

«...Biotechnology is the science of obtaining required for people materials and products with the use of living organisms and special equipment – the bioengineering...»



**INFORMATION
PACKAGE**

**FACULTY
OF BIOTECHNOLOGY
AND BIOENGINEERING**

Kyiv, 2021

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***** Information is current as for 2021/2022 academic year. Next academic year, there may be minor changes in the list of training specialties and educational programs.**



Foreign Economic Activity Office
+38044 204 8381
forea@kpi.ua
forea.kpi.ua/

Faculty of Biotechnology and Bioengineering
+380 44 204 9452; +380 44 204 8312
biotech@ntu-kpi.ua
biotech.kpi.ua



1. COMMON DESCRIPTION OF THE FACULTY

The first in Ukraine **Faculty of Biotechnology and Bioengineering (FBT)** was founded in January 2001 at the Igor Sikorsky KPI on the base of the Department of Biotechnology of the Faculty of Chemical Technology.



Biotechnology is the science of obtaining required for people materials and products with the use of living organisms and special equipment – the bioengineering.

The Faculty provides training of highly qualified professionals for modern sectors of biotechnology: microbial synthesis of biologically active compounds, immune- biotechnology, genetic engineering biotechnology, biotechnology of pharmaceutical drugs, eco biotechnology, bioenergetics, biodegradation of wastes, obtaining a useful substance from the biomass and wastes, biotesting of pollutions, engineering support of biotechnological and pharmaceutical productions, molecular biotechnology and bioinformatics.

Graduates of the Faculty can develop and implement the latest technological processes and design equipment for biotechnological and pharmaceutical productions, monitor and protect the environment of man-made impacts competently and scientifically , simulate biotechnological processes in order to determine the optimum conditions of biosynthesis, biodestruction of wastes and optimization of damaged ecosystems through widespread use of the most advanced mathematical methods and computer technology.

2. STRUCTURE

The **Faculty of Biotechnology and Bioengineering** consists of three departments:

- **Department of Industrial Biotechnology and Biopharmacy;**
- **Department of Biotechnics and Engineering;**
- **Department of Bioenergetics, Bioinformatics and Ecobiotechnology,**

and three research laboratories:

- **Laboratory of Physical and Information Technologies in Biology and Medicine;**
- **Laboratory of Magnetic Nanotechnology in Medicine and Biology;**
- **Laboratory of Vacuum Technology in Biology and Medicine.**



3. EDUCATIONAL PROGRAMS

Levels of higher education. Training of students at the **FBT** is carried out at three levels of higher education.

At the first level (Bachelor's course, I–IV academic years), the students acquire fundamental knowledge in chemistry, physics, mathematics, mechanics, computer engineering, and special disciplines. During the fourth year, they prepare and defend the bachelor's thesis and acquire a bachelor's degree.

At the second level, (Master's course, I-II academic years) students acquire relevant professional skills including laboratory practice. Applicants prepare and defend a master's theses and acquire a master degree

The third educational-scientific level – postgraduate studies, I-IV academic years. Applicants defend their dissertations and they are awarded the educational qualification of Doctor of Philosophy (PhD).

Terms of training: Bachelor – 4 years; Master (education-professional program) – 1.5 years; Master (education-scientific program) – 2 years: PhD – 4 years.

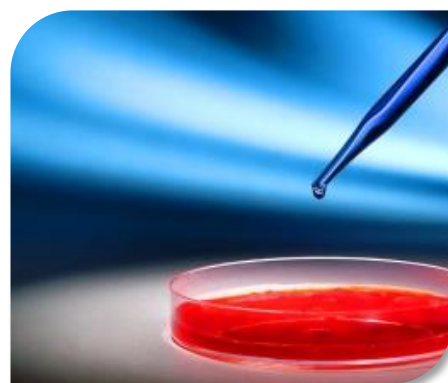
1. Department of Industrial Biotechnology and Biopharmacy provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	Second	Third
Biotechnology and Bioengineering	Biotechnology	Bachelor <i>EPP</i>	Master <i>EPP</i>	PhD <i>ESP</i>
			Master <i>ESP</i>	

*Comment: EPP – Educational-Professional Program
ESP – Educational-Scientific Program*

The department provides scientific and engineering personnel for the biotechnological, biochemical and chemical industries, food industries, research and design institutions of the biological and chemical profile, sanitary inspections, firms and institutions that produce food additives and veterinary drugs, control and production laboratories, control and analysis laboratories, certification centers.

