Ссылки на статьи научного издания Scientific Journal of Astana IT University

Выпуск № 1

№	Статья и ссылка	Аннотация
1.	Bezdelov, V., Kalinin, A., & Sultanova, B. (2020). EFFECTIVE MANAGEMENT AND OPTIMIZATION OF BUSINESS PROCESSES. *Scientific Journal of Astana IT University*, (1), 4-11. https://doi.org/10.37943/AITU.2020.1.63500	Abstract: This article discusses the problems of introducing an effective business, as well as optimizing business processes. Various approaches to managing and optimizing business processes are analyzed. The reasons for which it is necessary to improve the process and each component of this process are identified and described. Two main approaches to improving business processes are considered: functional and approach, the main differences between them, as well as the advantages and disadvantages of each of them are demonstrated. Any process has a life cycle, thanks to which it follows; the article considers the life cycle of six sigma. Based on the material studied, methods for improving business processes are proposed, and the role of the leader is examined, and concepts such as creative management and a creative manager are examined and what their role is in modern business. Any life cycle needs modeling, timely improvement, so that the company can get good results, so managers and chief managers must follow the simple rules discussed in the article in order to simulate the business process “as is” and “as it should be” , you can use the Business Process Management Notation and special software designed for this. The general conclusion of the article is that each company should choose its own approach and method of optimizing business processes based on general principles. Key words: business processes, processes, process management, optimization.
2.	Biloshchytskyi, A., Kuchansky, A., Andrashko, Y., & Biloshchytska, S. (2020). USE OF THE LINK RANKING METHOD TO EVALUATE SCIENTIFIC ACTIVITIES OF SCIENTIFIC SPACE SUBJECTS. *Scientific Journal of Astana IT University*, (1), 12-20. https://doi.org/10.37943/AITU.2020.1.63600	Abstract: A modification of the PageRank method based on link ranking is proposed to evaluate the research results of subjects of the scientific space, taking into account self-citation. The method of reducing the influence of self-citation on the final evaluation of the results of research activity of subjects of the scientific space is described. The evaluation of the results of research is calculated using the modified PR-q method, taking into account self-citation as a solution of a system of linear algebraic equations, matrix of which consists of coefficients determined by the number of citations of publications of one scientist in the publications of another scientist. The described method can be used for the task of evaluating the activity of the components of the scientific space: scientists, higher education institutions and their structural units. For the task of evaluating the research activity of subjects of the scientific space, a method based on link ranking (PageRank method for web pages) and taking into account the self-citation of scientists is proposed. The latter allows for an adequate assessment, taking into account the abuses associated with the authors’ excessive self-citation. The essence of the constructed method lies in the construction of a system of linear algebraic equations, whose coefficients of the matrix reflect the citations of some scientists by others in the citation network of scientific publications. The value of the coefficients of the matrix of such a system of linear algebraic equations is subject to certain restrictions, which allow to reduce the influence of the factor of excessive self-citation of the author on his overall assessment of research activity
3.	Golovachyova, V., Tomilova, N., & Abildaeva, G. (2020). THE EXPERT SYSTEM OF CONTROL AND KNOWLEDGE ASSESSMENT. *Scientific Journal of Astana IT University*, (1), 21-29. https://doi.org/10.37943/AITU.2020.1.63601	Abstract: The article deals with the problem of objective knowledge assessment using expert automated systems for monitoring and evaluating knowledge. The expert systems of control and knowledge estimation are usually developed on the basis of different approaches to constructing a question and answer on test. The analysis of existing testing methods made it possible to conclude that questions with selective and selectively constructed types of answer do not always allow objectively assessing the knowledge of trainees, which reduces the stimulating effect of pedagogical evaluation on cognitive activity of trainees, and the quality of the learning process as a whole. The article proposes a method of knowledge estimation, which is based on a new approach to constructing a question and answer that allows a freely designed form of a test response. Such answer is analyzed by a set of criteria for its formation based on the developed algorithms for the criteria for assessing their quality. This makes it possible to apply the obtained results to solve the scientific problem of objective knowledge assessment using testing. The proposed approach gives an opportunity to expand the functions of tests, thereby increasing the approximation degree of the estimation for the test to the level of the real knowledge of students. The purpose of the article is to justify the effectiveness and develop the expert system of control and knowledge assessment. The article is addressed to a wide range of researchers and experts in the field of education and information technologies.
