



Funded by the
Erasmus+ Programme
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DOCMEN



Development of two cycle innovative curricula in microelectronic engineering - DOCMEN

North Kazakhstan State University Named After M. Kozybayev

(Up to December 2017)

М. Қозыбаев атындағы

Солтүстік Қазақстан мемлекеттік университеті

1. OFFICE PROVISION ON SUPPORT AND SERVICES DISTRIBUTION IN MICROELECTRONICS (MICSO)



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- The Regulation on the Office for the Support and Dissemination of Services for Microelectronics (MicSO) has been developed and signed.



According to the faculty dean order (No. 33 from 28/02/2017) the Dr. Sci.Tech. Koshekov K.T. is appointed to be responsible for MicSO work.



2. THE DEVELOPMENT OF ACTIVITY PLAN



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Activity plan of measures is worked out on realization of the project on 2016 – 2018 years.

MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
NORTH KAZAKHSTAN STATE UNIVERSITY (NKSU) ALMATY

Plan*
of works "Development of two cyclic scientific projects in non-business engineering (DOC MEN)" for 2016 year

No	Activities	Q. of MM	Term of implemented plan	Certification notes
1	Development of the activity plan on the organization of the research DOC MEN program: - definition of faculties and departments – performers; - purpose of sections, responsible for realization; - formation of the research group and definition of the project coordinator from higher education institutions.	1 1 1	18.04.2016	- Define target faculties (institutes, departments) and persons which are interested to participate in the project. - Assign responsible persons for execution of each working package (WEP list - WEP No), if necessary, to create the relevant working group. - Identify the project coordinator at the University, accounting local conditions to organize the project work group (preferably under participation of university management target departments rectors, representatives of teachers, students/graduate students).
2	Making a list of used subject courses for analysis and future updates.	1	18.04.2016	Use used University courses used in the frame of the project.
3	Development of a bibliography of questions for analysis of existing curriculum/discipline (The questionnaire for the University and a questionnaire for interested non-academic partners). Develop a schedule to analyze used disciplines.	1	17.06.2016	Possible items to prepare a list of questions at the University: the name of discipline, what are the relevant faculties and departments, since which year is discipline taught, the number of studied subjects, the balance of practical/theoretical hours and student workload, the publisher, year of production and "freshness" of technical training tools, computers, software products, educational literature, the use of journals, national, foreign newspapers/technical journals, the availability of labors position. The practical performance of students in: small groups, the number of such works. - Conduct a survey of young professionals / graduates to figure out what competences were especially useful in the first. - Conduct a survey of employees related to the graduates of the University to clarify the requirements to competences/ skills of

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3. ATTRACTION, DISSEMINATION, SUSTAINABILITY AND USE OF PROJECT RESULTS



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Information on the project was provided:

- at information meeting with students and undergraduates (number of 25 people);
- at a meeting of the Academic council of NKSU named after M. Kozybayev (the protocol No. 6 from 26.02.2016);
- at a meeting of the Academic council of NKSU named after M. Kozybayev (the protocol No. 5 from 02.11.2017);
- at a faculty meeting "Power and Radio Electronics" with the invitation of managers of target departments.



4. PROJECT PROMOTION

- The information stand is created.
- The information booklet of the DOCMEN project published with a circulation of 500 copies is developed.
- Information on the project are placed in mass media: the publication of article in the NKSU named after M. Kozybayev large-circulation student's newspaper "Parasat", No. 2, 7 of April, 2016, No 2,3 of March 2017;
- the publication of article in the regional newspaper "Northern Kazakhstan", No. 28, 11 of March, 2017.
- the publication of article in the regional newspaper «Қызылжар нұры». - 2017. – 13 October;
- the publication of article on a portal Edunews.kz. News of higher school of Kazakhstan. - 2017. - 10 October.
- The update information on the project is posted on the website of NKSU:

<http://www.nkzu.kz/page/view?id=717>.



5. STATE OF THE ROOMS FOR MicLABs

- For a laboratory creation on microelectronics (MicLab), the laboratory No. 509-A/4k is taken, which is under the authority of "Power and radio electronics" department of engineering faculty. Address: Petropavlovsk, Pushkin St., 86.
- The regulations for the MicLAB laboratory have been developed and approved.



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Responsible for MicLab is the
associate professor Ritter D. V.

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6. STATE OF THE ROOMS FOR MicLABs

Due to the financial means of the project the laboratory of MicLAB was equipped by a computer technique and educational laboratory options :

- 1) "Industrial sensors of technological information ";
- 2) "Microcontrollers and microprocessor technique",
- 3) "Study of the personal computer - "Clever house",
- 4) "Digital and microprocessor technique".



