

## Learning Outcome Matrix – Modules to EP BA 60610700 – Artificial Intelligence

Learning Outcomes (critical units of competence)	Name module	
<b>LO 2.</b> Able to making decisions informed by philosophical and historical knowledge, techniques of discussion and debate. An ability to function effectively on a team whose members together provide leadership	HUM101	The newest history of Uzbekistan
<b>LO 2.</b> Able to making decisions informed by philosophical and historical knowledge, techniques of discussion and debate. An ability to function effectively on a team whose members together provide leadership	HUM102	Religious studies
<b>LO 2.</b> Able to making decisions informed by philosophical and historical knowledge, techniques of discussion and debate. An ability to function effectively on a team whose members together provide leadership	HUM103	Philosophy
<b>LO 1.</b> Able to communicate effectively with a range of audience and competently express oneself in Uzbek, Russian, and other foreign languages.	FRL101	Foreign language I
<b>LO 1.</b> Able to communicate effectively with a range of audience and competently express oneself in Uzbek, Russian, and other foreign languages.	FRL102	Foreign language II
<b>LO 5.</b> Able to apply foundational and advanced knowledge in the fields of mathematics, natural sciences, and technical sciences to complex engineering tasks, utilizing the latest scientific advancements to solve computational problems.	MTH101	Calculus
<b>LO 5.</b> Able to apply foundational and advanced knowledge in the fields of mathematics, natural sciences, and technical sciences to complex engineering tasks, utilizing the latest scientific advancements to solve computational problems.	PHY101	Physics I
<b>LO 5.</b> Able to apply foundational and advanced knowledge in the fields of mathematics, natural sciences, and technical sciences to complex engineering tasks, utilizing the latest scientific advancements to solve computational problems.	PHY102	Physics II
<b>LO 5.</b> Able to apply foundational and advanced knowledge in the fields of mathematics, natural sciences, and technical sciences to complex engineering tasks, utilizing the latest scientific advancements to solve computational problems.	MTH102	Differential equations
<b>LO 5.</b> Able to apply foundational and advanced knowledge in the fields of mathematics, natural sciences, and technical sciences to complex engineering tasks, utilizing the latest scientific advancements to solve computational problems.	MTH103	Discrete structures
<b>LO 6.</b> Able to design computer systems and their components using modern programming languages.	PRG101	Programming I
<b>LO 6.</b> Able to design computer systems and their components using modern programming languages.	PRG102	Programming II
<b>LO 1.</b> Able to communicate effectively with a range of audience and competently express oneself in Uzbek, Russian, and other foreign languages.	AWR101	Academic writing
<b>LO 7.</b> Able to design, implement, and manage database systems, ensuring data integrity.	DBM201	Databases
<b>LO 8.</b> Able to implement cybersecurity measures and understand the principles of cryptography and network security.	CSF201	Fundamentals of Cyber Security
<b>LO 9.</b> Able to analyze and design efficient algorithms and data structures to solve computational problems.	DSA201	Data structure and algorithms
<b>LO 10.</b> Able to design, implement, and analyze and to understand the design and functioning of computer hardware, including processors, memory, and I/O devices, digital systems using hardware description languages and tools.	EAC 201	Electronics and circuits
<b>LO 10.</b> Able to design, implement, and analyze and to understand the design and functioning of computer hardware, including processors, memory, and I/O devices, digital systems using hardware description languages and tools.	CAO201	Computer organization
<b>LO 12.</b> Able to design computer networks and data communication, including protocols, topologies, and to understand OSI model.	NWK201	Computer networks
<b>LO 14.</b> Able to apply fundamental AI principles and techniques, including search algorithms, knowledge representation, and machine learning, to formulate and solve a variety of basic problems in artificial intelligence.	AIF201	Fundamentals of Artificial Intelligence