Future specialists-biotechnologists actually are getting three educations: chemical, engineering, and biological. In addition to general scientific and engineering disciplines, students study such disciplines as microbiology and virology, biochemistry, genetics, cell and genetic engineering, immunology, general biotechnology, fundamentals of pharmaceutical production.



Graduates of the department are working at the leading pharmaceutical and biotech companies of Ukraine, certification laboratories and biocontrol. They are developing biologically active drugs at the Institute of Microbiology and Virology, Molecular Biology and Genetics, Biochemistry and others.

2. Department of Biotechnics and Engineering provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	Second	Third
Industrial Machinery Engineering	Equipment of Pharmaceutical and Biotechnological Productions	Bachelor <i>EPP</i>	Master <i>EPP</i>	–
			Master <i>ESP</i>	
	Industrial Machinery Engineering	–	–	PhD <i>ESP</i>

*Comment: EPP – Educational-Professional Program
ESP – Educational-Scientific Program*

The department trains professionals who are well versed in foreign and domestic equipment of pharmaceutical and microbiological industries, and due to it this:

- perform engineering for the implementation of the equipment in domestic plants and factories with subsequent maintenance and service;
- design new equipment for pharmaceutical and microbiological industries for production at domestic machine-building plants.



Graduates of the department are successfully working at the leading enterprises of Kyiv: PJSC "Darnitsa", JSC "Farmak", "Rosinka", PJSC "Biofarma", "Kyiv Winery of Sparkling Wines", PJSC SIC "Borshchahivskyi CPP."



3. Department of Bioenergetics, Bioinformatics and Ecobiotechnology provides training of specialists under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	Second	Third
Biotechnology and Bioengineering	Biotechnology	Bachelor <i>EPP</i>	Master <i>EPP</i>	PhD <i>ESP</i>
			Master <i>ESP</i>	

*Comment: EPP – Educational-Professional Program
ESP – Educational-Scientific Program*

Bioinformatics makes it possible to simulate biotechnological processes at the stages of development of industrial technologies, to analyze and predict the properties of new biological structures and molecules.

In addition to the basic disciplines of biological, chemical and engineering areas students study modern technologies of waste processing of different origin and specially grown biomass into the energy and useful substances that can replace existing synthetic analogs obtained with the use of natural gas and oil.

Students study the new wastewater treatment technology, the design of treatment plants and bioreactors.

At the Department, the genetic engineering techniques are used for the obtaining of bacteria, plants and other organisms with desired properties for use in environmental biotechnology to increase the energy output.

The department has the following research laboratories:

- Laboratory of Physical and Information Technologies in Biology and Medicine;
- Laboratory of Magnetic Nanotechnology in Medicine and Biology;
- Laboratory of Vacuum Technology in Biology and Medicine.

The department is provided with modern equipment such as probe scanning microscope NanoEducator, centrifuge apparatus, chamber for horizontal electrophoresis, apparatus for determining the magnetic susceptibility of magnetically sorbents and magnetic pharmaceutical forms, apparatus for producing of high-gradient ferromagnetic attachments by electrodeposition in magnetic field and by magnetically controlled corrosion, photocalorimeters KFK-2, thermostat, pH-meter, sterilizer, potentiostat, biological microscopes. All above-mentioned equipment is used for carrying out the educational process and in the performance of research works of students and graduate students, as well as for scientific research of the department.



Graduates of the department can work in the biochemical and biotechnological production of pharmaceutical chemicals companies, in the food industry, in the research and design institutions of biological, medical, and chemical areas, diagnostic laboratories, research centers for the creation of new drugs.

4. TRAINING AND LABORATORY BASE

The academic staff of the faculty actively use modern teaching technology during lectures, practical training, seminars, and laboratory sessions. They apply modern software products, Internet-resources, modern means of presentation, visual support of lectures in the form of films, videos, slides, etc.

