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WP1 BIOART Report

Evaluation on Existing Curricula

P13 State Higher Education Institution

«Pryazovskyi State Technical University» (PSTU)

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Developer of project curricula.

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Developer of project curricula.

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Contents

1. Current Status in your university and connected Colleges

Pryazovskyi State Technical University with almost 90 years history is a higher educational institution certified for the IV level of accreditation (the highest in Ukraine) in full and in all areas of activity. PSTU conduct studies on educational levels bachelor and master in 22 degree fields and 54 study programs in engineering, economics, information technologies and humanitarian fields. Every year 3-4 new perspective study programs are introduced and offered to the applicants. PSTU incorporates 3 colleges (Mariupol Machine-building College PSTU, Mariupol Mechanical and Metallurgical College PSTU, Mariupol College PSTU), all are certified for the II level of Ukrainian accreditation. There is a Medical College in Mariupol, (represented by over 320 students) of state subordination of the II level of accreditation. PSTU has a cooperation with the College for harmonization studies programs and to involve its graduates into the accelerated studying in PSTU, specializing in Biomedical Engineering.

a. Existing biomedical courses proposed as a specialization – B.Sc Level .

Biomedical Engineering. Total number of undergraduates is 36.

b. Existing biomedical courses proposed as a specialization – M.Sc Level

Biomedical Engineering (currently is under developing)

Existing Full curriculum biomedical courses – B.Sc Level

i. Ground courses (ECTS)

Higher Mathematics (13.5)
Physics (6.5)
General Chemistry (4.0)
Biochemistry (4.0)
Biophysics (4.0)
Mechanics (3.0)
Human Anatomy and Physiology (5.0)
Molecular Biology (3.0)

ii. Specialization courses

Biomedical Mechanics (3.5)
Diagnostic and Therapeutic Equipment (8.0)
Medical Terminology and Latin (5.0)
Materials Science and Biocompatible Materials (5.0)
Fundamentals of Medical and Social Rehabilitation (3.5)
Prosthetics of the Musculoskeletal System (5.0)
Methods for Biomedical Images Processing (4.0)
Programming Technologies in Biomedicine (8.0)
Fundamentals of management of biomedical systems (4.0)
Radiation Therapy and Diagnostic Systems (3.0)
Reliability, Verification and Certification of Biomedical Devices (4.0)
Telemedicine Systems (2.5)



- c. Existing Full curriculum biomedical courses – M.Sc Level
 - i. Ground courses
 - ii. Specialization courses

At the moment, the teaching of master students is not conducted yet, because the speciality “Biomedical Engineering” was established in PSTU only three years ago. However, the work is under way to develop a study-educational program for teaching master students. Its final content will be formulated basing on recommendations and the results of BioArt project.

2. Regional Labor Market Requirement Analysis

a. Preliminary Work.

In Mariupol today, there are 59 medical institutions and enterprises, including 37 state and 22 private ones, which are the potential employers for graduates of the speciality «Biomedical Engineering». The number of state institutions includes the regional level hospital, the regional level oncological dispensary, five city level hospitals, a specialized children's hospital, the Children's Ophthalmic Center, the Perinatal Center. Among the private medical enterprises are medical-diagnostic centers “Adastra”, “Medifast”, “Health code”, “Health clinic”, diagnostic centers “Solaris”, “Iridolab”, “Sinevo” etc. Besides, there are sanatoriums in Mariupol such as “Metallurgist”, “Seagull”, “Health”, children's anti-tuberculosis sanatorium “Aibolit”. The mobile military hospital, serving the South-East sector of the Donetsk region, is also situated in Mariupol. Despite the developed network of medical institutions, there is an acute shortage of specialists in prosthetics and bioimplant application in Mariupol. Therefore, the graduates of the speciality “Biomedical Engineering” are potentially in demand in the city. It is especially emphasized because of sufficiently large contingent of medical personnel (more than 10 thousand positions only in the public sector), which requires constant renewal.

b. Trends and requirements in the industry

Bionanotechnology, telemedicine systems, a new generation of implants, biocompatible materials

3. Prospects of Project Implementation

a. Involved Departments:

Departments:

Biomedical Engineering

Oleksandr Azarkhov, D.Sc. in Medicine, Professor, Head of Biomedical Engineering Department.

