

050616 - “Information technologies”

Table

Number of subjects	The name of subject	ECTS Credit
	General subjects	30
1	History of Azerbaijan This subject studies the emergence, formation and development of Azerbaijan's modern statehood traditions, the role of political, ideological, economic, and cultural factors in the formation of modern Azerbaijan statehood is analyzed and studied. The place and role of the Azerbaijani state in the modern world is systematically analyzed.	5
2	Business and academic communication in Azerbaijani language Within the framework of this subject, special attention should be paid to inculcating students' presentation, public speaking, academic and business writing skills in Azerbaijani language.	4
3	Business and academic communication in a foreign language Within the framework of this subject, special attention should be paid to giving students a presentation in one of the foreign languages of their major, oratory, academic and business writing, oral and written skills.	15
4	Elective subjects (<i>Elective subjects are determined by the higher education institution. Depending on the specifics of the major, additions can be made to elective subjects</i>)	6
4.1	Philosophy This subject - the main stages of the creation and development of philosophy, philosophical teaching about existence, concept of matter. Modern science about the structure of matter, movement. Space and time, the main laws and categories of dialectics, the problem of consciousness in philosophy, the philosophical meaning of man, nature and society, cognition and its structure, scientific cognition and its methods, creativity and intuition, ethics of science, specificity of social cognition. Society is a self-developing system, the main spheres of social life. Philosophical structure of economic life, social sphere of society, philosophical analysis of political life, spiritual life of society, subjects and driving forces of historical process, culture and civilization, personality and social values are analyzed and studied.	3
	Sociology This subject considers social events and processes in the context of society as a whole social system, analyzes and studies the structure, subject, methodology, characteristics of sociology, theoretical levels of modern sociological knowledge, as well as the variety of special sociological concepts. It studies possible perspectives of scientific research in this field.	
	Constitution of the Republic of Azerbaijan and fundamentals of law Constitution of the Republic of Azerbaijan, constitutional status of the	

	<p>state of Azerbaijan, citizenship of the Republic of Azerbaijan, human and civil rights, freedoms and duties, state power, division of power based on the Constitution, legislative power, executive power and its bodies, judicial power, its structure and system, fundamentals of labor law , basics of civil law, basics of family law, basics of criminal law.</p> <p>Logic The subject of logic helps a person to objectively assess opportunities, make quick and correct decisions, express ideas clearly, convince the interlocutor using correct arguments, and stay away from uncertain situations. This subject evaluates the ability to think logically, measures the ability to perceive and apply logical patterns, and allows you to learn how rich the knowledge base is in various fields.</p> <p>Ethics and aesthetics Information about Ethical thought in this subject, the main stages of its evolution: ethical thought in ancient India and China, ethical thought in antiquity, medieval and new ethical thought. Information about ethical thought in Azerbaijan, Islamic ethics, the essence and main functions of morality, morality and other forms of social consciousness, moral consciousness and action, the main categories of ethics: good and evil, duty and conscience, honor and dignity, happiness and the meaning of life, applied ethics and profession ethics is provided.</p> <p>Introduction to Multiculturalism Within this subject, a number of issues, including the essence and importance of the subject of multiculturalism, the traditions of various minority peoples living in Azerbaijan, the effects of multiculturalism on socio-economic development, the effects of multiculturalism on foreign policy, analyzing multiculturalism as the state policy of the Republic of Azerbaijan, Azerbaijani multiculturalism and world multiculturalism studies such issues as comparative analysis of samples and so on.</p>	
4.2	<p>Information technologies (specialization) Provision and processing of information. Information technologies. Subject and content of information. Information processes and its automation. Aspects of the approach to the study of information. Information systems. Structure and main object of information systems. Hardware and software part of the information system. Classification of information systems according to various characteristics. Main components of information systems. Their schemes of action. Development trends of information systems. Digital computing systems. Principles of computer construction. The concept of command. Architecture and structure of computers. It teaches the logical structure of computers. Information technology (IT) basics, including various types of computer equipment and network technology, are presented. Various data representation schemes such as binary number systems are covered. This course provides a broad introduction to the tools and applications students need to become successful professionals in the IT environment. Students will explore the core information technologies of human-computer interaction, data management, programming, networking, web systems and technologies, as well as information assurance and security. Working experience with some important elements of the IT field is gained through various laboratory exercises.</p> <p>Information management This subject covers the basics of using information systems in management, the company's information infrastructure, the analysis of</p>	3

