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APPROVED
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«13» 03 2026 y.

CATALOG OF DISCIPLINES OF THE UNIVERSITY COMPONENT

EDUCATIONAL PROGRAM **6B06126 - Applied artificial intelligence**

Level of education: bachelor's **degree Duration of study: 3 years** **Year of admission: 2026**

Cycle	Component	Name of the discipline	General labor intensity		Semester	Learning Outcomes	Brief description of the discipline	Prerequisites	Post-requirements
			in academic hours	in academic credits					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Module of natural science competencies									
BD	UC	Engineering Mathematics	150	5	1	LO1	The discipline "Engineering Mathematics" is designed to provide students with fundamental mathematical knowledge and skills necessary to solve applied problems in engineering and technical fields. The course covers the main sections of linear algebra, analytical geometry, differential and integral calculus of a function of one variable. The discipline studies mathematical methods used in the analysis, modeling and optimization of technical systems, which are key competencies for future engineers. Within the framework of the discipline, methods of interactive learning and the performance of computational and graphical work are used.	Basic school knowledge of mathematics	Probability theory and mathematical statistics, Discrete mathematics, Introduction to Data Science
BD	UC	Probability theory and mathematical statistics	150	5	2	LO1, LO2	Formation of students" theoretical knowledge and practical skills on the basics of probability theory and mathematical statistics as the main mathematical apparatus for building models of random phenomena, mastering methods of	Engineering Mathematics	The basics of artificial intelligence, Simulation

							mathematical modeling and analysis of such phenomena. Have skills in using statistical methods to solve problems of parameter estimation and hypothesis testing.		modeling, Deep machine learning
BD	UC	Introduction to generative AI	150	5	2	LO5, LO9	The discipline builds knowledge about principles, methods, and modern approaches in the field of generative AI (GenAI). Neural network architectures for generating text, images, music, and other data are considered, as well as issues of ethics and technology application. The course covers key models, including Gang, Wars, Transformers (GPT, BERT, DALE, Stable Diffusion), as well as their practical use. Students master tools (TensorFlow, PyTorch, Hugging Face, Openal API), learn how to develop and adapt generative models.	Algorithms and data structures	Deep machine learning
BD	UC	Discrete mathematics	120	4	2	LO1	The key concepts of discrete mathematics, including set theory, combinatorics, graphs and algorithms, are considered. Methods of logical inference, properties of finite automata and principles of algorithm construction are studied. The skills of analyzing discrete structures and solving problems related to graphs and combinatorial problems are being formed. The acquired knowledge is used to solve practical problems in computer science and other related fields.	Engineering Mathematics	Logical inference in artificial intelligence systems
Professional module									
BD	UC	Programming in Python	180	6	3	LO5	Formation of students to create modern cross-platform applications in Python using the universal PyQt5 graphics platform, interaction with the Internet, office documents, databases, graphics, multimedia and printing. Within the framework of the discipline, active learning methods are used - laboratory experiments, the method of working in small groups, "brainstorming".	Algorithms and data structures	Cloud Technologies, Methods and means of information retrieval, VR/AR technology and development, Simulation modeling, Methods of sound processing and recognition, Deep machine learning, Development for IoT,

