

**ШЕЙНБАУМ
ВИКТОР СОЛОМОНОВИЧ**

кандидат технических наук, доцент, советник ректора, профессор кафедры Машин и оборудования нефтяной и газовой промышленности Российского государственного университета нефти и газа имени И.М. Губкина, лауреат премии правительства Российской Федерации в области образования, заслуженный работник высшей школы, заслуженный работник Минтопэнерго Российской Федерации, отличник высшей школы, почетный работник высшего профессионального образования Российской Федерации, почетный нефтяник, почетный работник газовой промышленности
E-mail: shvs@gubkin.ru

**ШЕЛУДЬКО
ВИКТОР НИКОЛАЕВИЧ**

доктор технических наук, профессор, заведующий кафедрой Систем автоматического управления, первый проректор Санкт-Петербургского государственного электротехнического университета «ЛЭТИ» имени В.И. Ульянова (Ленина) (СПбГЭТУ «ЛЭТИ»), почетный работник высшего профессионального образования Российской Федерации
E-mail: VNSheludko@etu.ru

**ШЕПЕЛЕВА
ЕКАТЕРИНА АЛЕКСАНДРОВНА**

обучающаяся Северного (Арктического) федерального университета имени М.В. Ломоносова
E-mail: a.shepelev@narfu.ru

**ШЕПЕЛЕВ
АЛЕКСАНДР ЛЬВОВИЧ**

кандидат технических наук, доцент кафедры автомобильных дорог и строительного производства Высшей инженерной школы Северного (Арктического) федерального университета имени М.В. Ломоносова, Почетный работник высшего профессионального образования Российской Федерации
E-mail: a.shepelev@narfu.ru

**ЭПШТЕЙН
МИХАИЛ ЗАЛМАНОВИЧ**

кандидат экономических наук, доцент, заместитель заведующего кафедрой международного бизнеса Санкт-Петербургского государственного экономического университета
E-mail: m-epstein@yandex.ru

**ЯНУШИК
ОЛЬГА ВЛАДИМИРОВНА**

кандидат педагогических наук, доцент отделения математики и информатики Школы базовой инженерной подготовки Национального исследовательского Томского политехнического университета
E-mail: yanuschik@tpu.ru

Summary**THE AIMS OF HIGHER EDUCATION IN THE FORMATION AND DEVELOPMENT OF INDEPENDENT EVALUATION SYSTEM OF ENGINEERING QUALIFICATIONS WITH REGARD TO THE FUEL AND ENERGY COMPLEX**

V.S. Sheinbaum
Gubkin Russian State University of Oil and Gas (National Research University)

The article discusses, with the example of the FEC and the Gubkin University, the role and place of higher education in the country's activities aimed at moving to a new regulatory framework in the field of qualifications, based on professional standards. It is argued that, as a rule, the scientific centers and research universities, which perform the function of advanced education, become the backbone in the emerging and beginning to dominate in the innovative knowledge industry. The active participation of these structures in the definition and formulation of engineering competences required by innovators, methods and means of evaluation is certainly necessary.

PROFESSIONALISM AND (OR) CULTURE: COMPARATIVE ANALYSIS OF MISSIONS OF DOMESTIC AND FOREIGN HEIS

I.N. Yemelyanova
University of Tyumen

The article reveals the connection between professional and socio-cultural functions of the university. The origin of professionalization of university education is presented. The conclusions are based on the content analysis of the missions of universities in Europe (59 HEIs) and Russia (47 HEIs). The themes of modern sounding in the texts of missions in the context of professional and socio-cultural functions are determined. The importance of preservation of socio-cultural function in the content of professional function is determined.

DESIGNING THE MAIN EDUCATIONAL PROGRAMS FOR HIGHER EDUCATIONAL INSTITUTIONS

M.R. Ziganshina, S.A. Karandashov,
V.A. Mendelson
Kazan National Research Technological University

The ways of special programs development for training in foreign languages, primarily English, the future specialists in tourism, service and hospitality sphere are considered in the article. In addition to the competences connected with development of professional knowledge and skills, the foreign language knowledge undoubtedly has paramount value for future graduates. Modern methods and forms of education not always allow reaching the level demanded for fast communication with foreign experts in this area and to providing services to foreign guests. Introduction of new programs, forms and methods of training will make development of colloquial skills of a foreign language during the limited time period of time possible and will increase competitiveness of future specialists, our graduates, in labor market.