	<p>the development of electronic systems of customer relationship management, information systems and management, the system of enterprise models, the principles of the structure and creation of the system of interaction of enterprises with customers, the realization of the company's strategy using information technologies, Information Management of systems services: functions, processes, measurements, Information systems service effectiveness measurement, Information systems operation and development cost estimation, Information technology services and business, overview cost of ownership, Information technology development projects and organizational restructuring, Complex information systems standard methods of application, network provision of the system aimed at customer management</p>	
	<p>Fundamentals of Entrepreneurship and Introduction to Business Entrepreneurial environment and competition, small and medium entrepreneurship, taxation in entrepreneurial activity, price policy, management and marketing system. Organizational-legal forms of business. SWOT analysis, external and internal environment of entrepreneurship. Commercial, financial, consulting, production entrepreneurship. Accounting, redistribution, incentive, balancing and production placement.</p>	
	<p>Political science Political science is the science of politics. The main stages of the development of political thought. Development stages of Azerbaijan's political opinion. Politics is the regulatory, organizing and controlling function of society. Political power and its bearers. Political elite. Political system theory. Political regimes. Political parties and party systems. Democracy: basic institutions. Parliament is the main democratic institution. Electoral systems. The state is the main political institution. Political consciousness and political ideology. Political culture. Civil society. Theory of world politics and international political relations. The concept of modernization as a theoretical model of political development. Political technologies. Political studies and political analysis. Making political decisions. Political science of international relations. Global problems of international politics. Foreign policy activity of the state.</p>	
	Specialization subjects	120
6	<p>Linear algebra and analytic geometry This subject covers complex numbers, matrices and determinants, linear space and its basis, linear algebraic equations and their solution methods, linear transformations and quadratic forms, Cartesian coordinate system in plane and space, simple problems of analytic geometry, elements of vector algebra, equations of straight line and plane, bilinear algebraic lines and surfaces.</p>	3
7	<p>Mathematical analysis This subject introduces the elements of set theory, the concept of the limit of a sequence, the limit and basic properties of a univariate function, continuity of a univariate function at a point and set, regular continuous univariate functions in a set, differential and integral calculus of a univariate function, numerical and functional series, multidimensional Euclidean space, limit of a multivariate function, teaches discontinuity and regular discontinuity, differential and integral calculus of multivariable function. General information is given about</p>	7

	one-order ordinary differential equations and systems of equations, n-order ordinary differential equations	
8	<p>Differential equations</p> <p>One-order ordinary differential equations and system of equations, methods of construction of solutions of n-order ordinary differential equations, existence, uniqueness and stability of solutions of Cauchy and boundary problems for these equations, application of differential equations to mathematical modeling of various processes of natural science, classification of special derivative differential equations, mathematical physics On the formulation and correctness of Cauchy and boundary value problems for the equations are taught.</p>	3
9	<p>Discrete mathematics</p> <p>This subject studies the basic elements and concepts of information theory, mathematical logic, graph theory, algorithm theory, set theory, including fuzzy sets and relations theory, combinatorics, and the principles of their application in computer engineering. Within the subject, algebra, relations, fuzzy relations, linguistic variables, predicate calculus, coding of information, calculation of quantity, measurement units, number systems are studied.</p>	3
10	<p>Probability theory and mathematical statistics</p> <p>This subject covers events and actions on them, various definitions of probability and its calculation rules, the application of full probability and Bayes formulas, distribution laws of discrete and random quantities and their numerical characteristics, the basic essence of the law of large numbers and central limit theorems, the main elements of mathematical statistics, planning statistical determination due to the selection of parameters, laws related to normal distribution.</p>	3
11	<p>Physics</p> <p>This subject covers classical mechanics, including vector algebra, particle kinematics and dynamics, energy and momentum, conservation laws, rotational dynamics, oscillatory motion, gravity, thermodynamics and kinetic theory of gases, electrostatics, including conductors and insulators; DC circuits; magnetic forces and fields; magnetic effect of moving loads and currents; electromagnetic induction; Maxwell's equations; electromagnetic oscillations and waves, geometrical and physical optics.</p>	5
12	<p>Fundamentals of information technologies</p> <p>The basics of information technology (IT), including various types of computer hardware and network technologies, are introduced. Various data representation schemes such as binary number systems are covered. This course provides a broad introduction to the tools and applications students need to become successful professionals in the IT environment. Students will explore the core information technologies of human-computer interaction, data management, programming, networking, web systems and technologies, as well as information assurance and security. Working experience with some important elements of the IT field is gained through various laboratory exercises.</p>	8
13	<p>Fundamentals of programming</p> <p>Steps and methods of problem solving on the computer; general principles of building algorithms; concept of programming system; program structure; teaches how to create and use data types, operators and operations, control structures, arrays, strings, pointers, files, subroutines, object-oriented programming model, concept of classes and objects, properties and methods are taught.</p>	6