									Industrial practice 1
BD	UC	Algorithms and data structures	150	5	1	LO6	Formation of students' skills in making an informed choice of data storage method when solving problems of processing large amounts of information, which can make this solution effective and competitive. To familiarize students with the basics of using data structures of varying complexity (arrays, lists, hash tables, trees, graphs, stacks, queues) and algorithms for working with them in solving various problems. The C++ or C# programming languages are used to solve various practical problems.	Basic school knowledge of computer science	Introduction to generative AI, Programming in Python, The basics of artificial intelligence, Educational practice, Databases
BD	UC	Cloud Technologies	150	5	4	LO3, LO7	The discipline “Cloud Technologies” is aimed at studying modern methods of data storage, processing, and transmission using cloud computing. The course covers the main models of cloud services (IaaS, PaaS, SaaS), the architecture of cloud platforms, virtualization, containerization, as well as issues of security and administration of cloud infrastructure.	Programming in Python, Databases	Industrial practice 2/ Pre-graduation practice
BD	UC	Occupational safety and health	150	5	5	LO12	Occupational Safety and Life Safety is a discipline that studies workplace safety requirements and methods of protecting human life and health. The course develops skills for preventing hazardous situations and acting correctly in emergency conditions.	Basic knowledge of life safety	Industrial practice 2/ Pre-graduation practice
BD	UC	Introduction to Data Science	150	5	3	LO4, LO5	The discipline studies the basic methods of working with data and Data Science technologies. The course covers data collection, processing, analysis, and visualization methods, as well as the fundamentals of machine learning and forecasting. During the training, students develop skills in applying analytical tools to solve practical problems and make data-driven decisions.	Engineering Mathematics	Simulation modeling, Methods of sound processing and recognition, Deep machine learning
Information Technology and Artificial Intelligence Module									
BD	UC	3D modeling and visualization	90	3	1	LO9	The discipline "3D modeling and visualization" is devoted to the study of the basics of designing three-dimensional objects, scenes and their visualization using modern technologies and software. This course is aimed at developing students' knowledge and practical skills necessary to work in the field of digital content creation, architectural design, game development, virtual and augmented reality, as well as other creative industries	Basic school knowledge of computer science	Innovative Design in IT, VR/AR technology and development
BD	UC	Innovative Design in IT	90	3	3	LO6, LO9	The discipline “Innovative Design in IT” is aimed at developing skills in creating and implementing IT startups.	3D modeling and	Industrial practice 1

							The course covers the fundamentals of developing innovative ideas, designing digital products, teamwork, and presenting startup projects.	visualization	
BD	UC	The basics of artificial intelligence	120	4	3	LO2, LO5	Formation of students' basic theoretical knowledge and practical skills in the field of artificial intelligence — including core methods of knowledge representation, machine learning, data mining, and decision-making — forms the basis of this discipline. The course focuses on developing the ability to apply AI methods for solving engineering and applied problems in the field of intelligent control and industrial automation, taking into account the ethical and social aspects of using intelligent systems.	Algorithms and data structures, Probability theory and mathematical statistics	Methods of sound processing and recognition, Deep machine learning, Logical inference in artificial intelligence systems, Industrial practice 1
Practice-oriented module									
BD	UC	Educational practice	60	2	2	LO1 – LO12	The organization of educational practice is aimed at ensuring familiarization of bachelors with the main areas, objects, areas of professional activity and profiles of training and consolidation of theoretical material, as well as conducting study tours in the branch of the department for this educational program.	Algorithms and data structures	Industrial practice 1
Professional module									
PD	UC	Methods and means of information retrieval	180	6	5	LO2, LO9	Formation of students' theoretical knowledge and practical skills in the field of information retrieval (IP). The course is aimed at studying the methods of searching, organizing and processing information in large amounts of data, including text, multimedia and structured data. Special attention is paid to the use of modern algorithms and technologies used in information systems.	Programming in Python, Databases	Industrial practice 2/ Pre-graduation practice
PD	UC	VR/AR technology and development	120	4	4	LO9	The discipline is aimed at studying the theoretical foundations and practical skills of developing virtual (VR) and augmented (AR) reality. During the course, students learn about the principles of VR/AR systems, their architecture, methods of user interaction, as well as tools and technologies used to create interactive applications. Students master the main software environments and frameworks for developing VR/AR applications, including Unity, Unreal Engine, ARKit, ARCore and Vuforia, as well as work with various hardware platforms such as virtual reality helmets, mobile AR devices and specialized controllers.	3D modeling and visualization, Programming in Python	Industrial practice 2/ Pre-graduation practice
PD	UC	Simulation	150	5	5	LO2, LO4	As a result of studying the discipline, the student will be	Probability	Industrial