DESIGNING OF VOCATIONAL TRAINING FOR ENGINEERS IN THE CONTEXT OF COMPETENCY-BASED APPROACH

S.E. Tsvetkova
Lobachevsky State University of Nizhny Novgorod
I.A. Malinina
National Research University Higher School of Economics

The purpose of the article is to consider, analyze and clarify certain concepts and aspects of the competency-based approach, the peculiarities of their functioning, which are important in the development of teaching materials for disciplines scheduled by the curriculum of University, for "Foreign Language" in particular.

ABOUT THE SYSTEM-PHILOSOPHICAL AND INSTRUMENTAL BASIS ELITE PREPARATION OF FUTURE ENGINEERS

V.V. Likholetov, E.V. Godlevskaya
South Ural State University
(National Research University)

From interdisciplinary positions, the prospects of elite engineering education, the problems of its system-philosophical and instrumental basis are analyzed and the results of the conceptual synthesis of the model for forming the competencies of future engineers are presented. When targeting the «assemblage of an integral person» in the course of elite training, it is important to rely on entrenched social ideals in Russian society and the accumulated experience of training engineers in our country and the world.

TWO-PRODUCT PROJECT-ORIENTED MODEL FOR ENGINEERING EDUCATION

L.V. Kremleva, O.I. Bederdinova
Northern (Arctic) Federal University named after M.V. Lomonosov

Intensification of innovative development of enterprises of the real sector of the economy, the introduction of digital technologies in the area of industrial production leads to increasing needs for relevant professional competencies as an existing engineering staff and graduates of engineering specialties of universities. The article presents a methodological model of scientific-educational and scientific-research projects on the basis of the infrastructure departments of the universities of the interdisciplinary type. The experience of the implementation of the proposed model, determine the most important mechanisms and organizational forms of participation of University infrastructures in the programs of innovative development of industrial enterprises of the high technology sector of the economy.

EXPERIENCE OF USING E-LEARNING AND REMOTE EDUCATIONAL TECHNOLOGIES IN IMPLEMENTATION OF ADDITIONAL PROFESSIONAL PROGRAMS IN A TECHNOLOGICAL UNIVERSITY

L.T. Miftakhutdinova
Kazan National Research Technological University

The article is in the context of global digital society and describes relevant problems in engineering pedagogy and modern engineering staff using trends of electronic educational resources for online-learning development. There is described the certain experience in distance learning system for additional professional education: the practice of the Center for Distance Learning Education in forming conditions for active use of information and communication technologies in educational activity.

FROM "TECHNOPARK IN SCHOOL" TO "SCHOOL-TECHNOPARK". THE SECOND YEAR REALIZATION OF THE PROJECT

V.V. Kutuzov, V.N. Sheludko,
A.A. Minina, S.T. Sidorenko
Saint Petersburg State Electrotechnical University "LETI"

The article presents the second year realization of the project "Regional (network) Resource Centre of Education Development of the Leningrad Region «Kudrovo» (R(N) RCED LR)" with the direct participation of the St. Petersburg State Electrotechnical University (ETU "LETI"). R(N)RCED LR integrates resource of educational and scientific organizations general, higher and extra (additional) education, which aims to identify and develop the talents of schoolchildren of the Leningrad Region in scientific and engineering fields and provides a systematic approach to solving urgent problems in the field of technical education and development scientific and technical creativity of children throughout the territory of the Leningrad Region. Such approach allows to implement the Federal state educational standard of general education to a qualitatively new level, to improve the quality of prac-

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tice-oriented school education and build competence conscious choice of future profession, competitiveness and adaptability to the modern requirements of development the key branches of the economy, as well as the successful socialization in life.

THE EDUCATIONAL MODEL OF PROJECT-ORIENTED TRAINING OF YOUNG PROFESSIONALS TECHNICAL AND ENGINEERING DIRECTIONS IN THE CONCEPT INDUSTRY 4.0.

N.Yu. Loginov, D.G. Levashkin,
A.A. Kozlov, V.A. Gulyaev
Togliatti State University

In the article the educational model of training young specialists of engineering profile based on the implementation of the project approach in the learning process based on the concept of Industry 4.0. The project approach allows to implement future specialists of enterprises to quickly adapt to changing technology.

