S.Seifullin Kazakh Agrotechnical Research University

CATALOG OF ELECTIVE DISCIPLINES

For students in the direction of preparation 6B061 Information and communication technologies

Brief description of the elective disciplines of the educational program

EPG	EP	Form of education	The name of discipline	Code of subject	Discipline cycle	Component	Number of credits	Level of training	Cafedra	Course	Academic period	Pre-requisitions	Post-requisitions	Brief content of the discipline	Key learning outcomes	Name of the alternative discipline
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Physics	Fiz 1258	BS	Elective subjects	3.0	Bachelor	Physics and Chemistry	1	2	Information and communication technologies, Algorithms and data structures for developers	Computational methods on a computer	The discipline studies the basic physical phenomena, fundamental laws and concepts, as well as methods of physical research. Considers techniques and methods for solving typical problems from various fields of physics, introduces modern scientific equipment, forms the skills of conducting an experiment, the ability to highlight specific physical content in applied problems of a future specialty.	To be able to analyze the influence of environmental factors on the vital activity of living organisms and the environment; Possess the basics of economic and legal knowledge in the forestry sector; know and understand the goals and methods of state regulation of the economy. Evaluate and integrate the basic theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Physics for computer science
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Physics for computer science	FDI 1275	BS	Elective subjects	3.0	Bachelor	Information systems	1	2	Information and communication technologies, Algorithms and data structures for developers	Computational methods on a computer	Introduction to the discipline. Fundamentals of the theory of electrical conductivity of metals and semiconductors. The element base of modern computers, Harvard and Princeton computer architectures, generalized structure of the system unit. The device of semiconductor storage devices and external storage devices on magnetic, magneto-optical and optical media. I/O interfaces, organization of computer interaction.	To be able to analyze the influence of environmental factors on the vital activity of living organisms and the environment; Possess the basics of economic and legal knowledge in the forestry sector; know and understand the goals and methods of state regulation of the economy. Evaluate and integrate the basic theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Physics
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Basics of economics and law	OEP 2120	GER	Elective subjects	5.0	Bachelor	Economy	2	1	Political science and sociology, Cultural studies and psychology, Philosophy	Mathematical analysis, Mathematical logic and theory of algorithms	The discipline promotes knowledge of the subject of economic theory and methods of research, the basis of public production and forms of public economy, the mechanism of functioning of the market system, production, costs and income of the firm, national economy. To master the basics of the theory of the state and law, the basics of constitutional, administrative, civil, labor, family, criminal law.	Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions	Basics of anti-corruption culture, Ecology and life safety fundamentals, Entrepreneurship, Methodology of academic research
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Methodology of academic research	MNI 2121	GER	Elective subjects	5.0	Bachelor	Information systems	2	1	Political science and sociology, Cultural studies and psychology, Philosophy	Mathematical analysis, Mathematical logic and theory of algorithms	The study of various techniques and methods of scientific research: analysis, synthesis and design in General. Determination of the purpose, objectives and factors affecting the design. Ability to apply research results in design. Work with sources. Analysis of analogues. Preparation of the concept.	Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions	Basics of anti-corruption culture, Basics of economics and law, Ecology and life safety fundamentals, Entrepreneurship

