



National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"  
Biomedical Engineering Faculty



# 163 Biomedical Engineering Educational Master's Program "Medical Engineering"

and

## Certified Program "Artificial Organs"

Department of Biomedical Engineering  
of Igor Sikorsky Kyiv Polytechnic Institute

<http://bmi.fbmi.kpi.ua/>



National Technical University of Ukraine  
"Igor Sikorsky Kyiv Polytechnic Institute"



# Focus of Specialization (Educational and Professional Program) "Medical Engineering"

***Medical engineering*** covers research methods with the application of engineering and technical knowledge, as well as development, production, operation and certification of medical equipment, biomaterials, medical products, and healthcare software and information support.

<https://bmi.fbmi.kpi.ua/wp-content/uploads/2023/04/163-OPPM-MI-02.02.2023.pdf>

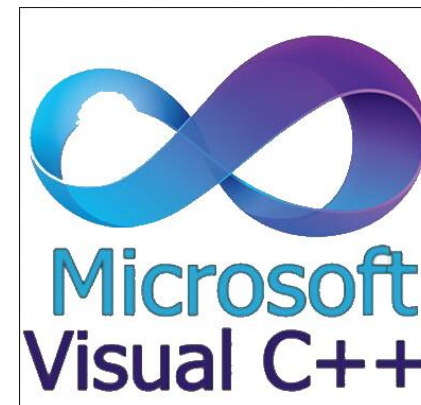




# Professional competences for Educational and Professional Program «Medical Engineering»

*The educational program contains regulatory disciplines that form the following competencies to students:*

- Ability to solve complex problems of biomedical engineering using methods of mathematics, natural and engineering sciences.

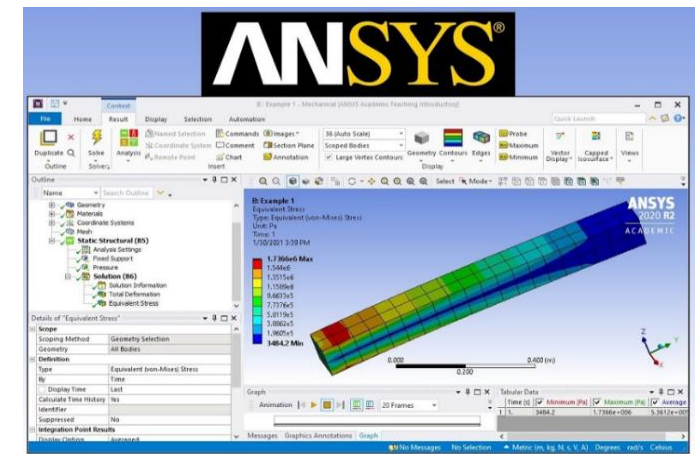
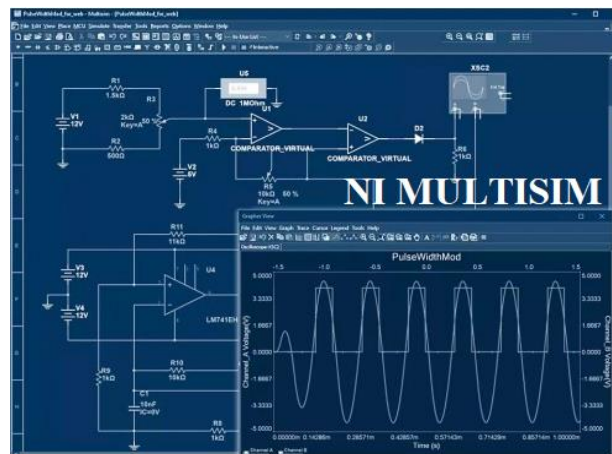




# Professional competences for Educational and Professional Program «Medical Engineering»

*The educational program contains regulatory disciplines that form the following competencies to students:*

- Ability to develop, plan and apply mathematical methods in the analysis and modeling of the functioning of living organisms, systems and processes in biology and medicine.