ON APPLYING THE PROCESS APPROACH IN DESIGNING ACADEMIC COURSE CONTENTS

L.N. Gorina, V.A. Filimonov, T.Yu. Freze
Togliatti State University

Its application turns the functioning of an organization into a controlled process. It is expressed in assigning functions to professionals and employees, arranging and optimizing documents, their logistics and other activities. The educational system should meet challenges of the professional community. Therefore, applying the process approach in the educational system strengthens the managerial competence and develops the competences of employee's work process regulation. The knowledge of modern management techniques applying the process approach as well as the knowledge about engineering and reengineering business processes of an organization are becoming essential for university graduates..

PRACTICAL ASPECT OF TEACHING DISCIPLINE APPLIED MATHEMATICS

K.Yu. Tarkhov
K.G. Razumovsky Moscow State University of Technologies and Management (the First Cossack University)

The form, content and structure of discipline "Applied mathematics" (with indicating title, number, organization and quantitative estimation of control activities) as one of the main sections in mathematical education of engineering specialists are considered.

COMPARATIVE ANALYSIS OF DIFFERENT METHODS FOR EVALUATION OF LEARNING OUTCOME

E.A. Erokhina, D.V. Khruslova
National Research University Higher School of Economics

The article describes the method of calculating the final grades in the study of the course "Algorithmization of calculations" in MIEM them. A.N. Tikhonova, higher school of Economics. The formula takes into account different types of control of assimilation of the material. The question of correlation of estimates for different types of work in the accumulated assessment is analyzed.

ELECTRONIC COURSE AS A WAY TO IMPROVE TECHNICAL STUDENTS' PROFICIENCY IN MATHEMATICS

O.V. Yanuschik
National Research Tomsk Polytechnic University
E.G. Pahomova
National Research Tomsk State University
V.A. Dalinger
Omsk State Pedagogical University

For several years students of Tomsk Polytechnic University have been taught mathematics with a web-based support. Web-based learning is a model of e-learning where 30% of the total course load is focused on students' work in the electronic environment developed within LMS Moodle platform. The objective of the electronic course is to help students master new theoretical

conceptions, consolidate learning material through practical application and organize their self-study within the scope of the subject. Our research is aimed at identifying the difficulties the first-year students face while studying mathematics and making necessary adjustments to the content of the electronic course with the purpose of helping students to overcome these difficulties. In addition, the research presents the comparison of the exam results of studying mathematics via web-based programs, the electronic course outcomes and the exam results of studying mathematics without web-based support, which is important for defining whether studying material via electronic resources influences the mark a student gets.

THE USE OF MODERN MANAGEMENT TECHNOLOGIES IN ENGINEERING EDUCATION WITH THE AIM OF IMPROVING ITS QUALITY

A.L. Shepelev, E.A. Shepeleva
Northern (Arctic) Federal University

The article analyzes the types of management technologies used in the system of engineering education, with examples of their use and opportunities for updating in accordance with the requirements, regulated by the Federal law "On education in Russian Federation". Recommendations in choosing the type of managerial technologies in engineering education with the aim of improving its quality in modern conditions are provided in the article.

TRAINING OF BACHELORS FOR INTERDISCIPLINARY ENGINEERING PROJECTS DURING THE PROCESS OF TEACHING PROFESSIONALLY ORIENTED FOREIGN LANGUAGE

N.N. Elsakova
Northern (Arctic) Federal University

The article proposes a method and describes the practical experience of training future engineers for interdisciplinary engineering projects on the basis of project profession-cognitive activity during the process of teaching professionally oriented foreign language.

BUSINESS GAME IN THE CONTEXT OF POST-INDUSTRIAL DEVELOPMENT

B.V. Korneychuk
National Research University Higher School of Economics

Studying business simulation games theory and practice in the context of post-industrial development provides justification for the wide use of this educational tool as a means of individualization of the learning process – and enables to evaluate its effectiveness as well as to identify challenges and prospects thereof. We have developed and tried out an empirical method to evaluate the coverage of business games among university students. The investigation showed backwardness of the Russian practice of use of business games.

THE COMMONWEALTH HIGHER EDUCATION INDUSTRIAL PRODUCTION

G.M. Korotkova, K.V. Motorin
Togliatti state University

Long-term cooperation of production and design Association "Electromechanics" with Togliatti state University allowed to solve the problems of equipping the laboratories of the training profile "welding Equipment and technology" with industrial equipment, which ensured the formation of engineering thinking of graduates.