B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Entrepreneurship	Pre 2122	GER	Elective subjects	5.0	Bachelor	Economy	2	1	Political science and sociology, Cultural studies and psychology, Philosophy	Mathematical analysis, Mathematical logic and theory of algorithms	The discipline studies the development and implementation of entrepreneurial initiatives. Considers the skills and qualities necessary for a modern entrepreneur, aspects of the business environment, business organization issues, analyzes the problems and opportunities that entrepreneurs face in a competitive environment, pays attention to developing effective strategies for successful entrepreneurship.	Assess the interconnection and interdependence of business processes in the context of the digital economy. Organize entrepreneurial activities, demonstrate knowledge in the field of modern business and interpret the results of the activities of enterprises by industry. Model business processes to develop an enterprise development strategy	Basics of anti-corruption culture, Basics of economics and law, Ecology and life safety fundamentals, Methodology of academic research
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Basics of anti-corruption culture	OAK 2123	GER	Elective subjects	5.0	Bachelor	Economy	2	1	Political science and sociology, Cultural studies and psychology, Philosophy	Mathematical analysis, Mathematical logic and theory of algorithms	The course forms a system of knowledge on combating corruption, and the development on this basis of a civil position in relation to this phenomenon. As a result of mastering the discipline, students will be able to: navigate the legislation; analyze and apply legal acts in specific situations, follow moral	Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions	Basics of economics and law, Ecology and life safety fundamentals, Entrepreneurship, Methodology of academic research
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Ecology and life safety fundamentals	EOBZh 2124	GER	Elective subjects	5.0	Bachelor	Ecology	2	1	Political science and sociology, Cultural studies and psychology, Philosophy	Mathematical analysis, Mathematical logic and theory of algorithms	The course forms practical skills in identifying dangerous and harmless natural conditions, in preventing the causes and conditions for the occurrence of dangerous situations, in protecting the population and the production facility from the possible consequences of dangerous situations. Features of labor protection for women and youth, supervision and control.	To be able to analyze the influence of environmental factors on the vital activity of living organisms and the environment; Possess the basics of economic and legal knowledge in the forestry sector; know and understand the goals and methods of state regulation of the economy. Evaluate and integrate the basic theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Basics of anti-corruption culture, Basics of economics and law, Entrepreneurship, Methodology of academic research
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Technical english	TAYa 2249	BS	Elective subjects	3.0	Bachelor	Foreign Languages	2	2	Foreign language	Technical english	Basic vocabulary of texts in the specialty. Extraction of general information from the adapted text of the specialty. Confirmation or refutation of information from adapted texts in the specialty. Stable phrases that are most often found in professional speech. Oral and written presentation of the content of the adapted text in the specialty. Official-business style of communication. Scientific style. Basics of abstracting, annotating. Business documentation	Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions	Synergetics - interdisciplinary scientific theory
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Synergetics - interdisciplinary scientific theory	SMNT 2270	BS	Elective subjects	3.0	Bachelor	Information systems	2	2	Foreign language	Synergetics - interdisciplinary scientific theory	Fractal geometry of nature. Linear and nonlinear fractals. Fractal dimension. The principle of self-similarity. The Mandelbrot set. Phase portrait of the instability of the object. Theory of probability and information. Information entropy. Theories of stability, chaos and catastrophes. Differential equations of nonlinear processes and their numerical solutions. The Lorentz dynamical system.	To be able to analyze the influence of environmental factors on the vital activity of living organisms and the environment; Possess the basics of economic and legal knowledge in the forestry sector; know and understand the goals and methods of state regulation of the economy. Evaluate and integrate the basic theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Technical english
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Web development	WP 2263	BS	Elective subjects	5.0	Bachelor	Information systems	2	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Computational methods on a computer, Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection	Features of IP protocols versions 4 and 6. IP tunnels. Designing a site. Principles of construction of hypertext information systems. Client web technologies: HTML, CSS, JavaScript, HTML5, Ajax, JQuery, XML; JavaScript scripting language, jQuery. Programming in PHP, PHP7. Framework YII, Laravel. SQL query language. Create MySQL database. PostgreSQL DBMS.	To be able to analyze the influence of environmental factors on the vital activity of living organisms and the environment; Possess the basics of economic and legal knowledge in the forestry sector; know and understand the goals and methods of state regulation of the economy. Evaluate and integrate the basic theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Internet application development

