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SHAKARIM UNIVERSITETI SEMEY

Development of two cycle innovative curricula in microelectronic engineering – DOCMEN

REPORT 30M (up to June 2018)

Shakarim State University of Semey

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SHAKARIM UNIVERSITETI SEMEY

1.1. Curricula/ UPDATED COURSES

Table 1.1.1. UPDATED COURSES

Course №	Title of the course and in which program it is taught (Bachelor, Master)	Its volume (in ECTS	Number of students participating in the course	Name new elements in the course and and estimate the percentage they represent in relation to the preexisting course	Link to the course on the university page	Accreditation and recognition: Specify the date when the course was accredited in the curriculum
Course 1	«Pulse and digital control systems», M	5	9	Pulse Code Modulation (PCM) encoding decoding & reconstruction sampling rate aliasing, undersampling and oversampling synchronization Pulse Amplitude Modulation(PAM) sampling theorem / Nyquist aliasing reconstruction time division multiplexing (TDM)	http://library.semgu.kz/	5.06.2017 r
Course 2	«Digital and analog chips», B	5	31	CAD tools for design of analogue and mixed-signal integrated circuits (CADENCE) Design and simulation of digital circuit (symbol creation, circuit simulation, application) Semiconductor chips assembly Specialized assembly methods Mounting technological map development	http://library.semgu.kz/	5.06.2017 r
Course 3	«Electronic » B	5	31	Assembling technology in microelectronics. Assemblylevel Micro-electro-mechanical systems assembly Components soldering. Critical parameters definition Mounting quality control. Visual control	http://library.semgu.kz/	5.06.2017 r

∑(Total number of updated courses) = 7

∑(Total number of ECTS) = 35

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Course 4	«Information-control systems» B	5	31	Modulation (Overview), Analog modulation; Digital modulation, Modulation Methods FSK, PSK, QPSK, Data Coding Theory: DES, AES, RSA; Data transmission standards, Satellite Communication Systems, Satellite Services; Satellite Repeater, Tracking, Telemetry & Telecommand	http://library.semgu.kz/	5.06.2017 г
Course 5	«Industrial Controllers» B	5	31	Network the ground station and its extension. TCP/IP Client/Server System, Algorithms and Data Structures; AVR-microcontrollers, fundamentals of the C-language, important software-tools,Informatics and wireless data transmission for nano satellite applications	http://library.semgu.kz/	5.06.2017 г
Course 6	Applied Electronics,B	5	15	Fundamentals of superconductivity High Temperature Superconductivity (Overview of Superconducting Materials with Tc Higher than 23 K) Applications of Superconductor in Electronics eg. Electromagnetic Energy Converters	http://library.semgu.kz/	5.06.2017 г
Course 7	Digital Circuitry, B	5	15	Network the ground station and its extension. TCP/IP Client/Server System Algorithms and Data Structures, AVR-microcontrollers, fundamentals of the C-language, important software-tools Informatics and wireless data transmission for nano satellite applications	http://library.semgu.kz/	5.06.2017 г

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1.1. Curricula/ NEW COURSES

Table 1.1.2. NEW COURSES

Course №	Title of the course and in which program it is taught (Bachelor, Master)	Its volume (in ECTS)	Number of students participating in the course	Link to the course on the university page	Accreditation and recognition: Specify the date when the course was accredited in the curriculum
Course 1	Design of nanoscale integrated circuits (B)	5	20	http://library.semgu.kz/	5.06.2017 г
Course 2	Verification of the property of microelectronic components and devices by impedance spectroscopy (B)	5	20	http://library.semgu.kz/	5.06.2017 г
Course 3	Nanoscale electronic devices and novel simulation techniques (B)	5	20	http://library.semgu.kz/	5.06.2017 г
Course 4	Bio-Nanoelectronic devices for biosensing and nanocomputing (B)	5	20	http://library.semgu.kz/	5.06.2017 г
Course 5	Технологии монтажа в микроэлектронике (B)	5	20	http://library.semgu.kz/	5.06.2017 г
Course 6	Technologies and Applications of Superconductive Materials (B)	5	20	http://library.semgu.kz/	5.06.2017 г