14	<p>Modern programming languages</p> <p>Modern programming languages, their development, advantages and disadvantages; to apply modern programming methods in the creation of information systems; to determine data structures and simpler ways of solving a complex problem when designing algorithms in the process of solving problems; to use the libraries of standard programs included in the programming language; to apply modern programming language when solving problems; modular programming methods; teaches the development and implementation of applications for various platforms (Apple, mobile, etc.), Internet are taught.</p>	6
15	<p>Computer architecture</p> <p>This subject explains the description of numbers and symbols in the computer, describes the computer's i/o system and interaction structures, the cpu project, it explains the working principles of internal and external virtual memory systems, peripheral devices. This subject explains the description of numbers and symbols in the computer, describes the computer's i/o system and interaction structures, the cpu project, it explains the working principles of internal and external virtual memory systems, peripheral devices.</p>	8
16	<p>Data structure and algorithms</p> <p>Special emphasis is placed on basic data structures, static and dynamic data structures, arrays, stacks, trees and graphs, implementation of trees and graphs, spanning trees, stacks, memory management, caching techniques, sorting, searching, string operations, and graph algorithms. A number of other areas are covered, including fundamental algorithms, geometric algorithms, and some algorithms from operations research. The course focuses on developing programs, understanding their performance characteristics, and evaluating their potential effectiveness in applications.</p>	7
17	<p>Database systems</p> <p>Data modeling; normalization; relational model; database construction; query language; simple and complex queries; conceptual modeling, hierarchical, network, and relational models to establish database connectivity. As a result of teaching this subject, students should have extensive knowledge about NoSQL database systems. One should know their similarities and differences with classic SQL systems. In particular, you should be familiar with the MongoDB database management system, and you should know in what form data is entered into this system in the form of documents. In addition, students should know how to perform manipulation operations on the data available in the system.</p>	7
18	<p>Operating systems</p> <p>This course provides a convenient and efficient interface between user programs and computer hardware. One should know the basic principles of building modern operating systems, the architecture of Windows, Unix, Linux, Mac OS and mobile operating systems, how to compile and call functions in C, pass parameters to functions, declare arrays, search arrays, declare pointers, the relationship between pointers and arrays, declare strings, assigning values to strings, functions for working with strings, creating an object in C language, addressing its limits, allocating space for creating a dynamic object, deleting the space allocated for a dynamic object, writing data to files and reading data from files with Read and write functions, working with virtual machines, virtual start, save and stop machines, install Linux systems as virtual, change system settings of virtual machines,</p>	6

	<p>get a dump file of programs that have crashed, read processor registers by virtual executor, write physical memory speed to disk file, analyze physical memory speed, cp , cat, more and diff commands in C language, execute programs with the gdb analysis program and stop execution at the required address, design simple client programs for popular server programs, respond to signals received from other processes and the kernel, to get a dump file of programs where errors occur, to determine the crossing points between two different computers in the network with the tracetr command, to obtain the source codes of the kernel of the operating system, to configure, compile and execute them, to learn the basic functions of the operating systems, utilities, antivirus packages, in the construction of modern computer networks the various network protocols, hardware and software tools used.</p>	
19	<p>Multimedia technologies The main goal of this subject is that students learn what multimedia technologies are, which use several types of information at the same time, their programs and how to use them. They should be able to use it for education, entertainment, etc. in electronic publishing houses, from the preparation of telecommunications on-demand programs to the selection of necessary credits in multimedia conferences. It teaches computer graphics, color schemes, their types, raster, vector and fractal graphics, 3D graphics, their features, widely used graphic editors, their working principles, multimedia tools.</p>	6
20	<p>Information security It teaches Information security and its main properties; Dangers and threats to information resources; channels of information leakage; cryptosystems; encryption methods; steganography; information hiding methods; network security; security attacks; digital signature technology; to use security measures to protect computers and information from cyber attacks and prevent unauthorized use.</p>	6
21	<p>Human-computer interface Human-computer interface includes interactive aspects of computer operating systems, hand tools, heavy machine operator controls, and process control. Goals for computers, Differences with related fields, Design, Principles, Methodology, Display designs, Thirteen principles of display design, Cognitive principles, Mental model principles, Attentional principles, Memory principles, Human-computer interface, Current research, User customization, Embedded computing , Augmented reality, Social computing, Knowledge-based human-computer interaction, Emotions and human-computer interaction, Brain-computer interfaces are taught</p>	7
22	<p>Computer networks Introduction to computer networks, network requirements and layered architecture, ISO reference model, data encoding/structuring, error detection and correction, Ethernet and FDDL Network layer and WAN, IP and routing, cell switching and ATM, bridges, internet - global internet. End-to-end protocols, UDP, TCP and RPC. It includes information about application layer, security, domain name system (DNS), and WWW protocols. This course covers the hardware, bus architecture, ports, network cards, cables, routers, switches, network reliability required to interconnect digital devices to ensure data transmission over a network. It covers network performance optimization issues.</p>	8
23	<p>Artificial intelligence</p>	6

