ӘЛ-ФАРАБИ атындағы
ҚАЗАҚ ҰЛТТЫҚ УНИВЕРСИТЕТІ

КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ УНИВЕРСИТЕТ
имени АЛЬ-ФАРАБИ

«БІЛІМ БЕРУ БАҒДАРЛАМАЛАРЫН ЖАҢҒЫРТУ: АККРЕДИТАЦИЯ ЖӘНЕ КАДРЛАР ДАЙЫНДАУ САПАСЫНЫҢ КЕПІЛІ»

46-ғылыми-әдістемелік конференция

МАТЕРИАЛДАРЫ

14-15 қаңтар 2016 жыл

1-кітап

МАТЕРИАЛЫ

46-й научно-методической конференции

«МОДЕРНИЗАЦИЯ ОБРАЗОВАТЕЛЬНЫХ ПРОГРАММ: АККРЕДИТАЦИЯ И ГАРАНТИЯ КАЧЕСТВА ПОДГОТОВКИ КАДРОВ»

14-15 января 2016 года

Книга 1

Алматы 2016

Mussiraliyeva Sh.

IMPLEMENTATION A TRAINING METHODOLOGY FORTHE FORMATION OF ENGINEERSAT MASTERS LEVEL IN THE DEVELOPMENT OF ADVANCED INDUSTRIAL INFORMATICS SYSTEMS

Latest requirements in production, business and society have a strong influence on teaching methods and content of engineering education today. Modern engineering projects cover technical, but also management, social, economic, and many other aspects that significantly affect their complexity. Specificity of tools and mechanisms for formation of a new quality in a competence-based education system requires a careful study of Kazakh and foreign experience in innovative education as well as ways of introducing them into traditional educational system. The problem of training's quality is a central issue in their demand for domestic economy and international recognition, which is directly related to the content of education and implementation technology of educational programs. Nowadays, throughout the world there is an active transformation of engineering education aimed at developing competencies required by professionals, in particular at ability of their application in practice

Al-Farabi Kazakh National University is the leading institution of the system of higher education of the Republic of Kazakhstan.The university consists of 14 functioning faculties, 98 departments, 20 scientific research institutes and centers, a techno-park; more than 2 000 professors, doctors, scientific candidates and PhD's, more than 100 academicians of the largest academies, about 30 honored figures of the Republic of Kazakhstan, more than 30 laureates of State and nominal awards of RK and 40 laureates of the young scientists' awards, 45 fellows of state scientific fellowships. More than 18 000 students and masters at the multilevel system of higher professional education study in the university. We cooperate with 418 largest international universities of the world on the realization of joint international educational programs, exchange programs for students and internship.

The Information Systems Department of KazNU named al-Farabi is committed to providing undergraduate and graduate students with the knowledge and skills required to plan, develop, and deploy technology-based business solutions. Students are equipped with a solid understanding of the strategic role of information systems in organizations and the influential role of technology in society.The department trains specialists in the field of information systems, recruits to the specialty:

Bachelor's Degree
6B070300 – Information Systems;
6B070200 – Automation and Control;
Master's Degree
6M070300 – Information Systems;
6M100200 – Information Security Systems;
6M070200 – Automation and Control;
Ph.D.
6D070300 – Information Systems,
6D100200 – Information Security Systems,
6D070200 – Automation and Control.

Teachers of IS department are taking part in the three educational TEMPUS projects now.

TEMPUS PICTET. Project is designed for strengthening of the links between education and ICT business by enhancing the RU-KZ system of professional ICT-training by using EQF, building effective System of professional ICT-Education, setting up Network of ICT-training centers in RU/KZ universities for enforcing infrastructure and framework. Wider objective is the improvement of the quality of ICT-specialists preparation by building an effective System of professional ICT-education and strengthening links with business environment in RU and KZ.

The project specific objectives:

- To create e-qualifications framework for RU and KZ
- To establish a network of ICT-training centers in PC universities
- To create the new methodology of professional ICT-training
- To elaborate new curricula for ICT-qualifications and introduce them into practice of professional training, providing with teaching materials and learning environment
- To develop a quality assurance mechanisms ensuring the quality of professional training in ICT
- Dissemination of the System of professional ICT-education, new methodology, teaching materials and methods among ICT-educators and ICT-business.