5. RESEARCH ACTIVITY

Department of Industrial Biotechnology and Biopharmacy

The main directions of scientific work of the department:

- Biotechnology of microbial synthesis of vitamins.
- Genetic activity of nanocomposites and chemical contamination of agricultural and food products, cosmetics and household chemicals.
- The use of biotechnology and biotechnology in medicine.
- Biochemistry and biotechnology of higher basidiomycetes.
- Development of technology for probiotic preparations based on lactate bacteria.
- Biotechnology and finished pharma products of bacteriolytic enzymes and antibiotics.
- Development of tools *in-vitro*-diagnostics of infectious diseases and hormonal disorders.
- Biotechnology of fungal carotenoids. Enzyme systems of the genus *Polyporus*.
- Biotechnology of polysaccharides obtaining from higher basidiomycetes.

Department of Biotechnics and Engineering

The main directions of scientific work of the department:

- Development of membrane systems for private households;
- The vibration of flat and shell fragments under the influence of kinematic and wave spatial factors;
- Terms of occurrence of the wave coincidence and spatial-frequency resonances;
- Implementation of acoustically transparent structures.



- Remote control of heat transfer process in a bioreactor with an ultrasonic beam;
- Membrane technologies of mixtures treatment;
- Mathematical modeling techniques in biotechnology.

Department of Bioenergetics, Bioinformatics and Ecobiotechnology

The main directions of scientific work of the department:

- Modern technology of biological wastewater treatment;
- Development of microbial fuel cells to produce electricity and hydrogen;
- Biotechnology producing of energy carriers (methane, hydrogen, alcohols, etc.) from the organic wastes of different origin;
- Studies on the impact of physical and chemical factors on the change in microalgae metabolism to produce energy carriers, biologically active substances, drugs;
- Development of a new magnetic dosage form for targeted drug delivery to the tumor;
- The study of self-organization processes in the system metal-electrolyte in a constant magnetic field;
- Investigation of self-organization processes in the metal-electrolyte system in a constant magnetic field;
- Magnetically controlled biosorption of heavy metal ions by *S.cerevisiae* yeasts in a constant field with the use of the system of ferromagnetic elements;
- Microstructuring of metal surfaces by electrodeposition and controlled corrosion in the magnetic field;
- Development of high gradient magnetic matrix and designs of magnetic separators;
- Development of new methods for producing magnetically controlled sorbents, including biosorbents for biomedical purposes.

6. INTERNATIONAL COLLABORATION

The international interuniversity cooperation includes joint scientific and educational projects, an organization of short-term exchange programs for student, graduate students and teachers, and collaborative research.

International interuniversity cooperation includes conducting joint research and educational projects, organizing short-term exchange and internship programs for students, graduate students and teachers.



7. CONTACT INFORMATION

- 1. Dean Faculty:** Doctor of Tech. Sci., Prof., Tetiana S. Todosiichuk
Address: 37 Prosp. Peremohy, Ed. Building 4, Room 169, Kyiv, 03056, Ukraine
Phones: +38(044) 204-94-52, +38(044) 204-83-12
e-mail: biotech@kpi.ua
Official website: biotech.kpi.ua
- 2. Department of Industrial Biotechnology**
Head of Department:
Doctor of Biological Sciences, Professor ,Oleksii M. Dugan
Phones: +38(044) 204-98-51, +38(044) 204-82-13
E-mail: prombt@i.ua
Telegram: https://t.me/dekanat_fbt
Facebook: <https://bit.ly/3dogpbY>
Official website: prombiotech.kpi.ua/
- 3. Department of Biotechnics and Engineering**
Head of Department:
Doctor of Technical Sciences, Professor, Viktoria M. Melnyk
E-mail: kafedrabi9@gmail.com
Telegram: t.me/fbt_main2018
Facebook: <https://www.facebook.com/bioengineer.kpi>
Phone: +38(044) 204-94-51
Official website: bioengineering.kpi.ua
- 4. Department of Bioenergetics, Bioinformatics and Ecobiotechnology**
Acting Head of Department:
Doctor of Technical Sciences, Professor, Natalia B. Golub
Phones: +38(044) 204-97-79;
E-mail: cobt@ukr.net
Facebook: <https://www.facebook.com/keb.kpi.ua>
Official website: keb.kpi.ua/en