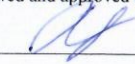|																
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Internet application development	RIP 2278	BS	Elective subjects	5.0	Bachelor	Information systems	2	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Computational methods on a computer, Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection	Technologies of using web programming languages in client applications; technologies of application Node.JS in server applications; use of web development tools; the use of modern web technologies for creating Internet applications. Layouts on CMS (Tilda, WordPress, Bitrix, Opencard). SEO principles.	Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions	Web development
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Design and architecture of software systems	PAPS 3260	BS	Elective subjects	5.0	Bachelor	Information systems	3	1	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection, Fundamentals of IT project management	A complex of parallel running programs. Layered architecture. Means of program interaction. Methods and means of information security software systems. Standards and profiles in the field of software systems. Methodological foundations of software systems design. Requirements analysis. Ascending and descending methods of software development. Interface design. Software models with structural and object-oriented approach. Documenting software systems. Computer-aided design and documentation of software products.	Determine the language tool for solving problems and process information using the tools of programming languages and application programs. Apply methods and means of organizing calculations in network systems, methods and means of organizing databases and knowledge bases in computer systems and networks, control and operation of hardware and software. Represent IT projects, maintaina culture of academic honesty, critically evaluate and interpret information in the field of ICT, economics and law. Apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels. To carry out professional communication in various forms in Kazakh, Russian and foreign languages to solve professional problems in the field of ICT. Use technologies, principles of organization and functioning of the Internet, analyze threats to information security. Evaluate and select modern operating environments and ICT for informatization and automation of solving applied problems and creating IS. Plan the work of an IT project, take part in the implementation, adaptation and customization of software and applied.	Design of software systems and complexes
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Design of software systems and complexes	PPSK 3276	BS	Elective subjects	5.0	Bachelor	Information systems	3	1	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection, Fundamentals of IT project management	The industry of industrial development of software systems. Architecture of software systems. Architectural structures and representations. Modular structures. Distribution structures. Variants of software system architectures. The life cycle of software systems. PS design strategies. Design of software systems. Setting requirements for the PS. Development of technical specifications for the design of software systems. Requirements analysis and development of external specifications. Structural design.	Determine the language tool for solving problems and process information using the tools of programming languages and application programs. Apply methods and means of organizing calculations in network systems, methods and means of organizing databases and knowledge bases in computer systems and networks, control and operation of hardware and software. Represent IT projects, maintaina culture of academic honesty, critically evaluate and interpret information in the field of ICT, economics and law. Apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels. To carry out professional communication in various forms in Kazakh, Russian and foreign languages to solve professional problems in the field of ICT. Use technologies, principles of organization and functioning of the Internet, analyze threats to information security. Evaluate and select modern operating environments and ICT for informatization and automation of solving applied problems and creating IS. Plan the work of an IT project, take part in the implementation, adaptation and customization of software and applied.	Design and architecture of software systems

B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years)	Company database management systems (Oracle)	SUBDKO 3269	BS	Elective subjects	5.0	Bachelor	Information systems	3	1	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Cybersecurity and data protection	Relational data model. Basic operations of relational algebra: selection, projection, Cartesian product. Data models. Technology and principles of database design. Modeling of the subject area. Principles of organization of Oracle DBMS. Organization of external memory. The level of direct data management in external memory. Database design in Oracle DBMS. The main components of the Oracle database. Client-server data organization models	Determine the language tool for solving problems and process information using the tools of programming languages and application programs. Apply methods and means of organizing calculations in network systems, methods and means of organizing databases and knowledge bases in computer systems and networks, control and operation of hardware and software. Represent IT projects, maintaina culture of academic honesty, critically evaluate and interpret information in the field of ICT, economics and law. Apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels. To carry out professional communication in various forms in Kazakh, Russian and foreign languages to solve professional problems in the field of ICT. Use technologies, principles of organization and functioning of the Internet, analyze threats to information security. Evaluate and select modern operating environments and ICT for informatization and automation of solving applied problems and creating IS. Plan the work of an IT project, take part in the implementation, adaptation and customization of software and applied.	Databases for DevOps
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Databases for DevOps	BDDD 3279	BS	Elective subjects	5.0	Bachelor	Information systems	3	1	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Cybersecurity and data protection	Databases and database management systems. Functional composition. Classification of database architectures. System directories. Data models. Multi-user services. NoSQL class database management systems. The difference is SQL vs. NoSQL. The NoSQL model. Types of systems. Storage and access to complex data structures	Determine the language tool for solving problems and process information using the tools of programming languages and application programs. Apply methods and means of organizing calculations in network systems, methods and means of organizing databases and knowledge bases in computer systems and networks, control and operation of hardware and software. Represent IT projects, maintaina culture of academic honesty, critically evaluate and interpret information in the field of ICT, economics and law. Apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels. To carry out professional communication in various forms in Kazakh, Russian and foreign languages to solve professional problems in the field of ICT. Use technologies, principles of organization and functioning of the Internet, analyze threats to information security. Evaluate and select modern operating environments and ICT for informatization and automation of solving applied problems and creating IS. Plan the work of an IT project, take part in the implementation, adaptation and customization of software and applied.	Company database management systems (Oracle)