TEMPUS PROMIS. PROMIS stands for **PRO**fessional network of **M**aster's degrees in **I**nformatics as a **S**econd Competence.

Project'smainGoals:

- Extension of ERAMIS network in Central Asia
- Improvement of the academic quality of the network
- Improvement of the vocational focus of the master degrees in computer sciences in different ways
- Establishment of strong relationships between companies and universities
- Adapting teaching process to the students working in parallel of the studies
- Improvement of the network by sharing courses and pedagogic material

TEMPUS MEDIS.

In winter of 2014 an international project MEDIS (A Methodology for the Formation of Highly Qualified Engineers at Masters Level in the Design and Development of Advanced Industrial Informatics) started as part of TEMPUS IV - 6th Call for proposals program. Given the above, this project is an excellent opportunity to adopt innovative teaching methods of European universities for quality education of engineering students. MEDIS project aims to adapt master trainingprograms for engineering specialties from EU partner universities by including in programs the Advanced Industrial Informatics Specialization Module (AIISM) aimed at training professionals in engineering design and development ofindustrial information systems using microcomputers, industrial computers, mobile and cloud computing platforms for decentralized control and management of complex processes. Such courses willcontribute to preparation of highly skilled engineers who will be able integrate easily into labor market. Moreover, involvement of such engineers in production will help increase productivity and competitiveness of companies, thus contributing to development of the whole society [1].

The objectives of the project are:

- offer PBL (problem-based learning) methodology and develop resources for teaching the proposed modern industrial informatics specialization module (AIISM);
- review the curricula of universities in partner countries and adapt AIISM in order to integrate it into specific training programs in each partner country;
- develop training courses and train teachers, support and administrative staff in the partner countries;
- implement AIISM-PBL methodology in the partner countries and contribute to its further use;
- evaluate the results of AIISM implementing;
- disseminate experience and resultsof the project among interested parties.

On 19-22 of February, 2014 an organizational meeting of project participants was held in the Polytechnic University of Valencia (Spain), and on 23-24 of October, 2014, a regular meeting of MEDIS project executors was held in the Technical University of Sofia (Bulgaria). At this stage, teachers of information systems department carried out a possibilities analysis of AIISM integration in the master curricula and trainings for trainers for courses under consideration has started. Project participants from the EU university partners have developed educational programs based on problem-oriented and project-oriented approaches to learning.

The methodology aims to create a working environment for students that is as close as possible to the working environment in industrial companies.

Theteachingconsistsof:

1. Lectures: that describe the main idea by showing examples of corresponding applications.
2. Seminars: that discuss solutions to the stated real problem proposed by the group.
3. Laboratory classes: where students apply the proposed solution.
4. Mini-projects: that teach to plan, design and develop solutions for effective control of distributed and complex manufacturing processes.

The developed methodology is mainly based on problem based learning (PBL) and other accepted active learning techniques with the intention of creating a realistic working environment which the student will experience in his future career. This model is based on the educational goals proposed by the Accreditation Board for Engineering and Technology (ABET) [2] and different experiences [3,4].

Proposed method of learning requires specially equipped laboratory classes (industrial computers, microcomputers, simulators, etc.). At this stage of the project works on the purchase of related equipment is being carried out. AIISM moduleconsistsof 5 sub-modules:

- Industrialcomputers;
- Microcomputers;
- Mobile and cloud computing platforms;

- Industrialnetworksandprotocols;
- Industrialcontrollersandsimulators.

Project executors from Kazakhstan and foreign countries:

- Universitat Politecnica de Valencia (Spain)
- MalardalenUniversity (Sweden);
- Technical University of Sofia (Bulgaria);
- UniversityofStuttgart (Germany);
- UniversityofPorto (Portugal);
- al-Farabi Kazakh National University (Kazakhstan);
- S.Toraigyrov Pavlodar State University (Kazakhstan);
- Saint Petersburg State Polytechnic University (Russia);
- PetrozavodskStateUniversity (Russia);
- Odessa National Polytechnic University (Ukraine);
- Ukrainian National Technical University (Ukraine).