	In this subject, the main research areas in the theory of artificial intelligence; advantages and disadvantages of knowledge representation models; working principles of artificial intelligence systems; formation methods and methods for solving intellectual problems; principles and methods of implementation of image recognition systems; natural language interface development and application problems; building natural language recognition systems and text synthesis.	
24	Web systems and technologies It describes the technologies used to communicate via the Internet; applies commonly used search methods to search the Internet; creates and manipulates modern image formats creates the appearance of web pages with script programming.	7
25	IT projects' management The main goal of the subject "IT project management" is to acquire a well-prepared and efficient approach to issues related to IT project management. This subject teaches participants to work on quality software or other IT projects that require a special approach to solving, such as project planning, execution and control. In the process of project management, this subject is used to control various situations, establish relationships with various team members, prepare software instructions, support for users who will be involved in product development, and define project terms, recovery and effective termination, etc.	5
26	Civil defense In this subject, students will learn about civil defense, the methods of protecting a nation's citizens (usually non-combatants) from military attacks and natural disasters, the principles of emergency operations and prevention, mitigation, preparedness, response, or emergency evacuation and recovery.	3
	Subjects determined by the institution of higher education <i>The subjects here are determined individually by each higher education institution and are reflected in the curriculum of that specialty</i>	60
27	Instrumental and applied programs About system software, Basic software, operating systems, operating systems and network operating systems, Functions of utilities, Maintenance of utilities, Antivirus software, Utilities, Symptoms of computer viruses, Instrumental software, Programming languages and systems, Integrated programming environment , Software complexes, Applied software, Types of applied programs, About and groups of general-purpose programs, Steps of solving problems on a computer. Setting the issue. Case analysis and research. Creating a solution algorithm. Algorithm description in programming language. Testing and debugging. Obtaining and analyzing results. The main properties of the algorithm - determinism, massiveness, consequentiality and discreteness. Algorithm description methods - verbal description (natural language), algorithmic language description (program), graphic description (block diagram). Conventional symbols used in block diagram illustration. Algorithm structure types) – linear, branching and cyclic (recursive) algorithms. Simple and complex branching algorithms. Simple and complex cyclic algorithms. It teaches how to describe an algorithm with pseudocode.	3
	Fundamentals of information security	