B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Neural networks and their applications	NSIP 3255	BS	Elective subjects	5.0	Bachelor	Information systems	3	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection, Fundamentals of IT project management	Artificial neural networks. Architecture of artificial neural networks. A set of tools for creating, initializing, training, modeling and visualizing a network. Methods and algorithms for training artificial neural networks. Gradient learning algorithms. Algorithms based on the use of the conjugate gradient method. Application of neural networks for designing control systems for dynamic processes.	solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels use technologies, principles of organization and functioning of the Internet, analyze threats to information security solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels use technologies, principles of organization and functioning of the Internet, analyze threats to information security	Basics of neural networks
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Basics of neural networks	ONS 3273	BS	Elective subjects	5.0	Bachelor	Information systems	3	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection, Fundamentals of IT project management	Introduction to the theory of neural networks. Models of neurons. Methods of learning a single neuron. Algorithms for learning networks of general form. Analytical teaching methods. Programming neural networks. Genetic Algorithms. Selection of the optimal architecture of neural networks.	solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels use technologies, principles of organization and functioning of the Internet, analyze threats to information security	Neural networks and their applications
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Introduction to machine learning	VMO 3266	BS	Elective subjects	5.0	Bachelor	Information systems	3	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection, Fundamentals of IT project management	Theoretical knowledge and Data management tasks, including data loading, data transformation, and preliminary data analysis and visualization, familiarity with the main tasks and models of machine learning. Methods for assessing the quality of work of various machine learning models, understanding the process of integrating machine learning models within the framework of tasks.	solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas apply application area analysis methods at the conceptual, logical, mathematical and algorithmic levels use technologies, principles of organization and functioning of the Internet, analyze threats to information security	Introduction to artificial intelligence
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Introduction to artificial intelligence	VII 3272	BS	Elective subjects	5.0	Bachelor	Information systems	3	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Scripting programming languages, Virtualization and containerization technologies, Cybersecurity and data protection, Fundamentals of IT project management	Representation of knowledge in intelligent systems. Algorithms for logical inference based on knowledge. Representation of fuzzy knowledge. Decision making under conditions of incomplete certainty. Stages of development of expert systems. Modern Machine Learning. Problems of classification and regression. Evaluation of the quality of machine learning algorithms. Clustering tasks. Search for outliers and anomalies in data.	determine the language tool for solving problems and process information using the tools of programming languages and application programs solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas use technologies, principles of organization and functioning of the Internet, analyze threats to information security	Introduction to machine learning