According to the plan of MEDIS project the new curriculums were elaborated for the specialties of Information Systems,Information Security Systems, Automation and Control. Five new courses will be introduced during 2015-2016 educational year.Parts of curricula for corresponding specialties are shown in tables 1,2,3.

Table 1.6M070200– Automation and Control

Module	**Code**	**Disciplinename**	**Credits**	**Semester**		
				I	II	III
Basic disciplines						
1.2. Elective module	Elective module #2 ASUSTMSSAU 5206	Microcomputers	3	1+1+1		
	Elective module #3 IK 5207	Industrialcomputers	3	1+1+1		
	Elective module #4 KSUTP 5208	Industrialcontrollers andsimulators	3		1+1+1	
Specialized elective disciplines						
2.2. Elective module	Elective module #3 MOKP 6307	Mobile and cloud computing platforms	3			1+1+1
	Elective module #4 6308	Industrialnetworksa ndprotocols	3			1+1+1

Table 2.6M070300– Information Systems:

Module	**Code**	**Disciplinename**	**Credits**	**Semester**		
				I	II	III
Basic disciplines						
1.2. Elective module	Elective module #2 ISP 5205	Industrialnetworksa ndprotocols	3		1+1+1	

Table 3.6M100200–Information Security Systems:

Module	**Code**	**Disciplinename**	**Credits**	**Semester**		
				I	II	III
Basic disciplines						

1.2. Elective module	Elective module #3 MOKP 5307	Mobile and cloud computing platforms	3	1+1+1		

References

1. Welcome to MEDIS. 2015. Retrieved from www.medis-tempus.eu.
2. ABET. 2012. Criteria for accrediting engineering programs. Retrieved 03-21-12 from http://www.abet.org/DisplayTemplates/DocsHandbook.aspx?id=3143.
3. Hassan Mohamed Houcine and others "A Hybrid Structured Methodology for Developing Computer-based Industrial Computer Systems" International Conference on Frontiers in Education (FECS). LasVegas (EE.UU.) 2012
4. Houcine Hassan Mohamed and others "An innovative proposal for the Industrial Informatics subject". International Conference on Engineering Education (ICEE). Valencia (Spain) July 2003
5. Yessengaliyeva Zh., Mussiraliyeva Sh. "A Methodology for the Formation of Highly Qualified Engineers at Masters Level in the Design and Development of Advanced Industrial Information Systems (MEDIS project)". International Conference "Competence-oriented system of knowledge evaluation". Kazakhstan, Almaty, 17-18 january 2015.
6. Al-Farabi Kazakh National University. 2015. Retrieved from http://www.kaznu.kz/en.

Tukeyev U., Rakhimova D.

ON THE EXPERIENCE OF THE FORMATION OF AN INTERNATIONAL EDUCATIONAL PROGRAM OF DOUBLE-DIPLOMA TRAINING MASTERS OF COMPUTER SCIENCE AS A SECOND COMPETENCE

1. Проект ТЕМПУС PROMIS.

In Al-Farabi Kazakh National University on the Mechanics and Mathematics Department in the 2013-2016 years is performing TEMPUS project PROMIS «PROfessional network of Master's degree in Informatics as a Second competence". Partners in the project are 5 universities in Europe, 2 from each of the University of Central Asia / 1 /.

Tempus PROMIS project objectives are:

1) improving the professionalization of master's programs by establishing strong links with local businesses in the sectors of IT and ICT;

2) the development of the participation of enterprises in the learning process online master's degree programs.

3) implementation of the Master's programs Master by adapting training schedule to the students working at the enterprise.

WHAT WE HAVE NOW in current situation:

1. Join educational program PROMIS of Master's Informatics as second competence.
2. Training mobile seminars for trainers in european universities.
3. Agreements between Al-Farabi KazNU and other universities in frame of project PROMIS.
4. Educational process of Master's Informatics as second competence in KazNU.
5. Mobility of PROMIS masters by financing of KazNU in the European universities.
6. Collaborations in branch of preparing of PhD students.

2. JOIN EDUCATIONAL PROGRAM OF MASTER'S INFORMATICS AS SECOND COMPETENCE

Name of the discipline	**Lec+ lab (hours), ECTS**
I semester (15 weeks)	
Algorithms and Data Structures 1	30+30, 6 ECTS