∑(Total number of new courses) = 6

∑(Total number of ECTS) = 30

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1.2. FUTURE COURSES IN MICROELECTRONICS

Table 1.2. FUTURE COURSES IN MICROELECTRONICS			
Course №	Title of the course and in which program it will be taught (Bachelor, Master)	Its volume (in ECTS) (Approximately)	Number of students expected to participate in the course (Approximately)
Course 1	Practice oriented curricula for micro electronics and data transmission	5	20
Course 2	Microelectronic technologies for alternative sources of energy	5	20
Course 3	Packaging technologies in microelectronics	5	20
Course 4	Project management	5	20

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2. Training and teaching activities

Training at Technical University of Sofia (19.06.2017 – 30.06.2017)

Theme of training	Teacher
Desing of nanoscale mos ics	Slavka Tzanova
Nanomaterials	Mariya Aleksandrova
CAD in micro- nanoelectronics	George Angelov
AMG-Technology – small company for research, design and fabrication of microsystems	Marin Hristov
Nanocoatings and nanostructures – theory and practice	Mariya Aleksandrova







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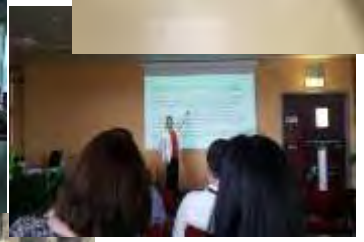
SHAKARIM UNIVERSITETI SEMEY

2. Training and teaching activities

Training at Politecnico di Torino (01.07.2017 – 21.07.2017)

Theme of training	Teacher
BIO/CMOS interfaces and co-design	Prof. Sandro Carrara
Micro/nano-electronics and photonics	G. Perrone, M.Visintin D. Demarchi A. Vallan
Principles of micro/nanoelectronic devices: design and fabrication. Example and modelling of a MEMS accelerometer.	D. Demarchi
Photonics I: introduction, photonics for industrial and biomedical applications	G. Perrone
Characterization of Mems and optical sensors	A. Vallan, G. Perrone
Photonics II: applications to communications	R. Gaudino
Industrial applications of photonics	G. Perrone
smart society: User-driven design methodologies	F. Corno
Sensor networks	C. Chiasserini
Mobile applications for sensor data	G. Malnati
Data science for Sensor Data	T. Cerquitelli
Internet of things and ambient intelligence (IoT architectures and programming methods; examples of IoT devices and services	F. Corno



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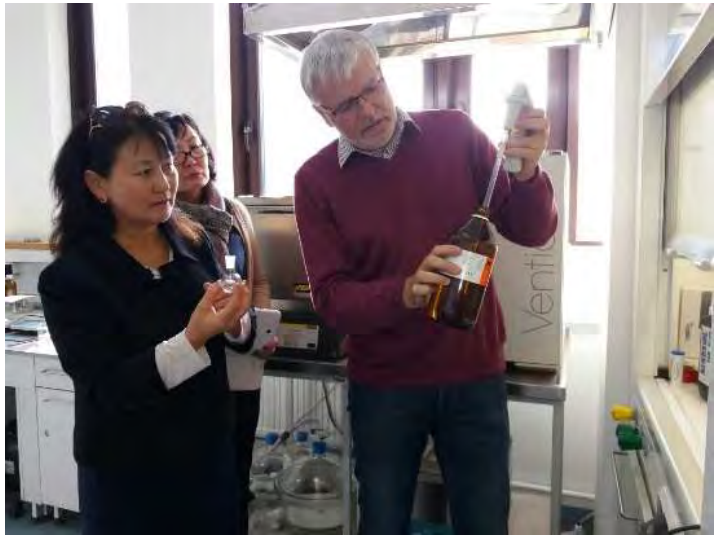
2. Training and teaching activities

Training at Cracow University of Technology (25.09.2017 – 29.09.2017)