	<p>First of all, this subject introduces the student to the specialty of information security. The course teaches the subject, scope, basic principles and concepts, and goals of information security. The knowledge and skills that an information security specialist should know and their connections with other subjects and specialties are taught. Lectures clearly describe the areas covered by information security for students, and practical exercises show the possibilities of using the acquired knowledge in work activities, forming the thinking characteristic of an information security specialist.</p>	
28	<p>Mathematical logic The subject of logic helps a person to objectively assess opportunities, make quick and correct decisions, express ideas clearly, convince the interlocutor using correct arguments, and stay away from uncertain situations. This subject evaluates the ability to think logically, measures the ability to perceive and apply logical patterns, and allows you to learn how rich the knowledge base is in various fields.</p>	
29	<p>System programming The subject of system programming, depending on its content, covers a wide range of problems, from the management of computer equipment to the management of computer software. In essence, in addition to playing the role of a bridge between equipment and user applications, correct and safe execution of user program requests, providing user programs with the required computer resources, ensuring the possibility of synchronization and mutual information exchange between them, including the possibility of joint use of resources are considered topics related to problems of system programming.</p>	
30	<p>Distributed systems DISTRIBUTED SYSTEMS, Applied processes and a set of databases used in these processes, data processing, distributed systems, Computer network nodes, distributed system nodes, Distributed system model, Distributed system $S=\{S1,S2,...SN\}$ nodes, Databases (DB) in nodes of DS, Processors operating in nodes of distributed systems, Management of distributed systems, Requirements imposed on modern DSs are high reliability; collective access to information resources; protection of data from unauthorized access; maximum use of both technical and computing resources of the system; remote and quick access to the system; easy communication of users with the system; open architecture (possibility of expansion at any time), Distributed database systems, nodes in DS, definition of DDB (Distributed DataBase), definition of DDB(Distributed DataBase), definition of DDB (Distributed DataBase), DDB (Distributed DataBase) definition, hardware dependency.</p>	4
31	<p>Geographic information systems Introduction to geographic information systems, the essence of geographic information systems, the emergence of geographic information systems, the main components of geographic information systems, software of GIS, hardware of GIS, what is GPS?, ground control points, GIS classification, presentation of geographic objects in GIS, formats of geographic data in GIS, subsystems of GIS and their differences from traditional technologies, data in GIS and their characteristics, conceptual types of GIS, modeling of objects in GIS database, Geographical attributes , information analysis in GIS environment, geographic coordinate systems in GIS, cartographic projections and datum in GIS, use of remote sensing method in GIS,</p>	

	role of aerial and space images in GIS, role of GIS in multi-purpose cadastral issues, international experience in the field of GIS.	
32	<p>Multiculturalism</p> <p>This subject includes a number of issues, including the essence and importance of the subject of multiculturalism, the traditions of various minority peoples living in Azerbaijan, the effects of multiculturalism on socio-economic development, the effects of multiculturalism on foreign policy, analyzing multiculturalism as a state policy of the Republic of Azerbaijan, comparative analysis of samples of the relationship between Azerbaijani multiculturalism and world multiculturalism and so on</p>	3
33	<p>Business technical English</p> <p>Besides being an international language, English is also the main business language. In this regard, a high level of business English is of particular importance. Thus, improving business English skills will help improve work efficiency, business and career prospects. Through this subject, students will have the opportunity to improve business communication skills and self-confidence in oral English, develop language skills for discussion and negotiation, make presentations in English, rules of business correspondence, as well as study business culture and protocol issues of English-speaking countries.</p> <p>During the teaching of a foreign language, the development of language components (pronunciation, vocabulary and grammar) and language skills (reading, writing, listening and speaking) in students is in the center of attention.</p> <p>Regarding the sequence of the teaching material, it should be said that the goal here is to develop oral speech habits with students as quickly as possible, that is, first of all, it is necessary to learn the most common phenomena in the language. Grammar is given a special place in the teaching of this subject. In the training process, it is necessary to inculcate the skills and habits of working independently with students. The main goal of the subject is to familiarize students with the problems encountered in translation during conversation and direct communication. In each lesson, students are presented with new materials, terms related to the specialty of information technologies, the text, new words, phrases and their explanation are explained. In the teaching of the lesson, a wide space is given to the discussion of the terms related to the IT specialty.</p>	3
34	<p>Russian language</p> <p>To write and read the alphabet and words of the Russian language correctly, to know and correctly use the basic grammar, expressions and phraseology of the Russian language, to have the habits of speaking and listening in Russian, the skills to read, understand and translate various texts in Russian, Russian skills to write and use the language correctly.</p>	