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7. DOCMEN PROJECT AGREEMENTS



- The Cooperation agreement within DOCMEN Plus project with “Dinamika zhizni” LLP is undersigned specializing in sale and service of medical equipment.
- The Agreement on Cooperation with the Pavlodar State University named after A.Ya. S.Toraigyrova.



8. PUBLISHING THEIR OWN EDUCATIONAL AND METHODOLOGICAL MANUALS



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- A monograph "Identification Measurements in Oil and Gas Industry ", of 150 pages are developing to be published now.
- Methodical manuals are planned to develop for the laboratory practical works on the new equipment of MicLAB laboratory, in particular on the microcontroller and microprocessor equipment, industrial sensors.



9. ADDITIONAL WORK ON THE PROJECT DOCMEN



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According to DOCMEN project subject-matter two scientists from the leading European higher education institutions were invited for students' and undergraduates' lecturing using funds of NKSU named after M.Kozybayev:

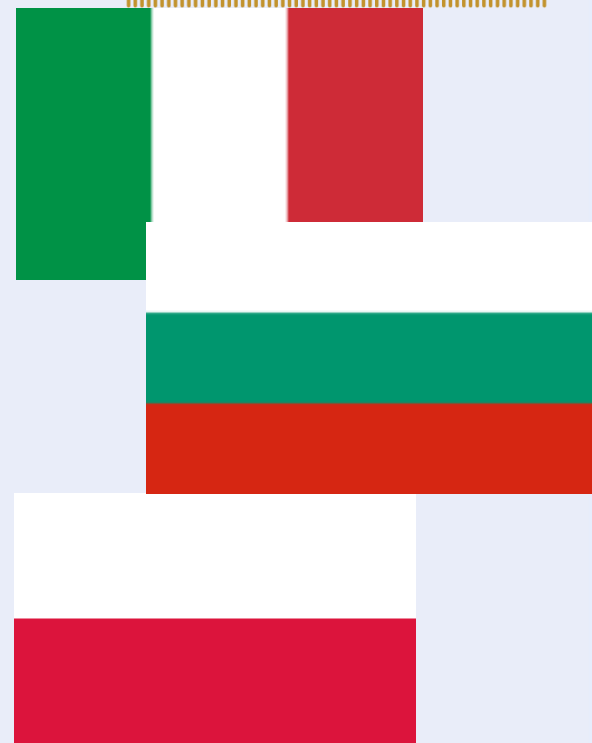
- Videkov V. Hr., Technical university of Sofia (Bulgaria), subject "Technologies of Superficial Installation";
- Tolstoguzov A. B., the Center of physical and technological researches at New university of Lisbon (Portugal), the subject "Micro and Nanomaterials and Modern Technologies in Radio Electronics and Instrument Making".



10. INTERNSHIPS IN EUROPEAN UNIVERSITIES



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According to the approved criteria for teachers casting for the training at the European universities (Protocol No. 6, of 17.03.2017 of meetings of the working group on DOCMEN project) we recommend to direct:

- Technical University Sofia, 19.06.17-30.06.17 – Koshekov K. T., Savostin A. A., Ritter D. V.;
- Politechnic di Torino - 3.07.17-18.07.17 - Koshekov K. T., Savostin A. A., Ritter D. V.
- Cracow University of Technology – 25-29.09.17 – Shevchuk E., Chugunova A.

11. INTERNSHIPS IN EUROPEAN UNIVERSITIES

Training at Technical University of Sofia

(19.06.2017 – 30.06.2017)

- Lecture on Nanocoatings and nanostructures.
- Lecture on Computer Added Design in Microelectronics.
- lecture and laboratory in the clean rooms of AMG Technology.
- Laboratory training in the Thin Films Deposition Lab and in the Photolithography and Galvanic Lab.



12. INTERNSHIPS IN EUROPEAN UNIVERSITIES

Training at Politecnico di Torino (01.07.2017 – 21.07.2017)

- BIO/CMOS interfaces and co-design.
- Building tomorrow society: NanoElectronics & Photonics.
- Building tomorrow society: IoT applications and data management.



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13. INTERNSHIPS IN EUROPEAN UNIVERSITIES

Training at Cracow University of Technology

(25.09.2017 – 29.09.2017)

- Microelectronic technologies for alternative sources of energy
- Project management (business planning, funding, marketing, performance)
- ECAD for Microsystems: ELECTRONIC DESIGN AUTOMATION COURSE
- Soft Skills for Engineers.