4.	Kropachev, P., Imanov, M., Borisevich, Y., & Dhomane, I. (2020). INFORMATION	Abstract: The aim of the article is a comprehensive approach to addressing the digitalization of education in the Republic of Kazakhstan based on

	TECHNOLOGIES AND THE FUTURE OF EDUCATION IN THE REPUBLIC OF KAZAKHSTAN. *Scientific Journal of Astana IT University*, (1), 30-38. https://doi.org/10.37943/AITU.2020.1.63639	identifying problems in this area, forming priority tasks and possible ways to solve them. Implementation of IT-programs in the learning process making serious additions to the pedagogical requirements, ethics, and discipline of students also the content of the disciplines. All these aspects are becoming especially relevant today when the quality of education is becoming a strategic task and the key to the successful development of the country's economy in the digital era. The article touches on the problems of the modern "digital" generation, its dependence on communication in social networks and instant messengers, the impact of this dependence on health and the level of knowledge. The algorithm for educational technologies will be the main educational goals: the ability to think outside the box, be creative in solving problems, and develop logic and intelligence. Therefore, to formulate requirements for training ICTs, it is necessary to implement measures to assess the effectiveness of implemented programs based on experimental data. Such studies are being conducted today to improve the quality of the educational process, which means that they can be used for ICT. In conclusion, if to base on the results of the survey, the main problems were identified and a number of tasks were set for a deeper study, a general idea was formed on the scope of the forthcoming work and the goals for its achievement
5.	Ponomarenko, R., & Dyka, A. (2020). FUZZY INFERENCE SYSTEMS BASE ON POLYNOMIAL CONSEQUENTS OF FUZZY RULES. *Scientific Journal of Astana IT University*, (1), 39-49. https://doi.org/10.37943/AITU.2020.1.63641	Abstract: Various fuzzy inference systems that operate on the basis of polynomial consequents of fuzzy rules. As well as inference methods for such systems, in particular, Takagi-Sugeno fuzzy inference systems, their differences from other popular fuzzy systems, such as Mamdani systems, etc., are considered. The attention is focused on the features of the functioning of such systems both in the construction of elementary fuzzy systems. The Systems for which the calculation of the general logical conclusion involves intermediate levels of logical inference with many hierarchically interconnected blocks of fuzzy rules. Fuzzy sets of type 2 are considered, the membership index of which is a fuzzy term of the first type. This allows you to take into account the secondary fuzziness of linguistic concepts in the design of intelligent systems based on fuzzy inference. Fuzzy systems of the second type based on Takagi-Sugeno systems and the iterative Karnik-Mendel algorithm are considered to obtain a logical conclusion for fuzzy systems with the interval membership functions of the second type in the antecedents of fuzzy rules. The proposed procedure for lowering the order of fuzzy rules for higher-order Takagi-Sugeno fuzzy systems is described and justified. A fuzzy inference method for higher-order fuzzy systems based on the partition of a set of input variables is proposed. It is proposed to build a separate block of fuzzy rules for each of the input subspaces in the presence of a common polynomial. Which is a higher-order consequent, that reduces the total number of fuzzy rules in blocks
6.	Sipko, E., Kravchenko, O., Karapetyan, A., Plakasova Zh., & Gladka, M. (2020). THE SYSTEM RECOGNIZES SURFACE DEFECTS OF MARBLE SLABS BASED ON SEGMENTATION METHODS. *Scientific Journal of Astana IT University*, (1), 50-59. https://doi.org/10.37943/AITU.2020.1.63643	A system for recognizing surface defects in marble slabs is proposed. The pattern recognition method based on segmentation methods was further developed. The algorithm of the recognition system. The article describes methods for determining damage from digital images on various hard surfaces. Research in this field is relevant for a wide range of industrial enterprises that specialize in the production of various kinds of materials: parts, marble slabs, building materials, etc. To solve this problem, it is proposed to use the k-means clustering method. It has been experimentally established that Gaussian blurring algorithms, the Hough transform, and the Kenny algorithm are best suited for recognizing defects on the surface of a marble slab. The developed complex method based on the theory of pattern recognition allows you to quickly identify defects and damage on the surfaces of marble slabs. On the basis of the method, a system for understanding defects is implemented in software. The main stages of the system are described in the article. The results of the analysis of the image of the surface of the marble slab on a specific example are presented. The developed complex method based on the theory of pattern recognition allows you to quickly identify defects and damage on the surfaces of marble slabs. On the basis of the method, a system for understanding defects is implemented in software. The main stages of the system are described in the article. The results of the analysis of the image of the surface of the marble slab on a specific example are presented.
