



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



## Faculty of Physics and Mathematics

# About the Faculty



The faculty is founded in 1996.

The faculty carries out training of bachelors, specialists and masters in Physics and Mathematics specialties.

Also at the faculty there is training for Doctor of Philosophy Degree and Doctor of Science Degree.

The dean of the faculty is Doctor of technical sciences, professor **Vladimir Vanin**.



# Activity of the faculty

## Pedagogical

- Baccalaureate courses

## Scientific

- Magistracy courses
- Graduate school

# The faculty is based on 7 chairs.

1. The General and solid-state physics chair (headed by Doctor of technical sciences **Vitalii Kotovskyi**).
2. The Mathematical analysis and probability theory chair (headed by Doctor of physical and mathematical sciences, professor **Oleg Klesov**).
3. The Mathematical physics chair (headed by Doctor of physical and mathematical sciences, professor **Vladimir Horbachuk**).
4. The General and Theoretical Physics chair (Headed by Academician of the National Academy of Sciences of Ukraine **Vadim Loktev**).
5. The General and Experimental Physics chair (Headed by Head of the Corresponding Member of the Academy of Pedagogical Sciences of Ukraine **Yuriy Horobets**).
6. The Differential equations chair (headed by Doctor of physical and mathematical sciences, professor **Nikolay Dudkin**).
7. The Descriptive geometry, engineering and computer drawing chair (headed by Doctor of technical sciences, professor Halina Gnitezka).



# About the Faculty in figures

- Quantity of teachers
  - Professors 18
  - PhDs 106
- Quantity of students
  - Physics 125
  - Mathematics 157
- Quantity of faculties serviced by the FMF
  - 19 faculties, 8 out of 9 educational institutes

- Specializations:

### Specialty 111 Mathematics:

- Insurance and financial mathematics  
(The Mathematical analysis and probability theory chair carries out training of bachelors and masters)
- Mathematical and computer methods in modeling of dynamic systems  
(The Mathematical physics chair carries out training of bachelors and masters)

### 104 Physics and Astronomy:

- Computer simulation of physical processes  
(The General and solid-state physics chair carries out training of bachelors and masters)

# Diploma of international standard



## International cooperation



# Physics and Astronomy

Specialty:

**Computer simulation  
of physical processes**



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# Physics and Astronomy

The direction of training is aimed at studying fundamental and applied problems of modern physics using mathematical and computer modeling methods.

## **Opportunities:**

- Dual diploma program and internship at US, French, and German universities.
- Getting scholarships and conducting research in the European Union.
- Getting an educational and qualification level **Doctor of Philosophy**.

# Duration of training

Baccalaureate

- 3 years 10 months (4 academic years)

Magistracy

- 1 year 9 months

# Baccalaureate courses (I cycle)

## GENERAL TRAINING CYCLE

- Educational disciplines of natural science training
- Training disciplines of basic training
- Educational disciplines of social and humanitarian preparation (**at the choice of students**)

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## Educational disciplines of natural science training

Mathematical analysis

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Analytic geometry and linear algebra

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Basics of vector and tensor analysis

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Differential and integral equations

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General Physics

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Chemistry

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## Training disciplines of basic training

Basics of economy

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Life safety and civil protection

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Probability theory and mathematical statistics

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Methods of mathematical physics

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Computer Graphics

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Theoretical physics

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## Educational disciplines of social and humanitarian preparation (at the choice of students)

Historical educational disciplines

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Ukrainian-language academic disciplines

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Philosophical educational disciplines

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Psychological disciplines

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Legal discipline

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Social and humanitarian educational disciplines

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Foreign Language

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Foreign language of professional orientation

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# Baccalaureate courses (II cycle)

## PROFESSIONAL PREPARATION CYCLE

- Educational disciplines of professional and practical training
- Educational disciplines of professional and practical training (**at the choice of students**)

Total number of hours of the undergraduate courses = 7200 hours

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# Educational disciplines of professional and practical training

Computer simulation in physics

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Informatics and programming

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Special sections of mathematical analysis

