Выпуск № 8

1.	Azibek, B., Kusdavletov, S., Aresh Dadlani, Quoc-Viet Pham, Behrouz Maham (2021). DEFENDER-ATTACKER MODELS FOR RESOURCE ALLOCATION IN INFORMATION SECURITY. Scientific Journal of Astana IT University, (8), 4-11. https://doi.org/10.37943/aitu.2021.96.94.001	Abstract: Today, information security in defender-attacker game models is getting more attention from the research community. A game-theoretic approach applied in resource allocation study requires security in information for successive defensive strategy against attackers. For the defensive side players, allocating resources effectively and appropriately is essential to maintain the winning position against the attacking side. It can be possible by making the best response to the attack, i.e., by defining the most effective secure defensive strategy. This present work develops one defender – two attackers game model to determine the defensive strategy based on the Nash equilibrium and Stackelberg leadership equilibrium solutions of one defender-one attacker game model. Both game models are designed and studied in two scenarios: simultaneous and sequential modes. Game modes are defined according to the information that is available for attackers. In the first one, the defender is not aware of the attack and makes a simultaneous decision of how many resources should be allocated. Meanwhile, in the second mode, the defender knows about the entrance of attackers into a market and is assumed to commit a better strategy. The budget constraints are studied for both modes, all calculations and proof are presented in the work. According to obtained game mathematical models, it can be highlighted that network value of customers is important through the introduction of new variables in modeling and performing game theory equilibriums. This paper underlines the importance of information availability, budget limitations, and network value of customers in resource allocation through mathematical models and proofs; and focuses on modeling and studying defender-attacker games to define defensive strategy.
2.	Biloshchytskyi, A. (2021). USE OF VECTOR ALGEBRA TO ENSURE THE INTEGRITY OF THE COMPONENTS OF THE PROJECT-VECTOR MANAGEMENT MULTISYSTEM OF EDUCATIONAL ENVIRONMENTS. Scientific Journal of Astana IT University, (8), 12-20. https://doi.org/10.37943/aitu.2021.35.85.002	The article is devoted to the development of a mathematical model of the projectvector space of educational environments. Mathematical formalization of the project-vector space is performed. The main directions of application of vector algebra to ensure the integrity of the components of multisystem of project-vector management of educational environments are proposed. It is shown that in order to build an effective project management system, it is not so much the direction of movement of individual objects that is important, but the same or different vectors of their movement in the project-vector space. The same vectors mean that the movement of objects of different projects is equally conditioned. A model for calculating the distances between vectors and determining the optimal set of project groups (respectively, subsystems of the project management system) is proposed. Mathematical models have been developed for estimating the magnitude of the similarity of vectors over significant time intervals, as well as estimating the magnitude of the proximity of vectors specified by qualitative categories. These models show that the slower the objects of various projects move relative to each other, the more profitable it is to attribute them to one group and manage them on the basis of a single component of a multi-project management system.
3.	Burbekova, S. (2021). FACTORS FOR ACHIEVING LEARNING OUTCOMES: OVERVIEW OF ASTANA IT UNIVERSITY'S EXPERIENCE. Scientific Journal of Astana IT University, (8), 21-31. https://doi.org/10.37943/aitu.2021.10.44.003	The article gives an overview of Astana IT University's (AITU) experience in performing the teaching conditions for achieving the learning outcomes. The introduction of a competency-based approach to the formation and assessment of learning outcomes has led to a new system of training and assessment tools. Stakeholdership as a modern mechanism, the problem of focusing on employers' needs, the stages of the education programme (EP) development and the criteria for assessing the learning outcomes achievement are discussed in details. The quality of education is determined by the quality of the results of the educational process, where the educational achievements of students and the qualifications of graduates become the main components of education quality. The purpose of the study is aimed to summarize the practice of using assessment tools as the key factors and conditions for establishing learning outcomes. The research methodology used is quantitative and qualitative data analysis as well as analysis of class observation in AITU done within the research on learning outcomes achievement. The choice and design of teaching technology are primarily determined by the type of students' competencies, characteristics of the planned learning outcomes for each level of competence (knowledge, skills, and experience). Constant improvement of EP content and educational technologies as a key factor of education services quality is a vital demand.
