethernet link layer protocol; network layer protocols; routing; addressing the network layer; the principle and purpose of network partitioning on a subnet; tasks and transport layer protocols; application-layer protocols - HTTP and HTTPS web protocols; mail protocols POP, IMAP, SMTP; IP addressing services: DNS and DHCP protocols; channel switching; configuration of the network infrastructure device; virtual terminal technologies; configuration of VLANs on switches, configuration of the router dynamic routing; routing network settings; setting up the address translation service.

Learning Outcomes (Competences)

On completion of the course students will be able to:

– design computer networks;

– carry out maintenance and administration of computer networks;

– know the skills of creating local networks:

– administer computer networks.

Graduates will know:

- architecture and operation principles of computer networks;
- ways to maintain and administer networks.

Credit Hours

Learners are expected to earn 5 credits doing 180 hours of work.

In-class training: 72 hours, including 18 hours of lectures and 54 hours of laboratory work.

Independent work: 54 hours.

Progress Evaluation

Exam, 3rd semester.

B.2 Practical Experience Including Research Work

B.2.I.1. Internship on Acquiring Primary Professional Skills

Course Aim

Consolidation of knowledge gained in the disciplines of the direction, acquisition of practical skills in the performance of scientific research.

Course Description

The course gives skills for analysis of literary data on the theme of the master's thesis in order to elucidate the current trends in the development of this direction.

The graduate should be able to apply the methods and means of informatics independently for modeling the domain; to use information systems to solve practical problems.

Learning Outcomes (Competences)

Graduates will know:

- model for evaluating the quality of software systems and a model of quality characteristics, an IT-quality management system;
- the content and procedure for creating user documentation for the modified elements of a typical information system.

On completion of the course students will possess the skills of:

- developing the infologic models of the object under study (subject domain) within the framework of the tasks;
- the development of conceptual models of processes and phenomena related to the object under study (subject areas) within the framework of the tasks.

Credit Hours

Learners are expected to earn 6 credits doing 216 hours of work.

Independent work: 216 hours.

Progress Evaluation

Graded exam, 2nd semester.

B.2.I.2. Internship on Acquiring Primary Professional Skills (Design)

Course Aim

The course focuses on development of practical skills to use the basics of organizing and planning works on the development, implementation and maintenance of software and information systems, work with project and technical documentation.

Course Description

The course develops students' abilities and practical skills of designing information systems; testing; documenting; installation and configuration of software.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- choose the technology of software development in accordance with the goals and objectives of design;

On completion of the course students will possess the skills of:

−developing and specification of the model of the customer's business processes

−analyze functional and non-functional requirements for the information system based on object-oriented or structural (functional, process, etc.) models

−the specification (or modeling) of the enterprise IT infrastructure

−developing the structure of the program code of the information system

−developing a prototype information system based on a typical information system

−creating project documentation for the modified elements of a typical information system

Credit Hours

Learners are expected to earn 15 credits doing 540 hours of work.

Independent work: 540 hours.

Progress Evaluation

Graded exam, 4th semester.

B.2.R. Research Work

B.2.R.1. Research Work

Course Aim

The course is designed to form students' practical skills in research and innovation, independent scientific work, research and experiments; systematization, expansion and consolidation of professional knowledge in the field of research methodology.

Course Description

The course focuses on publications related to research works of the department teaching staff. Students will learn to use specialized software, devices, experimental models of the department. They will have the skills to conduct experiments to understand the methods and tasks of the study; to estimate the accuracy of the results obtained, to identify possible errors in the process of organizing and conducting the simulation; to draw up a report on research work; to develop a program of scientific research on the theme of the master's thesis.

Learning Outcomes (Competences)

On completion of the course students will be able to:

– develop and (or) explore models of processes and phenomena related to the object under study;

– produce a specification of the concept that defines the model, structure, functions performed, and the interconnection of the components of the information system;

– develop object-oriented or structural (functional, process, etc.) models of information

systems or tools and methods for analyzing requirements depending on the object, subject, purpose and task;

– analyze, systematize and summarize the domestic and world experience, scientific and technical information on the research topic;

– prepare publications on the topic being developed on the basis of theoretical or experimental research within the framework of the tasks.

Credit Hours

Learners are expected to earn 21 credits doing 756 hours of work.

Independent work: 756 hours.

Progress Evaluation

Graded exam, 1st – 3rd semesters.

B2.R.2 Research Internship

Course Aim

The aims of the course: consolidation and deepening of knowledge received by students in the process of training, preparing them for solving organizational and technological problems in production, as well as mastering production skills and progressive methods of management and production management.

Course Description

The course develops students' practical skills in modeling information systems, design and software implementation of information systems, and reengineering existing standard solutions.

Learning Outcomes (Competences)

On completion of the course students will be able to:

- develop and (or) use object-oriented (structural, functional) models of information systems, including intellectual ones for formalizing processes and phenomena related to the object under study.

On completion of the course students will possess the skills to:

- develop programs in one of the high-level algorithmic or procedural programming languages.

Graduates will know:

- the methods and tools of expert support for the development of architecture and prototypes of information systems;
- the tools and methods of prototyping the user interface.

Credit Hours

Learners are expected to earn 9 credits doing 324 hours of work.

Independent work: 324 hours.

Progress Evaluation

Graded exam, 4th semester.

Russian as a Foreign Language (3 credits)

Course Aim

The aim of the course is to develop students' proficiency in the Russian language, sufficient to meet basic communication needs in domestic, social and cultural settings when communicating with native speakers in a basic range of situations.

Course Description

The course is oriented on the foreign students who have not previously studied the Russian language.

In the process of learning Russian as a foreign language, students will learn basic vocabulary, a set of lexical and grammatical structures sufficient for reading and understanding of simple texts for study and socio-cultural purposes of up to 150 words (e.g., road maps and city signs, names of squares, streets, etc.; retail signs, billboards, ads tours and other cultural events), learn to understand basic conversations (up to 60 words), monologue (up to 120 words). Learners will be able to start conversation and adequately respond to interlocutor’s statements (expressing wishes, requests, agreement /disagreement, gratitude, etc., personal attitude to events, facts), to produce coherent utterances on the proposed topic (minimum 7 phrases). International students will learn to cover their communication needs on the following topics: "About myself", "Work", "Study", "Working Day", "Leisure", "Holidays", "Family", and maintain simple conversations on familiar topics, including "Food", "Health", "Weather", "Transportation", "Shopping", "Getting around the city".

Learning Outcomes (Competences)

By the end of the course learners will be able to:

- understand spoken utterances about basic survival needs in areas of immediate need or on very familiar topics, understand simple questions and answers, simple statements and simple face-to-face conversations, understand the topic of the conversation, main and additional information (students will listen to the recording twice);

- read texts for gist; understand and define the theme of the text and its main idea; understand main and additional information of the text;

- create sentences and short paragraphs, produce simple written texts related to most survival needs and limited social demands;

- produce coherent utterances on the proposed topic and cultural setting; respond adequately to interlocutor' statements; start and end conversation in an appropriate manner, express communicative intent within the studied themes and communication situations.

Learning Hours

Learners are expected to earn 3 credits for doing 216 hours of work.

The course is delivered in the 1st semester of the 1st year of study.

Classroom instruction: 108 hours, including 108 hours of practical classes;

Independent work: 108 hours.

Progress Evaluation

Pass/fail exam, 1st semester.