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Pedagogy

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Discrete Math

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Introduction to specialty

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Mechanics of continuous media

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Pedagogical practice

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Basics of modern electronics

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# Educational disciplines of professional and practical training (at the choice of students)

Physics of solid state

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Physics of crystals

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Astrophysics

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Physics of the universe

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Electrodynamics of continuous media

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Electromagnetic field in the medium

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Infrared thermography

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Fundamentals of thermography

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Methodology of teaching physics

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Fundamentals of teaching physics

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Special sections of informatics

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Fundamentals of Informatics

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# Ending of baccalaureate course

Practice

- Pedagogical

# Magistracy courses

9 semester

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Scientific and  
pedagogical  
practice

Educational discipline in pedagogy

Management discipline

Workshop on foreign language scientific communication

Scientific work on the theme of the master's thesis 1. Fundamentals of scientific research

Physics and technology of low temperature-1. Physical bases for obtaining low temperatures. Methods of realization of low temperatures. Measurement of low temperatures

Problems of modern physics

Methods of experimental research

Computer modeling of collective processes in solid-1. Monkerlo Methods in Solid State Physics

Scientific and pedagogical practice

Civil Protection

Patent and Intellectual Property

Workshop on foreign language scientific communication

Educational discipline in Sustainable Development

Scientific work on the theme of the master's thesis 2. Research work on the theme of the master's thesis

Physics of magnetic phenomena

Methodology of teaching physics

Physics and technology of low temperature-2. Vacuum and its use in cryogenics. Measuring the vacuum. Properties of substances at low temperatures. Superconductors

Macroscopic quantum phenomena

Computer modeling of collective processes in solid-2. Hydrodynamic models of solid state phenomena

Workshop on foreign language scientific communication

Scientific work on the theme of the master's thesis 3. Research work on the theme of the master's thesis

Mathematical modeling of systems and processes

Physics of nanostructures

Fundamentals of Quantum Field Theory

Modern technologies in solid state physics

Numerical experiment in multiparticle systems

10 semester

11 semester



# Ending of magistracy course

Practice

- Research practice

Dissertation

- Master's thesis

According to the State Classifier of Business, graduates of the faculty can work as:

- Professionals in the field of physical and technical sciences;
- Researchers in the field of solid state physics, physics of lasers, plasma physics and astronomy;
- Teachers of universities and other higher educational institutions.

# Faculty has the license to train 10 graduate students each year

## Duration of Graduate school training

full-time  
study  
form

• 3 years

external  
form of  
education

• 4 years

# Graduate school (1 cycle)

## GENERAL TRAINING CYCLE

- Educational disciplines for gaining profound knowledge in the specialty
- Educational disciplines for mastering general scientific (philosophical) competencies
- Educational disciplines for obtaining language competences

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Educational disciplines for gaining profound knowledge in the specialty

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Selected sections of theoretical physics

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Selected sections of solid state physics

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Selected methods of computer analysis

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Phase transitions and critical phenomena

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Presentation of the results of scientific research

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Educational disciplines for mastering general scientific (philosophical) competencies

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General-scientific (philosophical) disciplines

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Educational disciplines for obtaining language competences

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Educational discipline of language and practical training

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# Graduate school (II cycle)

## PROFESSIONAL PREPARATION CYCLE

- Educational disciplines for obtaining universal competence of the researcher
- Teaching disciplines for obtaining linguistic competencies, sufficient for presentation and discussion of the results of scientific work by foreign

Total number of hours of the graduate school courses = 1245 hours

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Educational disciplines for obtaining universal competence of the researcher

Methodology of scientific research

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Pedagogical educational discipline

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Pedagogical practice

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Educational discipline from magnetooptics

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Educational discipline on magnetism

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Educational discipline on numerical methods

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Teaching disciplines for obtaining linguistic competencies, sufficient for presentation and discussion of the results of scientific work by foreign

Educational disciplines of language training  
(by choice of graduate student)

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# Successful completion of graduate school:

- published 5 or more works in scientific journals in the specialty
- defense of dissertation work



# Contact us

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