4.	Bushuyev, S., Bushuev, D., Bushuyeva, N. (2021). CONVERGENCE OF PROJECT MANAGERS COMPETENCIES IN HYBRID WORLD. Scientific Journal of Astana IT University, (8), 32-44. https://doi.org/10.37943/aitu.2021.22.46.004	Abstract: Global trends that occur in various fields of knowledge with a significant acceleration affect the development of information technology and project management competencies, programs, and project portfolios. The paper aims to develop and study information technology and mechanisms for assessing the competencies of project managers for their development based on current trends and flexible methodology of Agile in project management in creating modern information and communication technologies in project management. Global trends that challenge the development of project management competencies and programs are related to global acceleration, digitalization of society, development of blockchain, cloud and fog technologies, active introduction of smart systems, the transition from "Rational economy" to "Behavioral economy", "Green economy", "Sustainable development economy" and "Circular economy". The convergence of these trends creates a new platform for the effective application of existing methodologies, knowledge systems, and methods of assessing the competence of project managers. Based on convergence, integration, and harmonization of project and program management methodologies, step-by-step research methods have been identified. The formation of an updated system of

		competencies lies in the change of paradigms from the traditional waterfall life cycle model to the Agile life cycle models of the projects. Decisionmaking in conditions of uncertainty based on data mining, from rational to irrational forms. The article examines modern hybrid information models of projects and programs that change the competency systems of project managers, convergent models and methods of decision making. At the same time, the change in competencies as actions or functions to be performed by project managers affects the competency model and evaluation system, including key competency indicators. A meaningful model of diagnostics of application of competence models and methods of project management in the digital and "behavioral economy" based on flexible methodologies is given. Some key competency indicators that are used in assessing the competence of a project manager based on his competencies in working in a project team are identified. Patterns of behavior of project managers in project product creation and project management are studied. The patterns allowed the authors to identify bottlenecks in the application of Agile project management methodologies in the convergence of trend information models and technologies. An example of information technology for managing the assessment of competence of project managers according to the IPMA Agile ICB model is given.
5.	Chinassylov, D., Kozhamseitova, A., Kalen, M., Omirgaliyev, R. (2021). APPLICATION INFORMATION MODELING AND MACHINE LEARNING ALGORITHM FOR CLASSIFICATION OF WASTE USING SUPPORT VECTOR MACHINE. Scientific Journal of Astana IT University, (8), 45-53. https://doi.org/10.37943/aitu.2021.52.74.005	Abstract: The ecological state of the world is deteriorating for the worse every year. One of the main problems is inadequate waste disposal and inadequate sorting by waste type, which has led to inadequate treatment of bulk waste in landfills throughout the world. The issue of improper disposal of municipal solid waste (MSW) in Kazakhstan has been raised since 2013, to solve this problem, the first President of the Republic of Kazakhstan, Nursultan Abishevich Nazarbayev, issued a decree on the transition to a green economy. Under the leadership of the Ministry of Energy, it was planned to reduce the amount of inappropriate waste by 40% in the territory of Kazakhstan by 2030. There are a lot of problems in India like inadequate waste collection, transport, treatment, and disposal. Poorly recyclable garbage has a global impact, fouling oceans, obstructing sewers, and creating flooding, transferring infections, increasing respiratory problems due to burning, injuring animals that inadvertently consume waste, and affecting economic development. To classify garbage, researchers utilized a combination of mixed modeling and machine learning techniques. Using machine learning technology, the data obtained can be used to classify and redistribute garbage for any sector around the world.
6.	Kalikova, A., Kusdavletov, S. (2021). FEASIBILITY ANALYSIS OF AIR FLOATING DESIGN FOR ELECTRICITY GENERATION. Scientific Journal of Astana IT University, (8), 54-62. https://doi.org/10.37943/aitu.2021.19.41.006	Abstract: In the past several decades, there were presented different innovative technologies rather than traditional wind turbines for renewable energy that uses wind kinetic energy and remains in the air through aerodynamic forces. Unlike wind turbines with towers, their systems operate in a flight, and they are connected to a foundation by a cable that either transmits the energy generated at the airfoil or transmits mechanical energy to the ground. Nowadays, there are several existing and developing technologies; however, each of them has limitations and challenges. This work will present an analysis of air floating design for electricity generation at high altitudes. It is a tethered wind turbine with a Balloon system, which has a simple controlling system, relatively higher efficiency, and low-cost technology. The concept of the design is to model the electricity generation device powered by clean renewable energy, mainly wind power. Base on the concept of kite or helium balloon to provide enough buoyancy to keep the device working at certain altitude. To increase the energy conversion efficiency and the feasibility of the device, it is mostly used in the country, open area. Despite high efficiency which needs further investigation, the designed device is moveable, pollution free and little space consumed.
7.	Omirbayev, S., Mukhatayev, A., Biloshchytskyi, A., Kassenov K. (2021). NATIONAL MODEL OF THE QUALITY ASSURANCE OF EDUCATION IN KAZAKHSTAN: FORMAT, TOOLS, AND REGULATORY MECHANISMS. Scientific Journal of Astana IT University, (8), 63-73. https://doi.org/10.37943/aitu.2021.24.30.007	In this article, the authors consider the quality assurance system at the national level. The normative legal acts of the Republic of Kazakhstan contributing to the development of quality assurance at the institutional level are analyzed. The structure of state management of the quality assurance system of higher education is given. The authors show the implementation of the process of external and internal quality assurance in the country. At the same time, the internal quality assurance system is based on the principles of quality assurance and on the policy and standards of internal quality assurance, which are developed by the higher education institution independently, but on the basis of ESG. The design of the national quality assurance model is presented in a three-dimensional image. The basis of the National Model of Quality assurance of Higher Education in Kazakhstan (NMQAHE) is the system of internal quality assurance. The indicator of achievement of academic quality by the internal quality assurance system is the academic reputation of a higher educational institution. The answer to the question is given due to what the successful functioning of the national quality assurance model is achieved.