35	<p>Object-oriented programming</p> <p>The main goal of object-oriented programming (OOP) is to provide a way to organize and structure code in a more modular and reusable way. OOP is based on the concept of objects, which are instances of classes that encapsulate data and functionality. The main objectives of OOP can be summarized as follows:</p> <p>Encapsulation: Encapsulation is the process of grouping related data and functions into a single unit (object) and hiding the internal details from the outside world. This allows better control over the application's data and functionality and helps prevent unexpected changes.</p> <p>Inheritance: Inheritance is a mechanism that allows a class to inherit properties and behaviors from its parent class. It allows you to create new classes based on existing ones and facilitates code reuse, reducing duplication and maintenance efforts.</p> <p>Polymorphism: Polymorphism is the ability of an object to take many forms depending on the context. It allows the same interface to be used for different data types or classes, allowing more flexibility in programming and improving code readability.</p> <p>Abstraction: Abstraction is the process of simplifying complex systems by focusing on essential features and ignoring non-essential ones. This allows a more manageable system to be created by breaking it down into smaller, more manageable parts.</p> <p>Modularity: Modularity is the ability to break a complex system into smaller, more manageable parts or modules. This enables the generation of reusable code, increasing development efficiency and reducing maintenance efforts.</p> <p>Overall, the main goal of OOP is to create software that is modular, reusable, and easy to maintain, while allowing for greater flexibility, extensibility, and extensibility.</p>	6
36	<p>Engineering graphics</p> <p>In modern engineering practice, drawing drawings by the classical method - by hand - is losing its relevance. Automated design systems based on the capabilities of modern information technologies have already found wide application in project work. The application of this system allows drawing-graphic work to be performed with greater speed and quality, editing, reproduction, more flexible transmission in electronic form, and repeated use when necessary. The purpose of the engineering graphics course is to train students specializing in construction, engineering, architecture, technology and industry in the application of 2D and 3D graphics.</p> <p>This subject provides students with the ability to read, prepare and master plans, sections and traditional construction and engineering drawings. Also, students gain experience in developing and solving 2D and 3D graphics using various tools, such as AutoCAD, SolidWorks, or CATIA.</p>	
37	<p>Data science</p> <p>The purpose of this subject is to provide the student with the necessary knowledge of Python, statistics, linear algebra, probability theory, simple linear and n-dimensional linear and logistic regression, decision tree and basic knowledge of building neural networks; to prepare them as professional specialists in the field of management in the future by imparting skills to solve issues such as data collection, data processing, data visualization,</p>	4

	machine learning, clustering, classification, social network analysis, forecasting.	
	Basics of cryptography. In this course, students learn a brief history of the creation and development of traditional cryptography, its relevance, application areas and current problems, as well as how cryptography provides information security principles together with modern cryptosystems and encryption methods. The course reviews advanced cryptographic algorithms, along with block, stream, and public-key cryptographic algorithms, with practical applications of these algorithms.	
38	Informatics and computer analysis of environmental processes. Find, evaluate and manage information related to informatics and environmental processes, communicate and collaborate professionally using a variety of relevant media, produce professional digital content, solve problems using ICT and technology safely, "Waste-free production processes, waste recycling", "Environmental impact assessment", "Engineering geodesy", "Environmental expertise and basics of design", "Alternative energy sources", "Environmentally efficient technologies", "Environmental modeling", "Environmental forecasting", "Informatics and environmental computer analysis of processes"	
	Basics of cyber security Within this subject, the conceptual model, role and importance of cyber security, as well as its difference from information security, as well as their mutual relations, are taught. Various cyber attack vectors and subjects, widespread vulnerabilities, threats and risks in the field of cyber security, the characteristics of each stage of the cyber attack chain and ways to take necessary measures against them, the role and characteristics of technical and organizational measures in the field of cyber security are taught.	5
39	Basics of electronics This subject examines current and voltage; voltage and current sources; ohm's law; power and energy; parallel and series circuits; Kirchhoff voltage and current law; Thevenin's and Norton's theorems; condensers and inductances; Laplace and Fourier transforms; important issues in operating system design and implementation. The main purpose of electrical engineering and electronics is to study the structure of devices, their characteristics, chemical properties, the composition of the main compounds that replace metals, etc. It aims to convey the theoretical and practical issues of electrical engineering and electronics to students in a wider way.	5
40	Simulation of systems It teaches Formation of ideas about the subject of systems simulation as a science, its goals and objectives, scientific research methods, and its relationship with other sciences; Forming ideas about the forms of organization of systems simulation systems training; Forming ideas about the tools of systems simulation training; Forming ideas about the principles of systems simulation training, training methods; Forming ideas about the goals and tasks of systems simulation training for undergraduate students; Implementation of practical tasks used in the training of systems simulation course for undergraduate students	
41	Computer graphics Computer graphics, color schemes, their types, raster, vector and fractal graphics, 3D graphics, their features, widely used graphic	5