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14. TARGET FACULTIES AND DEPARTMENTS FOR THE IMPLEMENTATION OF THE PROJECT ARE DEFINED



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1) **Engineering faculty:**

- «Power and radio electronics», the head of the department - Koshekov K.T.;



2) **Faculty of information technologies:**

- «Information systems», the head of the department - Shevchuk E.V.;
- «Physics», the head of the department - Chugunova A.A.

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15. SPECIALTIES FOR IMPLEMENTATION OF THE PROJECT



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N	Specialties	Department	Coordinators
1	Radio-engineering, electronics and telecommunication	Power and radio electronics	Associate professor Ritter D. V.
2	Power engineering	Power and radio electronics	Doctoral candidate, senior teacher Kashevkin A.A.
3	Instrument making engineering	Power and radio electronics	Associate professor Savostin A.A.
4	Physics	Physics	Associate professor Useinov B. M.
5	Information systems	Information Systems	Doctoral candidate, senior teacher Astapenko N.V.

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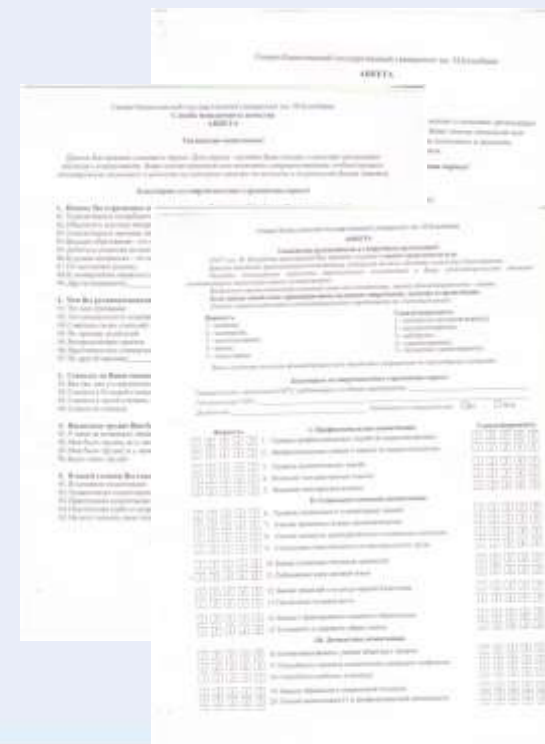
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16. QUESTIONNAIRE COMPLETED



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- Students' questioning on DOCMEN project informing was held from 11.09. 2016 to 25.09 2016 (25 participants).
- From 20.09.2016 to 28.09 2016, 34 specialties graduates' questioning on the level of training in the field of microelectronics was held.
- Potential employers' questioning of 5 organizations was held about the satisfaction with the graduates training in microelectronics from 20.09.2016 to 28.09 2016.



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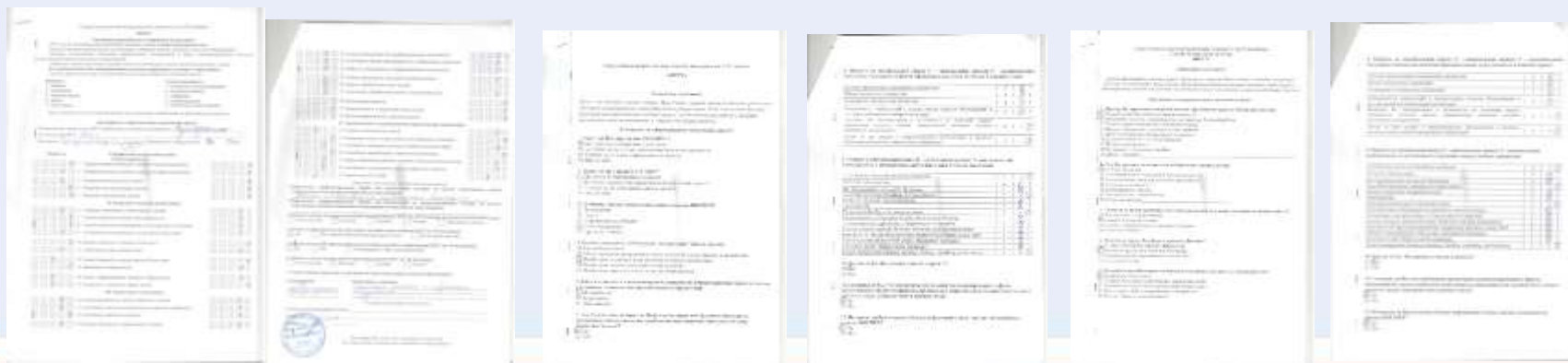
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17. ANALYSIS OF THE QUESTIONNAIRES



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- The results of the carried-out questioning show that from the graduates' professional qualities the quality of the received education, practical experience, skills, ability to completion and use of the knowledge, especially in the fields of microelectronics is especially appreciated.
- To provide graduates' high competitiveness in a labor market and their successful professional activity, it is necessary to impart to students operational skills with the modern microcontrollers and microprocessors and also with the modern systems of computer-aided and open design of different devices.