		modeling					introduced to the basic methods of solving problems based on simulation modeling, gaining skills in creating models of systems for various purposes, studying methods of planning experiments, applying the knowledge gained in creating and conducting experiments with simulation models of systems of varying complexity.	theory and mathematical statistics, Programming in Python	practice 2/ Pre-graduation practice
PD	UC	Databases	150	5	3	LO4	The discipline is aimed at developing knowledge and practical skills in database design, creation and administration, information storage, processing and security, SQL query development, and the use of database management systems for solving applied tasks.	Algorithms and data structures	**Cloud Technologies, Methods and means of information retrieval, Cybersecurity, Development for IoT, Industrial practice 1**
Practice-oriented module									
PD	UC	Cybersecurity	180	6	4	LO3	To form an understanding of technologies for achieving information security in all areas of activity and master a systematic approach to solving the tasks set in the field of cybersecurity. Questions are included about the types of tools used to combat cyber threats, ensuring cyber security, as well as types of malware, types of attacks, protection systems, controls to achieve information security goals. Within the framework of the discipline, active learning methods are used - the method of working in small groups, "brainstorming".	Databases	Industrial practice 2/ Pre-graduation practice
PD	UC	Methods of sound processing and recognition	180	6	5	LO5, LO9	The purpose of the course "Methods of sound processing and recognition" is to study mathematical models and algorithms underlying modern methods of processing audio, primarily speech signals. All stages of the signal processing process are considered, starting with preliminary analysis and identification of characteristic features, and ending with the construction of a classifying or recognizing system. Much attention is paid to such methods of digital signal analysis as hidden Markov models, Fourier transform, wavelet transform, artificial neural networks, clustering, filtering, etc. The analysis of modern recognition systems and tools for their development is carried out.	Programming in Python, The basics of artificial intelligence	Industrial practice 2/ Pre-graduation practice
PD	UC	Deep machine learning	180	6	5	LO2, LO8	Formation of students' theoretical knowledge and practical skills on the basics of building large neural networks for	Programming in Python,	Industrial practice 2/

							deep learning.	Probability theory and mathematical statistics, The basics of artificial intelligence	Pre-graduation practice
PD	UC	Logical inference in artificial intelligence systems	180	6	5	LO2, LO5	The course includes an overview of the main logical systems used in AI, from classical propositional and predicate logic to the main non-classical systems - intuitionistic, modal, temporal logic, monotonic and non-monotonic systems. The course provides a number of examples illustrating the use of logical inference in AI systems	The basics of artificial intelligence, Discrete mathematics	Industrial practice 2/ Pre-graduation practice
PD	UC	Development for IoT	120	4	4	LO5, LO6	The discipline "Development for IoT" is aimed at developing competencies in the field of design, programming and integration of Internet of Things (IoT) systems. As part of the course, students get acquainted with the basic principles of iOS devices, acquire skills in working with hardware, study modern data transfer technologies and methods for ensuring the security of IoT systems.	Programming in Python, Databases	Industrial practice 2/ Pre-graduation practice
PD	UC	Industrial practice 1	300	10	4	LO1 – LO12	The Main Objectives of Industrial Practice Are: Consolidation of Theoretical Knowledge and Practical Skills in the Selected Educational Program in Production Conditions, Acquisition of Experience in Organizational Work, Obtaining a Working Specialty, Formation of Practical Skills and Competencies in the Process of Mastering the Bachelor's Program. It Is Carried Out in Practice Bases at Enterprises According to This Educational Program.	Programming in Python, Databases, The basics of artificial intelligence	Industrial practice 2/ Pre-graduation practice
PD	UC	Industrial practice 2/ Pre-graduation practice	300	10	6	LO1 – LO12	Examines the Consolidation and Enhancement of Theoretical Knowledge Acquired During the Study Process, Collects Information for the Preparation of the Graduation Thesis, Studies Advanced Industrial Practices, and Gains Independent Work Experience by Applying Analysis, Comparison, Evaluation, and Design Skills in Energy-Sector Enterprises.	Industrial practice 1, Deep machine learning, Logical inference in artificial intelligence systems	FINAL CERTIFICATION
TOTAL			**3750**	**125**					