# Professional competences for Educational and Professional Program «Medical Engineering»

*The educational program contains regulatory disciplines that form the following competencies to students:*

- Ability to investigate biological and technical aspects of the functioning and interaction of artificial biological and biotechnical systems.



# Professional competences for Educational and Professional Program «Medical Engineering»

*The educational program contains regulatory disciplines that form the following competencies to students:*

- Ability to conduct research and observations on the interaction of biological, natural and artificial systems (prostheses, artificial organs, etc.), to plan biotechnical tests of artificial prostheses and systems.





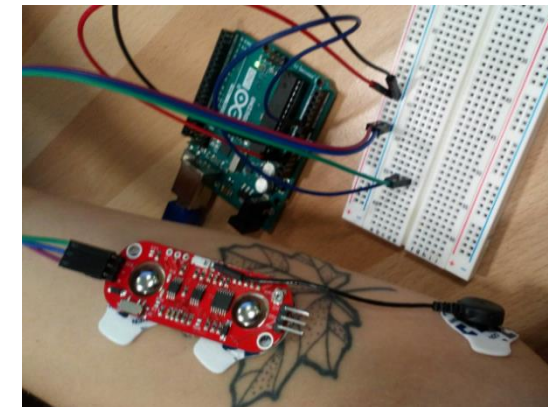
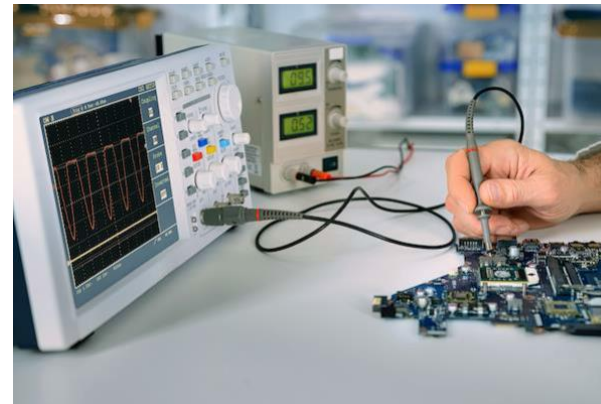
# Professional competences for Educational and Professional Program «Medical Engineering»

*The educational program contains regulatory disciplines that form the following competencies to students:*

Ability to design and practical use of microcomputer and microprocessor systems in medical and diagnostic information and measurement equipment.

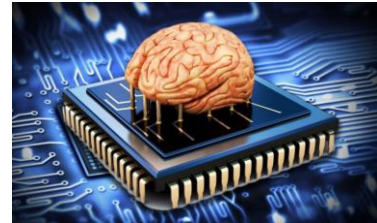


Code Composer Studio





# Curriculum: regulatory disciplines (professional training cycle)



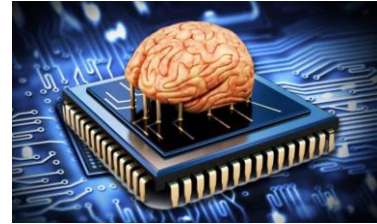
- Medical Physics
- Display System of Biomedical Data
- Coursework in Display System of Biomedical Data
- High-tech Systems for diagnosis and therapy
- Medical Microprocessor Systems. Digital Signal Processors
- Medical Microprocessor Systems. Design of Information-measuring Systems
- Scientific Work on Master's Thesis I. Basics of Scientific Research
- Scientific Work on Master's Thesis II. Scientific Research Work on Master's Thesis Topic
- Pre-diploma Practice
- Implementation of Master Thesis







# Curriculum: elective disciplines (professional training cycle)



- Artificial Organs
- Devices for Replacing Vital Functions of the Body
- Endoprosthesis and Exoprosthesis
- Regulatory affairs in biomedical engineering and biopharmaceutics
- Quality assurance systems in biomedical engineering and biopharmaceutics
- Biomaterials and Biotechnologies
- Electronic Sensors and Biochips
- Biophotonics and Nanoelectronics
- System physiology
- Physiology of Sensory Systems
- Medical expert systems





# Certified Program "Artificial Organs" for Educational and Professional Program «Medical Engineering»



The program "Artificial Organs" is aimed at deepening the fundamental knowledge, skills and abilities necessary for a clinical engineer, which makes it possible to carry out examinations of the quality and safety of the use of prostheses and implants, as well as to carry out the management of high-tech systems that are used to replace vital functions of the human body.