POTENTIAL OF NETWORK COOPERATION BETWEEN HEI AND CORE ENTERPRISE IN THE FORMATION OF PROFESSIONALLY ORIENTED SKILLS OF STUDENTS – FUTURE SPECIALISTS ON THE EXAMPLE OF FESTU AND FER

N.A. Kuzmina
Far Eastern State Transport University

The article is devoted to the possibilities of network cooperation between HEI and core enterprise on the example of the Far Eastern State Transport University and the Far Eastern Railway – the branch of JSC "Russian Railways".

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CURRENT DEFECTS OF THE RUSSIAN ECONOMY ELECTRIC POWER INFRASTRUCTURE DEVELOPMENT

S.V. Kiselev
Kazan National Research Technological University
A.V. Krasnov
Tatenergo Joint-Stock Company

The authors critically analyse the most important tendencies, directions and consequences of reforms in the electric power industry, conflicts of economic entities' interests in electric power sector, the reasons for low investment attractiveness of the industry, the effectiveness of the industry management mechanism and tools, and, consequently, the growing average age of equipment, continuous growth of energy prices for end consumers. The authors believe that the key reasons for the analysed phenomenon of aggregate of defects in electric power industry lie in the recent significant structural transformation of economy, which is not supported by technological and economically outdated structure of existing electric power capacities and networks, which naturally led to an increase in the tariff load on end consumers, a decrease in the load of generating stations and a drop in capability utilization index. As a result, extremely unbalanced excess capacities were formed, leading to degradation of the entire electric power complex.

ANALYSIS OF DYNAMIC CHANGES IN THE SUSTAINABLE COMPONENT (CORE) OF INNOVATION CLUSTERS

N.V. Trifonova, I.L. Borovskaya,
M.Z. Epstein
Saint-Petersburg State University of Economics

The paper is dedicated to the most important changes in the clusters' sustainable component (core) determined the transition to a new type of innovation clusters. The innovation cluster is defined by the authors as a new type of local concentration and interpenetration of research potential, business and manufacturing results of universities and business community. The result of the review allows the authors to identify the

dynamic nature of the core which is considered namely as a cumulative intellectual result of the innovation cluster functioning. The approach implemented by the authors connects the transformational changes of innovation clusters with the dynamics of the core, to define a new principle of the typology of innovative clusters.

CREATIVE POTENTIAL OF THE TEACHER OF THE RESEARCH UNIVERSITY IN THE SYSTEM OF ENGINEERING EDUCATION

R.Z. Bogoudinova
Kazan National Research Technological University

The article presents the problems of engineering education, the requirements for the results of professional activity of university teachers, new approaches to training, and the upgrading of the qualifications of teachers of modern higher education. The personal potential is revealed as the basis and the mechanism for ensuring the innovative activity of the teacher. Interactive methods are presented in the process of teacher training.

PEDAGOGICAL COMPETENCE OF THE HIGH SCHOOL TEACHER

M.R. Ziganshina, S.A. Karandashov,
V.A. Mendelson
Kazan National Research Technological University

The theoretical aspects of the pedagogical competence of the teacher of higher education are studied in the scientific article. The authors emphasize the relevance of the topic under study. Their own outlines his own understanding of the concept of "competence" has been outlined and personal understanding of the essence of the competence of the teacher of higher education has been described.

ENGINEERING ETHICS AND TECHNICAL UNIVERSITY GRADUATE'S COMPETENCES

A.M. Blinov, E.N. Ovchinnikova,
O.G. Bykova
Saint-Petersburg Mining University

The article is concerned with the approach to formation of technical university gradu-

ate's competences from positions of professional ethics of engineers. The short analysis of the concept of engineering ethics is given, examples of engineering communities codes of ethics from different countries are given. The authors offer the methods of training of students within educational programs of training of future engineers.

UPDATING THE CREATIVE COMPONENT OF A PROFESSIONAL MOBILITY OF STUDENTS IN THE EDUCATIONAL PROCESS OF THE UNIVERSITY

T.A. Fugelova
University of Tyumen

Formation of the creative relationship of future engineers to the world as a basis for "entering" into culture, inclusion in innovative activities is a condition for the formation and development of their professional mobility. Professional mobility is manifested in the creative activity, ability to meet the growing demands of the profession and culture productively.