	editors, their working principles, multimedia tools, computer graphics applications; Types of graphics and their creation; Issues solved with the help of graphics. Information about information and computer technologies; What is used in the application of graphics; Importance and role of computer graphics application; Work with graphic editors on the computer; Modern graphic programs and their fields of application.	
42	<p>Systems engineering</p> <p>System engineering is a scientific direction that studies the general problems of the parts that make up the system, taking into account the changes in all aspects, turning the interconnected parts into a whole. This specialty covers issues related to design, programming, testing and operation of modern computer-information systems, including information technologies in high-tech production, Internet technologies and software creation technologies, architecture of robotics and complexes, automated production control systems and programming of robotics. .</p>	
43	<p>Web programming</p> <p>In this course, students will learn the basics of Web programming for developing websites on the Internet. Main sections to be considered: HTML registration Web page and cascading style sheets (CSS), programming the client part of the site in JavaScript, programming the server part of the site in JS, using the MySQL database management system, building sites on the basis of Content Management System (CMS).</p>	4
44	<p>Modern elements of computer programming</p> <p>Computers and their development history, Classification of computers, Components of a desktop personal computer, Algorithm concept, main properties, types and description methods of algorithms, Computer software, Algorithmic languages, Computer networks, Basic elements of language, Program structure, Data types. Simple and string types, Operators, Input and output procedures, Conditional transition operator, Selection or option operator, Unconditional transition operator, Loop operators, Sets, Arrays, Entries, Procedures, Functions, Procedure variables, Recursions, File variables, Files operations, Modules, Standard procedures and functions.</p>	
45	<p>Robotics</p> <p>As a field related to technology, it studies robots, their design, construction, management methods, and computer systems created for information processing. The field of robotics is becoming more and more popular all over the world. The desire and idea to produce automatic machines goes back a long time. Leonardo Da Vinci made sketches and plans for the robot construction. Humans have always been fascinated by creating machines that can perform tasks or interact with them. With robotics lessons, children develop comprehensively. At the same time, their logical approach, teamwork and communication skills also develop. Children's imaginations are vast, and if they are used properly, they can build a wonderful future.</p>	4
	<p>Network Security</p> <p>Within this subject, deeper knowledge about networks is taught in order to understand the security issues of networks. Students should</p>	

	<p>know concepts such as RADIUS, TACACS+, Kerberos, SSO, LDAP, etc. and acquire knowledge about different network equipments (IDS, IPS). They learn auditing and logging of networks. They learn the mechanisms of sniffing in networks, the adjustments needed to ensure security in networks. They understand and use security protocols available on the network. They learn about next-generation firewalls, as well as SIEM, SOAR, UEBA.</p>	
46	<p>Operations Research Operations Research, which includes many technical and scientific approaches, generally aims to solve the scientific approach to the best organization and use of systems in which limited resources are shared. The most important benefit of Operations Research is finding the best possible decisions for an entire organization. For example, it solves the following problems and similar ones. Operations Research taught in Computer Engineering is applied to companies to create maximum profit / minimum cost. The identified solution is required to provide minimum cost or maximum profit for the company. This is why operations research is so important for companies.</p>	
47	<p>Corporate information systems Basic concepts of corporate information systems. Projecting and implementation of the corporate information system, Information technologies and systems in the management of the corporation. The application of information technologies in the management system, the role of information technologies in the management system, the technical support of the corporate information system, the main concepts and principles of the information system, the principles of the establishment of the information system, the project stages of the information system. Classification of CSI, Classification of automated systems. Characteristics and architecture of WMD, requirement for WMD. Hardware-software platform of KIS, planning of production processes according to international standards. MRP/ERP systems, Pros and cons of the system used. Enterprise management according to MRP standards, Inventory and supplies management. Modern structure of MRP/ERP model, Production management. Planning, Service management. Financial management, The main aspects of automating the work of the enterprise, Application areas of information technologies in the management of the corporation, Examples of the implementation of information technologies in the management of the corporation, Accounting, Accounting in the enterprise. It teaches the financial flows of the enterprise.</p>	4
48	<p>Applied programming Computer software, Software, System software, Application software, Application programs, General-purpose ASW, Method-oriented ASW, Problem-oriented ASW, Global networks of ASW, Local and global for the organization of the calculation process, General-purpose of ASW, Text processors, Graphic software packages , Basic concepts and types of computer graphics, Formats of graphic files, Table processors, DBMS: MS ACCESS database management system elements, Methodological TPP, Mathematical software packages, MATHCAD system, Matlab system programming, teaches Matlab system operators are taught</p>	4
49	<p>Digital economy Digital environment regulation regulations; Personnel training for the digital economy; Information security; information infrastructure; Digital technology; Digital government. Financial transactions;</p>	