The Department of "Biomedical Engineering" was established in 2014 due to the increasing demand for specialists in biomedical engineering. The department was headed by Oleksandr Azarkhov, D.Sc. (Medicine) Professor, the author of 43 scientific works, which include 1 teaching guide and 2 monographs. The students of the department are taught both engineering approaches to solving scientific problems and engineering the achievements of Medical and Biological Sciences for human health improvement and the life quality. This modern science industry provides applied research and solves the problem of production of specialized electronic tools for processing of biosignals, medical imaging, simulation and determination of the conditions of therapeutic effect. It combines the individual sections of the electrical, chemical, mechanical and optical engineering, with a common object of activity - development of methods and means of research of living substance is able to work in the field of

medicine (medical computing devices and monitoring systems, diagnostics, therapy, surgery, data processing, signals and images, modeling agencies, statistics, telemedicine), in the field of occupational health and real estate services at work in the departments of occupational health, real estate establishments; in the field of rehabilitation engineering (care products, fitness equipment, artificial organs) at the place of work in dispensaries, rehabilitation centers.

Responsibilities in the BioArt Project according to WPs

Oleksandr Azarkhov

1. Overall Project coordination,
2. Review and analyze related curricula in P13.
3. Compile a list of related curricular in P 13
4. Elaborate a comparative report with the situation of their relevant curricula in P13 with respect o programme countries.
5. Perform a market analysis in region.
6. Prepare a market analysis in region.
7. Elaborate a comparative market analysis report.

Vasil Iefremenko

1. Review and analyze related curricula in P13.
2. Compile a list of related curricular in P 13
3. Elaborate a comparative report with the situation of their relevant curricula in P13 with respect of programme countries.
4. Perform a market analysis in region.
5. Prepare a market analysis in region.
6. Ellaborate a comparative market analysis report.
7. Prepare teaching materials in P13 based on material received from EU partners.
8. Participate in teaching seminars in EU countries
9. Organize workshops/seminars in P13 for the local diffusion of knowledge from attendees to seminars in EU countries.
10. Conduct teaching pilots of the developed curriculum during a full academic year.
11. Prepare the curriculum for accreditation in P13

Olena Sorochan, Senior Lecturer

1. Prepare teaching materials in P13 based on material received from EU partners
2. Implement BIONIC labs. in P13
3. Participate in teaching seminars in EU countries
4. Organize workshops/seminars in P13 for the local diffusion of knowledge from attendees to seminars in EU countries
5. Conduct teaching pilots of the developed curriculum during a full academic year
6. Prepare the curriculum for accreditation in P13
7. Organize a student contest

Valeriy Krivonosov, Ph.D (Eng.), Ass. Prof..

1. Prepare teaching materials in P13 based on material received from EU partners
2. Participate in teaching seminars and master-classes in EU countries
3. Organize workshops/seminars in P13 for the local diffusion of knowledge from attendees to seminars in EU countries
4. Conduct teaching pilots of the developed curriculum during a full academic year.

Material Science and Advanced Technologies

Victoria Gavrilova, Ph.D (Eng.), Ass. Prof., Head of Material Science and Advanced Technologies Department

The Department of Materials Science and Advanced Technologies was founded in 1935, it has 4 D.Sc, Prof., 8 Ph.D's, Ass. Prof. and lecturers. It offers undergraduate and graduate degrees in the fields of materials science, metallurgy and metal working. The scientists of the Department study the development of metallic and nonmetallic materials and new technologies, including Smart Materials, which are applicable to various industries. The study of Smart Materials is paid great attention to, which is very important for the fields of medicine and prosthetics. Disciplines both on metallic materials (metals, alloys, steels, cast irons, smart alloys which are capable of improving their properties in operation), and non-metallic (polymers, plastics, mechanical rubber, glass and ceramics, powder and composite and many others), which are used in many industries, including bio-engineering, are taught at the Department In collaboration with the Department of Biomedical Engineering Departments of PSTU, the scientists developed training manuals and other teaching materials for the educational process in the field of bio-medical engineering and materials science. The department has a rich collection of various materials (including biomedical, prosthetic, etc.), adequate research equipment, modern laboratories and computer classes. Computerization in materials science and materials processing is highly appreciated (including 3D-design). The department has experience in international projects and programs.