# Certified program "Artificial Organs" involves the study of elective subjects

- Devices for Replacing Vital Functions of the Body
- Endoprosthesis and Exoprosthesis
- Biomaterials and Biotechnologies
- Electronic Sensors and Biochips
- Physiology of Sensory Systems



<https://bmi.fbmi.kpi.ua/wp-content/uploads/2023/04/SP-Artificial-organs-2023.pdf>



# Preparation for Solving Engineering Problems

Graduates are prepared to solve current problems at enterprises, organizations and institutions engaged in:

- modeling and designing of medical equipment and medical products;
- design of microprocessor and laser systems used in medicine and biology;
- development of special biomedical devices necessary for diagnosis and therapy;
- development and application of constructive biologically compatible materials;
- development of informational medical and diagnostic systems and devices for monitoring human physiological parameters;
- using modern methods and laboratory diagnostic equipment;
- carrying examination and technical support of medical equipment.





# Where can a Biomedical Engineer Work?

Among the medical institutions that need specialists in biomedical engineering, the following can be noted:

- **Clinics, Hospitals, Rehabilitation Centers** - engineering expertise and technical support of medical equipment.
- **Research Institutions** - modeling and design of medical equipment and medical products, development of informational treatment and diagnostic systems, development and application of biologically compatible materials.
- **Diagnostic Centers and Laboratories** - maintenance of medical devices for diagnosis and therapy, use of modern methods and equipment of laboratory diagnostics, technical support of informational medical and diagnostic systems and devices for monitoring physiological parameters of a human.





# The staff of the department (teaching special subjects)



Management of the Department of Biomedical Engineering and

Guarantors of Educational Programs on specialty 163 "Biomedical Engineering":

- **Vladyslav Shlykov**, Associate Professor, Doctor of Technical Sciences, Head of the Department of Biomedical Engineering of Igor Sikorsky Kyiv Polytechnic Institute, guarantor of the educational and scientific program of Doctors of Philosophy (PhD) "Biomedical Engineering";
- **Oksana Biloshytska**, Associate Professor, PhD, Associate Professor of the Department of Biomedical Engineering of Igor Sikorsky Kyiv Polytechnic Institute, Vice Dean of Education, guarantor of the educational and professional program of the first (Bachelor) level of the Higher Education "Medical Engineering";
- **Andriy Solomin**, Associate Professor, PhD, Associate Professor of the Department of Biomedical Engineering of Igor Sikorsky Kyiv Polytechnic Institute, guarantor of the educational and professional program of the second (Master's) level of the Higher Education "Medical Engineering";
- **Larysa Kalashnikova**, Associate Professor, PhD, Associate Professor of the Department of Biomedical Engineering of Igor Sikorsky Kyiv Polytechnic Institute, Deputy Dean of International Cooperation.





# Admission to the Master Degree

- **Foreign citizens can apply for a Master's Degree program on the basis of a bachelor's degree obtained by another specialty.** Such students will have additional entrance test: in the exam ticket there are three questions from the disciplines: "Object-oriented programming", "Analog and Digital Circuitry. Part 2. Digital Circuitry", "Mechanics".
- **Students who have obtained Bachelor Degree outside of Ukraine** should submit documents which have passed nostrification in the Ministry of Education and Science of Ukraine.

**Master Degree (in English):**

<https://istudent.kpi.ua/obuchenie/magistratura.html>

**Center for International Education of Igor Sikorsky KPI:**

<https://istudent.kpi.ua/vstup/buklet.html>