	business database; video conference; educational and training materials; information services; telecommunications; internet services; electronic invoice payments; stock trading, etc. state; policy and regulation; Internet, World Wide Web (WWW) and electrical infrastructure; telecommunications industry; digital service providers; e-business and e-commerce industry; information and knowledge management systems; intellectual property rights; human capital and knowledge workers; research and development; emerging technologies.	
50	<p>Information technologies in management</p> <p>Information technologies in management: basic concepts, terms, definitions and classification. Information systems (IS) and their requirements, investment in the field of intellectual technologies. Key components, relationships and segments of the e-business market. The concept of electronic money, the main characteristics and features of the Marketing information system. Means of protecting commercial information, Realizing the strategic capabilities of a business analyst, Skills that can be applied to solving existing and new problems in strategic planning technologies, Communication and information transfer, Networking, Database management systems, Calculation and analysis, Design systems are taught.</p>	3
51	<p>Intelligent analysis of large volumes of data (Data Mining)</p> <p>Artificial Intelligence - Field of Knowledge Management, Development Concept of Artificial Intelligence and its Paradigms, Presentation of Information in Intelligent Systems, Intelligent Systems, Machine Learning Methods: Intelligent Agents, New Architecture of Neural Networks and Learning Algorithms for their Modeling, Network Evolution Models of Cognitive Systems, Intelligent Systems development perspectives of methods and models, Social intelligence models and promising human-machine interfaces, Development of new methods of intellectual analysis of data and human-machine interfaces, Methods of analysis of large volumes of arbitrary structured information for determining criteria and factors in the creation of new applied directions, Scientific-technological forecasting application of artificial intelligence methods in solving problems are taught.</p>	
52	<p>Automated information systems of the enterprise</p> <p>The role of automated systems in the informationalization of society, the technical and economic advantages of the automation of information systems, the classification of automated information systems, the need to use automated systems in production, scientific research and education, the development directions of automated information systems, information technologies, the main organizers of information processes, the information system. Elements of the system, technical structure of automated information systems, general characteristics of the complex of technical means, selection of technical means for automated systems, interaction of functional and technical structures, advantages of organizing information provision based on the basic principle, place and role of the database in automated systems, functional scheme of the information system , Properties of information effects on information systems, Creation of database as an automated system, Organization of work process with database, Architecture of database. Reliability of information provision, Information protection in automated information system, Information - search systems, Algorithmic support of automated systems, Software of automated systems, Structure and main</p>	5

	components of software, Mathematics of automated systems, Necessity of automation of information system are taught.	
53	<p>Fuzzy logic and decision making</p> <p>History of the origin and development of fuzzy mathematics, applications of fuzzy mathematics in Japan, Europe and America, applications of fuzzy mathematics in Azerbaijan, fuzzy logic. Brief historical information, mathematical apparatus of fuzzy set theory and fuzzy logic, examples of solving problems in fuzzy mathematics, mathematical models and algorithms of fuzzy inference system, creation of fuzzy logical inference systems in MATLAB and FuzzyTech software packages, Fuzzy -comparison of fuzzy sets, Operations on fuzzy sets, Distance between fuzzy sets, Fuzzy index, Definition of fuzzy quantities, Triangular fuzzy numbers, Trapezoidal fuzzy numbers, Triangular fuzzy numbers performing mathematical operations on, performing mathematical operations on trapezoidal fuzzy numbers, determining fuzzy quantities, numbers and intervals, performing mathematical operations on fuzzy numbers and intervals, fuzzy relations and their definition, binary fuzzy relationships. Characteristics of binary fuzzy relations, Comparison of fuzzy relations and operations on them, Composition of binary fuzzy relations, Fuzzy judgment and operations on them are taught</p>	6
54	<p>Basics of "soft-computing".</p> <p>"Efficiency of software based on soft computing technologies, evaluation of SW's reliability, application of soft computer methods in the evaluation of SW's reliability models, conceptual model, Fuzzy truth and falsehood, to increase the reliability of pt with the application of soft-computing methods formulas, Fuzzy predicates, Existence level of fuzzy predicates, Fuzzy variable. Fuzzy linguistic variable, Fuzzy linguistic expressions, logical operations on fuzzy expressions, definition of fuzzy logic formula, definition of fuzzy close formulas, definition of fuzzy true and fuzzy false formulas, definition of fuzzy predicates to determine the existence of fuzzy predicates, to establish fuzzy linguistic variables, to perform logical operations on fuzzy expressions, to calculate the degree of equivalence of fuzzy formulas, the essence of fuzzy logical deduction, stages of fuzzy logical deduction and their determination, To apply the features of the application of fuzzy logic inference algorithms to the solution of specific problems of fuzzy logic inference algorithms.</p>	
	Internship	30