Responsibilities in the BioArt Project according to WPs

Oleksandr Cheiliakh The D.Sc (Eng.), Prof.

1. Review and analyze related curricula in P13.
2. Compile a list of related curricular in P 13
3. Elaborate a comparative report with the situation of their relevant curricula in P13 with respect to programme countries.
4. Perform a market analysis in region.
5. Prepare a market analysis in region.
6. Elaborate a comparative market analysis report
7. Prepare teaching materials in P13 based on material received from EU partners
8. Participate in teaching seminars and master-classes in EU countries
9. Organize workshops/seminars in P13 for the local diffusion of knowledge from attendees to seminars in EU countries
10. Conduct teaching pilots of the developed curriculum during a full academic year
11. Prepare the curriculum for accreditation in P13

Inna Oleyinik, Ph.D (Eng.), Ass. Prof.

5. Prepare teaching materials in P13 based on material received from EU partners
6. Participate in teaching seminars and master-classes in EU countries
7. Organize workshops/seminars in P13 for the local diffusion of knowledge from attendees to seminars in EU countries
8. Conduct teaching pilots of the developed curriculum during a full academic year.



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Automation and Computer Technologies

Oleksandr Simkin, Ph.D. in Engineering Science, Head of the Department of Automation and Computer Technologies

The Department of Automation and Computer Technologies is one of the leading chairs of the P13. The Dept. provides the preparation of bachelors and masters in the specialty 151 "Automation and computer-integrated technologies". In 2002-2004 under the direction of Associate Professor Oleksandr Simkin a Comprehensive Laboratory of Microprocessor Systems and Programming in real-time systems was created. The equipment for this lab and licensed software was provided by Siemens, and the software is QNX Software Systems (Canada).

Graduates of the department work as specialists in electronics and programming, designing the operation of automation systems in any industrial enterprises of Ukraine and hold leading positions in these substructures. The acquired knowledge and acquired skills of practical work, high level of knowledge of computer technology and information technologies ensure the mobility of students of the Dept. and allow them to work in enterprises of Ukraine and other countries. The graduates successfully work in the USA, Germany, Israel, Poland, Egypt and many other countries. Academic areas: physics, mathematics, informatics, industrial electronics, electrical measurements, instrumentation, theory of automated control, data bases, real-time operational systems, computer integrated systems software, organization of production.

Responsibilities in the BioArt Project according to WPs

Oleksandr Simkin, Ph.D (Eng.), Ass. Prof., Head of the Dept.

1. Prepare teaching materials in P13 based on material received from EU partners
2. Participate in teaching seminars and master-classes in EU countries
3. Organize workshops/seminars in P13 for the local diffusion of knowledge from attendees to seminars in EU countries
4. Conduct teaching pilots of the developed curriculum during a full academic year
Analyze the results of the pilots and perform the required changes in the curriculum

Oleksiy Koifman, Ph.D (Eng.), Ass. Professor

1. Prepare teaching materials in P13 based on material received from EU partners
2. Participate in teaching seminars and master-classes in EU countries
3. Organize workshops/seminars in P13 for the local diffusion of knowledge from attendees to seminars in EU countries
4. Conduct teaching pilots of the developed curriculum during a full academic year

b. Risk identification

Tense political and economic situation in Ukraine

Instability of the legislative base of Ukraine in conditions of reforming Higher Education

Bureaucratic obstacles in accreditation of the new curricula

The necessity of mastering the English by teaching staff.

Key participants may leave the projects for various reasons.