Theme of training	Teacher
Microelectronic technologies for alternative sources of energy	Janusz Walter
Project management (business planning, funding, marketing, performance)	Kinga Korniejnko
ECAD for Microsystems: ELECTRONIC DESIGN AUTOMATION COURSE	Kinga Korniejnko
Soft Skills for Engineers	Elena Eyngom



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3. Regional Cooperation

- As a result of the project dissemination activities, agreements were signed:

L.LP. KAZPOLIGRAF

D. Serikbayev East Kazakhstan state technical university

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3. Industrial Partners

Table 3.3. INDUSTRIAL PARTNERS	
Please, provide a list of industrial partners, with which you maintain communication and which could be interested in hiring your graduates	List of industrial partners: L.LP. KAZPOLIGRAF L.L.P. Kondiz L.L.P. Devices and automatics L.L.P. Reltech L.L.P. Kigros L.L.P. RTS – Installation LLP SemeyVodokanal

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4. Equipment

№	Name	Amount	Speciality
1	Lenova S50. 30 all in one. display 23", 1920*1080. Intel(R) Core i5 5200U, DDR3 8192 Mb, nVIDIA GeForce 820A 2048Mb, HDD 1Tb, Web, DVD-RW, Wi-Fi	5	1.5B070200 – **Automation and control,** **2. 5B070400 Computer Science and Software** **3. 5B072300 Technical Physics**
2	A set of laboratory equipment: C RIO-9035, 1. 33 GHz. Intel Atom Dual-Core CompactRIO ControBer, 8-slot, Kintex-7 70T FPGA, Real-Time, Non-XT,	1	
3	Software^ Academic LabVIEV Standart	1	

The following practical work is carried out in MicLab:

Basics of programming in the LabView environment;

- study of the CompactRIO module;
- installation and configuration of the software CompactRIO;
- Getting started with NI cRIO - 9035;
- Design of virtual measuring instruments in LabView $
- study of tachogenerator;
- study of encoders;
- research of rotating transformers;
- research of selsyns.

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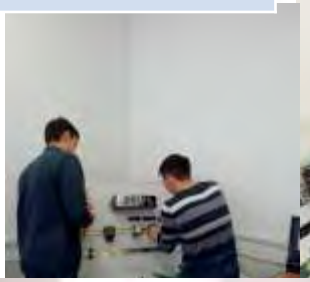
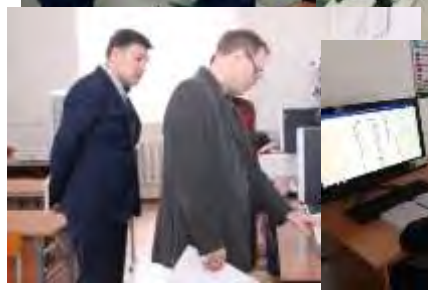
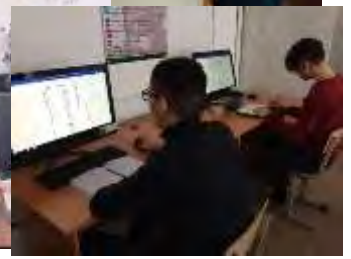
SHAKARIM UNIVERSITETI SEMEY

4. Equipment

Speciality	Number of BA students studying in MICLAB per month	Number of MA students studying in MICLAB per month	Number of working hours of MICLABs per month
Automation and control	31	9	52
Technical Physics	15		12
Computer Science and Software	13		12







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5. Dissemination and Sustainability

5.1. Dissemination

	Question	Answer
1	How many dissemination events were conducted?	Information on Project was presented: 1. During the meeting with under and postgraduated students; 2. On Academic Council at Shakarim University 3. On extended and joint sessions of Departments that implement courses. 4. Speech at the international educational forum "Didactic Bridge: Europe-Asia" 5. Publication in the scientific journal «Bulletin of the Shakarim State University of the City of Semey 6. On the official website of the GU Shakarim section "News" On the official site in the section of international cooperation On the site of the Department of «Automation and Computer Engineering»
2	How much and which of dissemination materials were produced (leaflets, brochures, flyers, publications etc).	1. Booklets - circulation 500 pcs. 2. Information stands - 2 pcs. 3. University student journal(№5 май 2016г.) 4. Mass-media –in newspaper «Vesti Semey»(»(№33 from 26.04.2016 г, №12(1089) from 10.02.2017г, №77(1154) from 26.09.2017г)
3	Provide the link to the project website	• University web-site (http://semgu.kz/mezhdunarodnoe-sotrudnichestvo/sovmestnye-proekty/proektu-development-of-two-cycle-innovative-curricula-in-microelectronic-engineering-docmen/) University web-site http://semgu.kz/mezhdunarodnyj-proekt-po-programme-erasmus

