

## Summary

### REALIZATION OF INTERDISCIPLINARY TRAINING IN A VIRTUAL ENVIRONMENT OF PROFESSIONAL ACTIVITIES

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Adherence to standards of international initiatives CDIO provides shift to a paradigm of the activity of learning and interdisciplinarity. The article in relation to the oil and gas industry shows that the reconstruction in the technical university of virtual engineering environment as a system of interconnected computer workstations for team of different specialists which are working in the oil and gas companies and a set of digital models of objects and technological tools more suited to implement this paradigm in practice.

### INTERDISCIPLINARY PROJECTS FOR ENGINEERING EDUCATION: FOCUSING THE GAP BETWEEN TEACHING PROFILE AND PROFESSIONAL SKILLS

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There is an urgent need for a systematic and shared global model of engineering accreditation that can be used to assess global professional skills and attributes of engineering graduates. The aim of the current paper is double. While on the one hand it presents the added value of the EUR-ACE accreditation system as a European best practice example to encourage the mobility of engineering graduates, on the other one it presents a survey on the graduates' opinion on the level of training in the different technical and non-technical areas, comparing the teaching profile with the actual needs of the professional working environments.

### NATURAL SCIENCE AND HUMANITIES CONCEPTS IN INTERDISCIPLINARY PROJECTS: BRIDGE THE GAP BETWEEN HUMANISTS AND SCIENTISTS

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The attitude of SciMat is just one sentence: "Science is to understand Nature". To make this possible knowledge must struggle for a unified perspective. Science Matters (SciMat) is the new discipline that treats all human-related matters as part of science. SciMat is about all human-dependent knowledge, wherein, humans (the material system of Homo sapiens are studied scientifically from the perspective of complex systems using unifying principles that can be found in different paradigms such as fractals and chaos. SciMat's definition of science: Science is human's pursuit of knowledge about all things in Nature, which include all (human and nonhuman) systems, without bringing in God or any supernatural.

### INTERDISCIPLINARITY IN ENGINEERING EDUCATION: TRENDS AND CONCEPTS

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Interdisciplinarity in engineering is a topic whose potential is not always matched by actual success. A perspective is presented here on when interdisciplinarity is capable of being helpful to success. Different examples of interdisciplinarity are presented in fields like neuroscience, films, computer games, gene development, and power grids. The role of interdisciplinarity complexity in defining both the wealth of a nation and the value of university education are also discussed.

### INTERDISCIPLINARY PROJECT MANAGEMENT OF STRUCTURE TRANSFORMATIONS IN STAFF TRAINING IN NUCLEAR INDUSTRY

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In the article the topical questions concerning increase in the competence level of experts, carrying out the activity in the sphere of nuclear branch are raised. The role and place of innovations in social development of the nuclear industry, the purpose and the problem of innovative activity are revealed. The priority directions in the sphere of modernization and technological development of Russian are stated, basic stages of staff training are presented. The information and procedural model of the management mechanism is shown by interdisciplinary projects of structural transformations of nuclear branch.

### INTERDISCIPLINARY CURRICULUM PROJECTS AT THE CONFLUENCE OF SCIENCE AND ART: PROJECT DEVELOPMENT EXPERIENCE AND FIRST RESULTS

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The article presents a review of interdisciplinary projects developed and implemented during the last 5 years at the National Research University of IT, Mechanics and Optics (NRU ITMO). The overall concept of such implemented projects fits into the 3D domain scheme "Science-Arts-Techne" as a basis in designing integrated subject ontology. The establishment of an on-line exhibition "Museum of Optics" embracing a harmonious blend of artifacts and art objects with a science

frame and up-dated information communication technologies (ICT) furthered new possibilities and prospects which are described in the article below. Copyrighted programs and examples of student creative works in such courses as "Optics and Arts: in the retrospect of time" and "Optics and Arts: theatrical projection" are presented.

### EXPERIENCE IN IMPLEMENTING INTERDISCIPLINARY PROJECT AT TGU IN TERMS OF «FORMULA- STUDENT» TEAM WORK

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Implementation of an interdisciplinary project at university may only be possible when a student team for a task to be completed is organized and there are appropriate facilities and software. The main condition for sustained student design activity is the presence of regulations which enable to handle a permanent inflow of new participants without replacing the key ones. Besides, the instructional material and modules incorporated into the current education programs guarantee the highest quality graduate training within various subject areas. Such interdisciplinary project is being implemented in terms of "Formula-Student" at Togliatti State University.