THE ROLE OF FOREIGN-LANGUAGE COMMUNICATIVE COMPETENCE IN THE COURSE OF COMPETITIVE SPECIALIST TRAINING

V.A. Mendelson, M.R. Ziganshina
Kazan National Research Technological University

The ways of special programs development for training in foreign languages, primarily English, the future specialists in tourism, service and hospitality sphere are considered in the article. In addition to the competences connected with development of professional knowledge and skills, the foreign language knowledge undoubtedly has paramount value for future graduates. Modern methods and forms of education not always allow reaching the level demanded for fast communication with foreign experts in this area and to providing services to foreign guests. Introduction of new programs, forms and methods of training will make development of colloquial skills of a foreign language during the limited time period of time possible and will increase competitiveness of future specialists, our graduates, in labor market.

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CONCEPT OF FORMATION, IMPLEMENTATION AND PRACTICAL APPLICATION OF QUALITY MANAGEMENT SYSTEM IN EDUCATIONAL INSTITUTION

E.S. Mishchenko, S.V. Ponomarev
Tambov State Technical University

Recent research has shown that in order to form a quality management system (QMS) in an Institution of Higher Professional Education (IHPE) it is recommended to use the model, requirements to which are stated in the international standard ISO 9001:2015 (GOST R ISO 9001–2015). There are 35 basic concepts of projecting and practical application of QMS, described in 7 groups in order of their conformity to quality management principles, specified in GOST R ISO 9000–2015. The experience suggests that only comprehensive implementation of given in the article concepts (in the scope of an entire educational institution) allows to implement and apply QMS in IHPE successfully.

QUALITY FUNCTION DEPLOYMENT IN HIGHER EDUCATION

N.V. Dubrovskaya, E.S. Mishchenko
Tambov State Technical University

The aim of this paper is to determine the use of Quality Function Deployment (QFD) in sphere of Higher Education (HE). The research is qualitative and based on the literature review. In HE QFD method is often used for curriculum design and development but its application to academic programs for including competencies required by employers is poor. This paper determines the possible path for further researches.

РЕЕСТР ОБРАЗОВАТЕЛЬНЫХ ПРОГРАММ, АККРЕДИТОВАННЫХ АИОР

Профессионально-общественная аккредитация образовательных программ (результаты)

Ассоциация инженерного образования России более 20 лет работает над созданием и развитием системы профессионально-общественной аккредитации образовательных программ в области техники и технологий в России.

АИОР является членом самых авторитетных международных альянсов по аккредитации инженерных образовательных программ, таких как Международный Инженерный Альянс (International Engineering Alliance), Вашингтонское соглашение (Washington Accord), Европейская сеть по аккредитации инженерного образования (European Network for Accreditation of Engineering Education, ENAEE). АИОР – единственная организация в России, имеющая право присуждать аккредитованным программам европейский знак качества EUR-ACE label.

Профессионально-общественная аккредитация инженерных образовательных программ, проводимая АИОР, признана в большинстве развитых стран мира и является международной.

По результатам на 01.06.2018 процедуру профессионально-общественной аккредитации АИОР прошли 517 образовательных программ (первого и второго цикла) 76 ведущих вузов России, Казахстана, Киргизии, Таджикистана, Узбекистана. Европейский знак качества EUR-ACE label присвоен 435 программам. Кроме того, аккредитовано 5 образовательных программ среднего профессионального образования. Списки аккредитованных АИОР программ регулярно публикуются на сайтах АИОР (www.ac-raee.ru/ru/reestr_programm.htm), ENAEE (eurace.enaee.eu), FEANI (www.feani.org/european-engineering-education-database/eed-database), Washington Accord (www.ieagreements.org), в Системе мониторинга профессионально-общественной аккредитации (accredpoa.ru).

Наличие у вуза образовательных программ, имеющих международную аккредитацию, способствует укреплению престижа вуза в России и в мире, привлечению российских и иностранных студентов, расширению академической мобильности студентов, разработке совместных с зарубежными университетами образовательных программ, дает возможность выпускникам вуза претендовать на получение статуса профессионального инженера в международных регистрах АПЕС, FEANI.

Реестр образовательных программ, успешно прошедших процедуру профессионально-общественной аккредитации в АИОР, приводится далее.