B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Fundamentals of big data processing technology	OTOBD 4265	BS	Elective subjects	5.0	Bachelor	Information systems	4	1	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Visual programming and data mining	Introduction to Big Data. Technologies for collecting and storing big data. Big data processing and analysis technologies in modern IT infrastructure: The lifecycle of Big Data analysis, standards.	determine the language tool for solving problems and process information using the tools of programming languages and application programs solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas use technologies, principles of organization and functioning of the Internet, analyze threats to information security	Methods and systems of big data processing
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Methods and systems of big data processing	MSOBD 4274	BS	Elective subjects	5.0	Bachelor	Information systems	4	1	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Visual programming and data mining	Introduction, distributed file systems. The MapReduce calculation model. SQL over BigData. Hive. Beyond MapReduce. Spark. Machine learning on big data. Streaming data processing. Key-value of storage in big data.	determine the language tool for solving problems and process information using the tools of programming languages and application programs solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas use technologies, principles of organization and functioning of the Internet, analyze threats to information security	Fundamentals of big data processing technology
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Introduction to parallel programming	VPP 4267	BS	Elective subjects	5.0	Bachelor	Information systems	4	1	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Visual programming and data mining	The discipline studies basic information about parallel computers. Performance analysis. The first steps in the direction of parallel programming. Scalable algorithmic methods. Streaming programming. MPI standard and other local-level languages. The ZPL language and other global-level languages. Assessment of the current state of the issue.	determine the language tool for solving problems and process information using the tools of programming languages and application programs solve problems of varying complexity using programming technology, inspect software components apply the mathematical apparatus of ICT to build algorithms for analysis, transformation, processing and to optimize information processes in various application areas use technologies, principles of organization and functioning of the Internet, analyze threats to information security	Parallel programming

B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Intelligent data analysis	IAD 4280	BS	Elective subjects	5.0	Bachelor	Computer science	4	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Visual programming and data mining	Discipline NumPy functions of linear algebra, SciPy mathematical algorithms and functions for data processing and visualization, Matplotlib is a library for creating 2D graphs in Python, R and RStudio environments, data access operators, functions and arguments, loops and conditional operators, R DBMS , setting. Teaches statistical calculations and graphs in R.	Analyze tasks, determine solutions and select efficient algorithms for task implementation. Define input and output data. Understand the integrity of the developing software. Pick a language and programming tools to it. Develop applications with a database, web portals, separate modules for them, integrate modules into applications. Describe the computer system architecture, the operation of computing parallel systems, classify computer systems according to the type processor, the memory principle, explain the idea of parallelization in multi-core processors. Install/maintain OS. To make judgments about the modernization of the computer system architecture, install and replace the internal/external devices of the computer. Describe the application software system and OS drivers, explain code of device drivers, use the basics of a programming language, competently use a set of tools for developing drivers. Use principles of parallel programming. Select and use the appropriate language for programming microprocessors and microcontrollers. Compare devices microprocessors and microcontrollers.	Visual programming and data mining
B057 - «Information technology»	6B06104 - «DevOps Engineering»	Full-time (bachelor 4 years) semester	Visual programming and data mining	VPIAD 4280	BS	Elective subjects	5.0	Bachelor	Information systems	4	2	Information and communication technologies, Algorithms and data structures for developers, Fundamentals of object-oriented programming	Visual programming and data mining	Multidimensional data view. Methods and algorithms for solving the main tasks of data analysis: classification, clustering, etc. The practical application of Data Mining in industries. Methods and models of data mining. Methods of statistical analysis and modeling, focused on finding models and relationships, hidden in the data set.	Analyze tasks, determine solutions and select efficient algorithms for task implementation. Define input and output data. Understand the integrity of the developing software. Pick a language and programming tools to it. Develop applications with a database, web portals, separate modules for them, integrate modules into applications. Describe the computer system architecture, the operation of computing parallel systems, classify computer systems according to the type processor, the memory principle, explain the idea of parallelization in multi-core processors. Install/maintain OS. To make judgments about the modernization of the computer system architecture, install and replace the internal/external devices of the computer. Describe the application software system and OS drivers, explain code of device drivers, use the basics of a programming language, competently use a set of tools for developing drivers. Use principles of parallel programming. Select and use the appropriate language for programming microprocessors and microcontrollers. Compare devices microprocessors and microcontrollers.	Intelligent data analysis

The catalog of elective disciplines was reviewed and approved by the faculty council, protocol № 10.1 " 28 " 08 2023 y.

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