### INTERDISCIPLINARY DIPLOMA - PROJECT IN "CIVIL ENGINEERING"

A.L. Shepelev, E.A. Shepeleva  
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Recommendations, defining the scope of graduate qualification papers on organizational-engineering issues within the framework of interdisciplinary diploma-project "Civil Engineering,"

were designed on the basis of diploma-project assessment of Specialists and Bachelor students in "Civil Engineering." Specifications of time scheduling and their reference data have been determined.

#### THE INTERDISCIPLINARY PROJECT IN ENGINEERING EDUCATION

E.S.Bykadorova, S.A.Veselova  
Siberian Transport University

The paper focuses on the interdisciplinary project aimed at developing engineering student's competence in foreign language within the "Bachelor – Master – PhD" education system. Complex approach is proposed to be used as the theoretical and methodological basis of project elaboration. The proposed multimedia learning package has been developed for the students of Siberian Transport University and displayed in Moodle.

#### TOWARDS THE ISSUE OF INTERDISCIPLINARY PROJECT IMPLEMENTATION IN ENGINEERING EDUCATION

I.G.Kartushina, I.V.Garifullina,  
E.S. Minkova.  
Immanuel Kant Baltic Federal University.

The paper analyzes the function of interdisciplinary projects in the process of engineering staff training. It reveals the potential of a project method in the framework of the practice oriented approach while training students in a technical university.

#### IMPLEMENTATION OF INTERDISCIPLINARY PROJECTS WITHIN BACHELOR DEGREE PROGRAM IN "QUALITY MANAGEMENT" (AN EXAMPLE)

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National Research University Moscow  
Institute of Electronic Technology Moscow, Russia

The article describes an example of an implemented interdisciplinary project within the framework of Bachelor Degree program 221400.62. The following aspects were defined: experimental analysis, advantages and specific characteristics of such projects.

#### IMPLEMENTATION OF CDIO INITIATIVE IN BACHELOR'S PROGRAMS OF MANAGEMENT SPECIALTIES AT ST.-PETERSBURG ELECTROTECHNICAL UNIVERSITY

I.V. Pavlovskaya  
Saint Petersburg Electrotechnical University "LETI"

The article studies the mechanisms to implement the elements of CDIO Initiative in management specialties by the example of Bachelor's program "Quality Management" at Saint Petersburg Electrotechnical University "LETI"

#### EDUCATION OF ENGINEERS IN RUSSIA

L.B. Khoroshavin  
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T.A. Badina  
Ural State Mining University, Yekaterinburg

The article discusses the need for education and training of specialists in our country in their harmonious unity, beginning from school and enhancing in engineering universities. The basic concept of educating creative individuals with high level of knowledge, intelligence and patriotism for strengthening the unity and progressive development of Russia is presented.

SUMMARY

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#### IMPLEMENTATION OF PFUR STRATEGIC DEVELOPMENT PROGRAM IN DEPARTMENT OF OIL-FIELD GEOLOGY AND MINING ENGINEERING

A.E.Vorobyev, Ye.V. Chekushina,  
I.L.Kapitonova, A.V. Sinchenko  
Peoples' Friendship University of Russia

This paper presents the operating results of the department of Petroleum Geology and Mining Engineering (PGMPE) aimed at engineering education development. It also describes the activities held in the framework of Strategic Development Program (SDP).

#### DESIGNING GENERAL ENGINEERING MODULE FOR BACHELOR'S PRODUCTION AND TECHNOLOGY PROGRAMS

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The article describes the experience of "General Engineering" module development for the educational program of Higher engineering school of UrFU. Being developed in the context of relevant international projects and initiatives, the module is designed as interdisciplinary, practice-oriented and student-centred. There are examples of the module learning outcomes correlated with the methods of their development and assessment. The main idea of the module design is the development of the process map which includes the module learning outcomes, achievement indicators, methods to define the module learning outcomes and the course content. Special attention is paid to assessment tools, in particular to the interdisciplinary project.

#### APPLICATION OF LEARNING OUTCOMES APPROACH IN EDUCATION PROGRAM DESIGN

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The paper provides methods of education program design based on learning outcome approach. It describes the application of this approach in different countries and suggests the ways of developing modular structure of education programs, projects and interdisciplinary tasks.