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18. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Bachelor degree. Radio Engineering, Electronics and Telecommunication		
1. Digital devices and microprocessors (4 ECTS).	Petrov P. A., Depart. PRE, ETF	December, 2017.
2. Computer-aided engineering systems (3 ECTS).	Ritter D. V., Depart. PRE, ETF	December, 2017.
3. Circuitry of analog devices (5 ECTS).	Savostin A. A., Depart. PRE, ETF	December, 2017.
4. Systems of data collection and processing (3 ECTS).	Savostin A. A., Depart. PRE, ETF	December, 2017.

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19. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Bachelor degree. Power Engineering		
1. Sensors of technological processes (3 ECTS).	Kashevkin A. A., depart. PRE, ETF	December, 2017.
2. Micro Controllers and microprocessors in power industry (3 ECTS).	Petrov P. A., Depart. PRE, ETF	December, 2017.
3. Nonconventional and renewables (3 ECTS).	Latypov S. I., depart. PRE, ETF	December, 2017.

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20. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Bachelor degree. Instrument Making Engineering.		
1. Bases of nanotechnologies - BD of EC - 1 course (2 credits, 3 ECTS).	Latypov S. I., depart. PRE, ETF	December, 2017
2. Integral and microprocessor circuit engineering (5 ECTS).	Savostin A. A., depart. PRE, ETF	December, 2017
3. Electrotechnical materials science (3 ECTS).	Kashevkin A. A., depart. PRE, ETF	December, 2017
4. Analog and digital electronic devices (5 ECTS).	Savostin A. A., depart. PRE, ETF	December, 2017

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21. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Bachelor degree. Physics		
1. Bases of automatic equipment and computer facilities - PD of EC - the 4th course (3 credits, 5 ECTS).	Useinov B. M., department of Physics, FIT	December, 2017
2. Radio electronics elements in elective courses of physics (5 ECTS).	Useinov B. M., department of Physics, FIT	December, 2017

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22. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Bachelor degree. Information Systems		
1. Computer architectures (5 ECTS).	Astapenko N. V., department- IS, FIT	December, 2017
2. Physical bases of digital equipment (5 ECTS).	Astapenko N. V., department- IS, FIT	December, 2017

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23. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Magistracy. Radio Engineering, Electronics and Telecommunication		
1. Systems of artificial intelligence (4 ECTS).	Koshekov K. T., department PRE, ETF	December, 2017
2. Modeling of systems (6 ECTS).	Koshekov K. T., department PRE, ETF	December, 2017

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24. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Magistracy. Power Engineering		
Systems of artificial intelligence (3 ECTS).	Koshekov K. T., department PRE, ETF	December, 2017

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25. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Magistracy. Instrument Making Engineering		
1. The intelligent measuring equipment (5 ECTS).	Koshekov K. T., department PRE, ETF	December, 2017
2. Robotic systems (3 ECTS).	Koshekov K. T., department PRE, ETF	December, 2017

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26. DISCIPLINES IMPROVEMENT OF SPECIALTIES



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Modernised Curricula/module inclusive ECTS related	Name of responsible teacher, department, faculty	Deadline or planned deadline to accreditation on the university level
Magistracy. Physics		
1. Introduction to materials science (3 ECTS).	Useinov B. M., department of Physics, FIT	December, 2017

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27. ACCREDITATION OF NEW ACADEMIC DISCIPLINES



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- Modular educational programs developed at the leading departments are considered in the University Academic committee and approved by Head of the Department of the academic questions.
- Working programs of disciplines (syllabuses) undergo the similar authorization procedure. Pilot teaching is planned to start in 2017-2018 academic year.

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28. COMMUNICATION BETWEEN CONSORTIUM ORGANIZATIONS



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At the project implementation all current questions on the project promotion were resolved quickly by e-mail, 6 videoconferences with the coordinator and participants of DOCMEN consortium are held. Communication is run at the high level.



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Thank you for attention!



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