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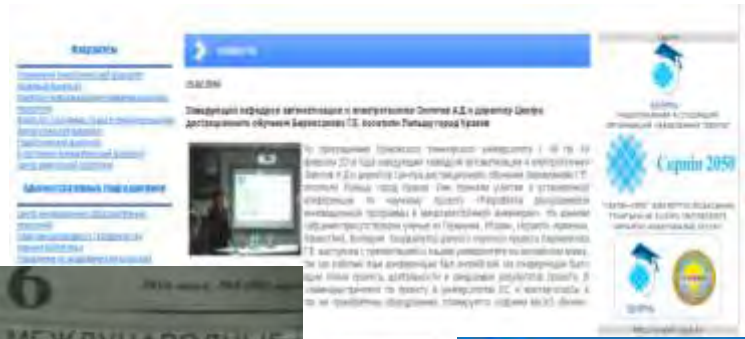
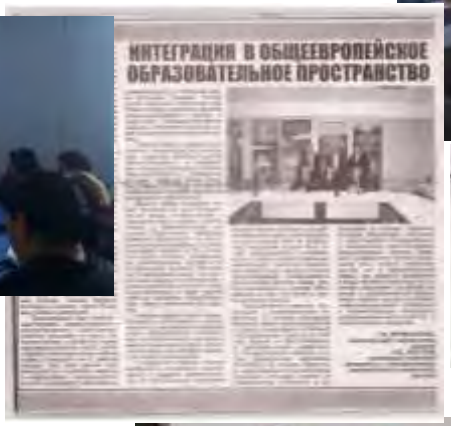
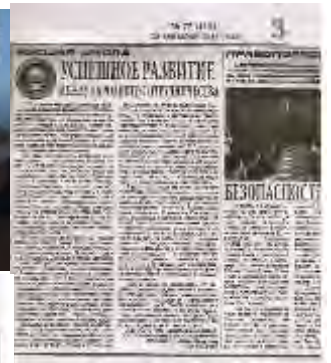
5.1. Dissemination







5.1. Dissemination

Table 5.1.2. DISSEMINATION EVENTS-2

No	Date	Title	Target Audience	Number of participants	Is there a press-release of the event (YES/NO). If YES, provide it.
1	2.04.2016 г	Session of the Department "Automation and Electrical Engineering"	Members of the department, invited	20	Extract from the meeting of the department
2	20.05.2016	Working group meeting with stakeholders	Working group of the project, interested in the project specialists	14	Extract from the meeting
3	7.10.2016г	Meeting with students and undergraduates	Students and undergraduates	33	
4	9.02.2016	At the Academic Council of the State Institution of Shakarim	Members of the Academic Council	18	Minutes of the Scientific Counci
constantly	constantly	In the class of microelectronics	Students and undergraduates	59	
	25.02.2016	On the university's website	All interested parties		

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5.2. Sustainability

The Office Provision on support and services distribution in microelectronics was founded on Department «Automation and Computer Science» (MicSO) room # 702, Regulation on function was created.

According to the faculty dean order (No. 37 from 15/03/2017) the Cand.Tech.Sci. Demyanenko A.I. is appointed to be responsible for MicSO work.

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6. Spin-off effects

1. Preparation and execution of the agreement on cooperation in the field of improvingof the educational process and /scientific research with the "Innovative Eurasian University" of the city of Pavlodar

2. Development and implementation of projects in the field of microelectronic engineering for enterprises of the city of Semey.

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Thank you for attention!

Project coordinator G. Berikkhanova

Shakarim State University of Semey