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<b>LO 6.</b> Able to develop proficiency and design computer systems and their components using modern programming languages.	WAC201	Create web applications
<b>LO 15.</b> Able to design and implement comprehensive knowledge representation systems, utilizing logical reasoning, ontologies, and semantic networks to create structured and accessible knowledge bases for various applications.	DKB301	Design of Knowledge Base
<b>LO 13.</b> Able to understand and apply diverse cloud computing architectures, deploying scalable applications while ensuring robust security, data privacy, and compliance with industry standards in cloud environments.	CCP301	Cloud computing
<b>LO 5.</b> Able to apply foundational and advanced knowledge in the fields of mathematics, natural sciences, and technical sciences to complex engineering tasks, utilizing the latest scientific advancements to solve computational problems.	MTH204	Probability and statistics
<b>LO 11.</b> Able to demonstrate knowledge of operating systems concepts, including process management, memory management, and file systems.	OPS201	Operating systems
<b>LO 14.</b> Able to learn comprehensive machine learning concepts, including supervised, unsupervised, and other types of methods, acquire practical skills in implementing, evaluating, applying models to practical problems using popular frameworks, develop skills in data preprocessing, feature selection, and critically assessing model performance metrics.	MLR301	Machine Learning
<b>LO 19.</b> Able to apply knowledge in the field of engineering in practice and effectively use engineering knowledge when conducting qualifying training and processing the results of experiments and drawing valid conclusions based on them.	IDP361	Individual project
<b>LO 20.</b> Able to design and implement parallel algorithms to improve computing efficiency and performance in HPC systems and distributed computing environments, deploy computer vision applications on Raspberry Pi using its hardware capabilities to efficiently process visual data, and test embedded systems by integrating hardware and software components for real-time applications.	EBS301	Embedded systems
<b>LO 14.</b> Able to develop and implement sophisticated neural network models, including deep learning architectures like CNNs and RNNs, for complex applications such as image and speech processing.	MLR402	Neural networks and deep learning
<b>LO 4.</b> Able to making decisions informed by health, safety, and workplace dynamics, utilizing methods to ensure the safety of social systems to preserve, develop, and enhance the effective functioning of individuals and society.	PHT101	Physical Training
<b>LO 3.</b> Able to understand and apply pedagogical principles and psychological theories, facilitating effective communication and learning strategies in educational and professional settings.	GEN301	Pedagogy. Psychology
<b>LO 4.</b> Able to understand and apply principles of life safety, including risk assessment, hazard identification, and safety protocols, specifically in environments involving the development and deployment of AI systems and technologies.	GEN302	Life safety
<b>LO 4.</b> Able to develop comprehensive business plans, demonstrating understanding of entrepreneurial processes, market research, financial planning, and strategic management for launching and sustaining business ventures.	GEN303	Fundamentals of entrepreneurship and business planning
<b>LO 4.</b> Able to understand the principles of a green economy, applying sustainable practices in business and industry to promote environmental conservation and sustainable development goals.	GEN304	Green economy
<b>LO 15.</b> Able to design and implement robust expert systems, leveraging rule-based and case-based reasoning techniques to automate decision-making processes in specialized and complex domains.	ITS201	Expert systems
<b>LO 15.</b> Able to design, develop, and evaluate intelligent systems, integrating advanced AI techniques while considering ethical, social, and practical implications of their deployment in real-world scenarios.	ITS202	Applied intelligent systems
<b>LO 16.</b> Able to implement and optimize speech information processing systems, applying advanced signal processing and machine learning techniques to analyze, synthesize, and recognize speech signals.	ITS303	Speech Information Processing

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LO 20. Able to analyze and forecast time series data, applying statistical models and machine learning techniques to identify patterns, trends, and anomalies in temporal datasets.	ITS304	Time Series Analysis
LO 16. Able to implement advanced NLP algorithms, utilizing state-of-the-art frameworks to perform tasks such as parsing, sentiment analysis, machine translation, and information extraction from textual data.	ITS305	Natural Language Processing (NLP)
LO 16. Able to design, develop, and optimize speech recognition systems, addressing challenges such as noise, accent variation, and speaker differentiation to improve system accuracy and usability.	ITS306	Speech recognition systems
LO 20. Able to design and implement IoT systems, integrating sensors, communication protocols, and data analytics to create intelligent, connected environments for various applications and services.	ITS407	The Internet of Things
LO 15. Able to design intuitive and accessible user interfaces, applying principles of usability and user-centered design to enhance user experience and satisfaction in interactive systems.	ITS408	Human and computer interaction
LO 13. Able to implement and manage cloud-based technologies, optimizing infrastructure and resource allocation while ensuring secure, efficient, and scalable deployment of applications and services.	ITS409	Cloud technologies
LO 20. Able to design, implement, and optimize parallel algorithms, leveraging multicore and distributed computing resources to enhance performance, scalability, and computational efficiency in various applications.	ITS410	Parallel programming
LO 18. Able to develop and implement computer vision systems, utilizing image processing, machine learning techniques to perform tasks like object detection, recognition, and scene understanding.	ITS411	Computer vision
LO 18. Able to design and apply pattern recognition systems, employing classification, clustering, and feature extraction techniques to identify and analyze patterns in complex datasets.	ITS412	Pattern recognition systems
LO 14. Able to develop and optimize deep learning models, including state-of-the-art architectures like GANs and LSTMs, for advanced applications in image, speech, and natural language processing.	ITS413	Deep Learning
LO 14. Able to implement reinforcement learning algorithms, such as Q-learning and deep reinforcement learning, applying them to dynamic environments and evaluating their effectiveness in optimizing decision-making.	ITS414	Reinforcement Learning
LO 15. Able to design and evaluate intelligent systems, integrating AI techniques like machine learning, expert systems, and NLP, while assessing their practical, ethical, and societal impacts.	ITS415	Design of intelligent systems
LO 15. Able to apply data mining techniques to discover patterns, trends, and associations in large datasets, using appropriate tools and methodologies to support decision-making and knowledge discovery.	ITS416	Intelligent data analysis (Data Mining)
LO 16. Able to develop and implement advanced algorithms for natural language recognition, focusing on tasks such as automatic speech recognition, text-to-speech synthesis, and natural language understanding.	ITS417	Natural language recognition algorithms
LO 15. Able to design, implement, and optimize algorithms for intelligent data analysis, facilitating the extraction of actionable insights and knowledge from complex and high-dimensional datasets.	ITS418	Algorithms for intelligent data analysis
LO 17. Able to apply knowledge in the field of engineering in practice and effectively use engineering knowledge when conducting qualifying training and processing the results of experiments and drawing valid conclusions based on them.	QPR301	Practical Training
LO 17. Able to apply knowledge in the field of engineering in practice and effectively use engineering knowledge when conducting qualifying training and processing the results of experiments and drawing valid conclusions based on them.	QPR 402	Pre-graduation work practice
LO 17. Able to apply knowledge in the field of engineering in practice and effectively use engineering knowledge when conducting qualifying training and processing the results of experiments and drawing valid conclusions based on them.	GQW401	Graduation Qualification Work