7.	Smagulova, A., Tentekbayeva, Zh., & Abdin, A. (2020). STRATEGIES AND OPERATION PRINCIPLES OF LOGISTIC INFORMATION SYSTEMS. *Scientific Journal of Astana IT University*, (1), 60-69. https://doi.org/10.37943/AITU.2020.1.63645	Over the last few years the so-called new logistic technologies are rapidly developed. Information systems hold the central position in these technologies. Development of logistics in the developed countries not least are stimulated with the need of fast reaction of producers to market condition, aspiration to adapt in the changing situations in short time. The central idea of logistics is planning, management and control of entrepreneurial activity, all material and information flows connected with this activity. Information systems in logistics assume fast appropriate response to the market demand, tracking delivery time, optimization of

		functions in chains of delivery and supply. The research of modern backbone of information technologies in logistics is conducted in this article. Modern information technologies in logistics are analyzed. Modern technologies of information data processing in logistic streams and creation of logistic information technologies are also considered in the article. Some types of information technologies in logistics, structural principles and principles of operation of logistic information systems and also problems in the process of creation of logistic information technologies are described. The article is addressed to a wide range of researchers and experts in the field of logistics and information technologies.
8.	Bushuyev, D., Bushuieva, V., Kozyr, B., & Ugay, A. (2020). EROSION OF COMPETENCIES OF INNOVATIVE DIGITALIZATION PROJECTS. *Scientific Journal of Astana IT University*, (1), 70-83. https://doi.org/10.37943/AITU.2020.1.63658	Рассмотрены структура и функции механизмов развития и эрозии (размывания) компетенций в инновационных проектах по внедрению информационно-коммуникационных технологий в дигитализации общества. Определены факторы развития и эрозии компетенций. Была построена модель оценки компетенций и компетенций для успешного внедрения информационных и коммуникационных технологий на примере программ управления проектами и оцифровки. Предлагаемая модель развития компетенций проектной команды по созданию и внедрению основана на балансе факторов развития компетенций инновационного проекта и их эрозии в процессе реализации. Изучение факторов развития и эрозии компетенций в управлении инновационными проектами по дигитализации позволяет адекватно реагировать на изменения в профиле компетенций инновационных проектов. В то же время анализ позволяет руководителю проекта формировать эффективные программы для приобретения определенных компетенций для членов команды и других заинтересованных сторон. Предложенная модель факторов развития и эрозии системы компетенций проверена на примерах, подтверждающих ее адекватность и эффективность. Эта модель развития и эрозии компетенций команды проекта по дигитализации основана на балансе факторов для развития компетенций инновационного проекта и их размывания в процессе реализации. Изучение факторов развития и размывания компетенций в управлении инновационными проектами позволяет нам адекватно реагировать на изменения в профиле компетенций инновационных проектов. В то же время анализ позволяет руководителю проекта формировать эффективные программы для приобретения определенных компетенций для членов команды и других заинтересованных сторон. Предложенная авторами модель факторов развития и размывания системы компетенций проверяется на примерах применения методологии Agile на уровне кафедры управления проектами Киевского национального университета строительства и архитектуры. Реализация подтвердила адекватность и эффективность модели и методов анализа развития и размывания компетенций и, как следствие, компетентности. В качестве направления для дальнейшего развития необходимо определить методы и алгоритмы активного реагирования Лидера на развитие, и эрозию компетенций, формируя соответствующие компетенции членов команды, обеспечивающие успех инновационных проектов The structure and functions of the mechanisms of development and erosion of competencies in innovative projects for the implementation of information and communication technologies in the digitalization of society are considered. The factors of development and erosion of competencies are determined. A model for assessing competence and competencies for the successful implementation of information and communication technologies using the example of project management and digitalization programs has been built. The proposed model for the development of competence of the project team for the creation and implementation is based on a balance of factors for the development of competencies of the innovative project and their erosion in the implementation process. The study of factors of development and erosion of competencies in the management of innovative digitalization projects allows us to adequately respond to changes in the profile of competencies of innovative projects. At the same time, analysis allows the project manager to form effective programs for acquiring certain competencies for team members and other interested parties. The proposed model of the factors of development and erosion of the competency system is tested on examples that confirm its adequacy and effectiveness. This model for the development and erosion of the competencies of the digitalization project team is based on a balance of factors for the development of competencies of the innovative project and their erosion in the implementation process. The study of the factors of development and erosion of competencies in the management of innovative projects allows us to adequately respond to changes in the profile of competencies of innovative projects. At the same

		time, analysis allows the project manager to form effective programs for acquiring certain competencies for team members and other interested parties. The model of factors of development and erosion of the competency system proposed by the authors is tested on examples of applying the Agile methodology at the level of the project management department of the Kiev National University of Construction and Architecture. The implementation confirmed the adequacy and effectiveness of the model and methods of analysis of the development and erosion of competencies, and as a consequence of competence. As a direction for further development, it is necessary to determine the methods and algorithms of the Leader's proactive response to the development and erosion of competencies, forming the corresponding competencies of team members ensuring the success of innovative projects. Keywords: competencies, competence, competency-based approach, innovative projects, development and erosion of competencies, digitalization.
9.	Kubekov, B., Naumenko, V., & Ibraimkulov, A. (2020). PLANNING OF THE KNOWLEDGE CONTENT OF THE EDUCATIONAL PROGRAM USING ONTOLOGICAL ENGINEERING AND DESIGN-COMPETENCE APPROACH. *Scientific Journal of Astana IT University*, (*1)*, 84-95. https://doi.org/10.37943/AITU.2020.1.63684	В статье рассматривается инновационная методика формирования знаниевых компонентов планируемого обучения, основанная на концепциях и механизмах онтологического инжиниринга, проектно-ориентированной технологии обучения и компетентностной модели выпускника. Показаны возможности образовательной среды, связанные, во-первых, с традиционным формирование знаниевого контента дисциплин учебного плана; во-вторых, в случае использования проектно-ориентированной технологии обучения, планировать знаниевый тренд и формировать знаниевый контент профилирующих и базовых дисциплин учебного плана специальности в соответствии с компетенциями компетентностных моделей этапов CDIO и, в-третьих, используя проектно-ориентированную технологию обучения и компетентностный подход, планировать знаниевый тренд и формировать знаниевый контент сценария индивидуальной траектории обучения. В этом случае, для конфигурирования сценария обучения используются знаниевые компоненты и параметры smart-контракта. На примере дисциплины «Технологии разработки распределенных приложений» и проекта «Банковская система типа клиент-сервер» приведены формализмы и концепции образовательной среды, связанные с формированием знаниевого контента данной дисциплины, в соответствии с компетентностными моделями этапов CDIO. Данная методика нашла свое отражение в образовательной среде, выполненной в виде web-приложения, и апробацию в учебном процессе на кафедре «Компьютерная и программная инженерия» университета «Туран». The article considers an innovative method of forming knowledge components of planned training, based on the concepts and mechanisms of ontological engineering, projectoriented learning technology and the graduate's competence model. The possibilities of the educational environment are shown, first of all, connected with the traditional formation of knowledge content of the curriculum disciplines; second, in the case of using project-oriented learning technology, plan the knowledge trend and form the knowledge content of the profile and basic disciplines of the specialty curriculum, in accordance with the competence models of the CDIO stages and, third, using the project-oriented learning technology and the competence approach, plan the knowledge trend and form the knowledge content of the individual learning trajectory scenario. In this case, knowledge components and smart-contract parameters are used to configure the training scenario. Using the example of the discipline "Technologies for developing distributed applications" and the project "Client-server banking system", the formalisms and concepts of the educational environment related to the formation of knowledge content of this discipline, in accordance with the competence models of the CDIO stages are presented. This method is reflected in the educational environment, made in the form of a web application, and tested in the educational process, at the Department of Computer and software engineering, Turan University. Keywords: ontology model, support concept, expression of knowledge, knowledge component, competence model, smart-contract.
10.	Bakhtiyarova, Y., & Suleimen, Z. (2020). ASSESSING LTE TECHNOLOGY INTERFERENCE PARAMETERS. *Scientific Journal of Astana IT University*, (*1)*, 96-101. https://doi.org/10.37943/AITU.2020.1.63685	Статья посвящена оценке параметров помех экспериментальным путем. В статье рассмотрены технология LTE, основные параметры и услуги технологии LTE, проведен расчет внутренних параметров. Установлено, что потери зависят от расстояния между передатчиком и антенной. Результаты, полученные в ходе проведения данного эксперимента, показали, что при использовании аппаратуры сотовой

		связи в зоне обслуживания радиусом порядка 1,9 км связь в направлении АС-БС будет устанавливаться в 90% времени и мест с отношением сигнал/шум на выходе приемника не хуже 16 дБ. Как видно из расчетов, технология LTE обеспечивает эффективное радио покрытие и может работать с высокими скоростями для абонентов, находящихся в центре и на границе соты иметь достаточно хороший уровень сигнала The article is devoted to experimental estimation of interference parameters. The article discusses LTE technology, the main parameters and services of LTE technology, and calculates the internal parameters. Introduction of LTE technology in the Republic of Kazakhstan is currently an urgent topic. LTE technology is one of the most high-speed mobile access technologies. The main advantage of LTE is the so-called “open” Internet access. This means that a mobile network subscriber can access the Internet using the most convenient device at the moment – a mobile phone, PDA, smartphone, or laptop that has the most suitable characteristics for the current exchange of information. It is established that the losses depend on the distance between the transmitter and the antenna. The results obtained during this experiment showed that when using cellular communication equipment in the service area with a radius of about 1.9 km, communication in the direction of the AC-BS will be established at 90% of the time and places with a signal-to-noise ratio at the receiver output is no worse 16 dB As can be seen from the calculations, LTE technology provides effective radio coverage and can operate at high speeds, for subscribers located in the center and at the cell border to have a fairly good signal level.
11.	Shinasilova, F. (2020). METHODS OF INFORMATION SECURITY IN WIRELESS NETWORKS. *Scientific Journal of Astana IT University*, *1*(1), 102-114. https://doi.org/10.37943/AITU.2020.1.63687	Ақпараттық технологиялардың дамуы компьютерлік желілердің сенімді түрде жұмыс істеуін жоғарылату тапсырмасын алға қояды. Желілердің қауіпсіздігін зерттеу үшін желі арқылы ақпараттық ресурстарды жіберу барысында желілік хаттамаларды, желілік архитектураларды, қауіпсіздікті нығайту тәсілдерін құруды зерттеу қажет. Желілік шабуылдар, істен шығу, желілік құрылғылардың істен шығуы сымсыз желілерде ақпаратты тарату барысында қауіпсіздікке әсер ететін негізгі факторлар болып табылады. Бұл мақалада сымсыз желілерде ақпараттардың қорғалуын қамтамасыз ететін әдістер, соның ішінде аутентификация, шифрлену және қауіпсіздікті қамтамасыз ететін стандарттар қарастырылған. Қауіпсіздіктің бірнеше стандарттары бар, бірақ бұл мақалада сол стандарттардың тиімділігі мен стандарттарда қолданылатын кілттердің жұмыс істеу принциптері айқындалған. Сонымен қатар, мәліметтердің құпиялығы мен тұтастығын қамтамасыз ететін стандарттардың жұмыс істеу қағидасы анықталған. Яғни, TKIP хаттамасы әрбір тасымалданатын мәліметтер пакеті үшін жаңа құпия кілтті генерациялайды және бір статистикалық WEP кілті шамамен 500 миллиард мүмкін болатын кілттерге алмастырылады. Ол осы мәліметтер пакетін шифрлеу үшін қолданылу мүмкін. Кілтті генерациялау механизмі өзгертілген. Ол үш компоненттен тұрады: 128 битті ұзындығы бар базалық кілт(TK), тасымалданатын пакеттің номері(TSC) пен тасымалдаушы құрылғының MAC-адресі(TA). Сонымен қатар, TKIP-те инициализациялаудың 48 разрядты векторы қолданылады. Ол IV векторын қайта-қайта қолдану жағдайын туғызбау үшін қолданылады. TKIP алгоритмі 48 битті ұзындығы бар (TSC) пакет есебін қолданылады. Ол әрдайым артып отырады. Ал, 16 битті TSC жаңа IV енгізіледі(Сурет 4). Осылайша, шабуылдарға тосқауыл бола алатын механизм қалыптасады. Abstract: The development of information technology sets the task of improving the reliability of computer networks. To study the security of networks, it is necessary to study the creation of network protocols, network architectures, and ways to strengthen security when transmitting information resources over a network. Network attacks, failures, and the failure of network devices are key factors affecting the security of information transmission in wireless networks. This article discusses methods for protecting information in wireless networks, including standards for authentication, encryption, and security. There are several security standards, but this article describes the effectiveness of those standards and the key principles used in those standards. It also outlines the principles of standards that ensure the confidentiality and integrity of data. That is, the TKIP protocol generates a new secret key for each packet of data transmitted, and one static WEP key is exchanged for about 500 billion possible keys. It can be used to encrypt this data set. The key generation mechanism has been modified. It consists of three components:

		a 128-bit Basic Key (TC), a packet number (TSC) and a MAC address of the carrier. The TKIP also uses a 48-bit initialization vector. It is used to prevent repeated use of vector IV. The TKIP algorithm uses a 48-bit (TSC) packet calculation. It keeps increasing. Well, the new 16-bit TSC IV is introduced (Figure 4). Thus, a mechanism is created that can block attacks. Key words: wireless networking, security, authentication, asymmetric encryption, mesh portal, standard, Cisco Systems, WEP algorithm, TKIP protocol, MIC mechanism, IEEE 802.11i standard, authentication, EAP protocols.