"... faculty provides training of specialists for mathematization of science, technology, production, public relations – their formalization, structuring and the most extensive use of mathematical methods for solving of physical, technical, information, and management tasks..."

INFORMATION

PACKAGE

**FACULTY
OF APPLIED MATHEMATICS**

Kyiv, 2022

CONTENT

*** *Information is current as for the 2022/2023 academic year. Next academic year, there may be minor changes in the list of specialties and educational programs.*

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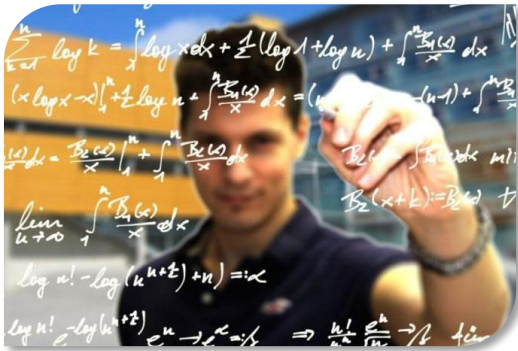fpm@kpi.ua
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1. COMMON DESCRIPTION OF THE FACULTY

The Faculty of Applied Mathematics (FAM) provides training for specialists in the important areas of modern social life. The mathematization of science, technology, production, and public relations is one of the most important fields and involves their formalization, structuring, and the most extensive use of mathematical methods for solving physical, technical, information, administrative, and other tasks.

Another important aspect of life is the informatization of society with computer and software engineering as basic tools. The latest achievements of fundamental and applied sciences are used in course of training at the Faculty.

Faculty trains specialists in the area of:

- Information technologies;
- **D**esign of operating systems;
- Development of the system and applied software;
- Design of automation systems;
- Scientific research;
- Expert systems;
- Development and use of computer systems and general-purpose networks;
- Specialized computer systems and networks with optimized parameters;
- Protection of information in computer systems, local and distributed computing systems.

Graduates of the faculty work in institutes of the National Academy of Sciences of Ukraine, sectoral research institutes, organizations, and enterprises that are engaged in the development and implementation of mathematical methods, computer and software systems, and other software and hardware automation of information, production, design and research processes, providing information technologies, protection of information, etc.

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2. STRUCTURE

*The **Faculty of Applied Mathematics** includes:*

1. **Department of Applied Mathematics;**
2. **Department of System Programming and Specialised Computer Systems;**
3. **Department of Computer Systems Software.**

3. EDUCATIONAL PROGRAMS

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

At the first level (Bachelor's course, I-IV academic years) students acquire fundamental knowledge in physics, mathematics, mechanics, computing, informatics, 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 to defend a master's thesis and acquire a Master's 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 (Ph.D.).

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

1. Department of Applied Mathematics provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	**Second**	**Third**
113 Applied Mathematics	Data Science and Mathematical Modelling	Bachelor *EPP*	Master *EPP*	–
			Master *ESP*	
	Applied Mathematics	–	–	Ph.D. *ESP*

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

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The graduates are skilled specialists in the development of information technology and information systems, mathematical and computer modeling of complex technical systems, processes, and phenomena, the development of mathematical support and software for information processing systems, the development of artificial intelligence, data mining, and soft computing.

Students acquire high-level training that is oriented on the practical use of mathematical methods and modern IT technologies for a wide range of engineering problems in the field of industrial, economic, environmental, and economic activity.
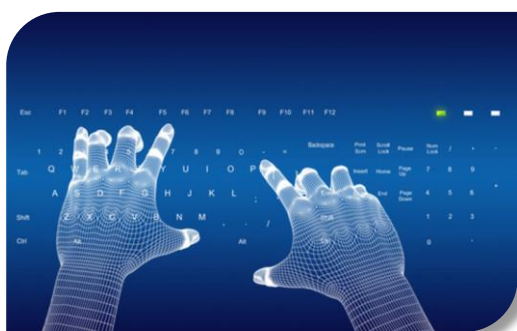
2. Department of System Programming and Specialised Computer Systems provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	**Second**	**Third**
123 Computer Engineering	System Programming and Specialized Computer Systems	Bachelor *EPP*	Master *EPP*	–
			Master *ESP*	
	Computer Engineering	–	–	PhD *ESP*

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

The graduates are skilled in the creation of hardware and software for current and future information technologies, development, and application of computer systems and networks for a general and special purposes, as well as needed system software, special-purpose computer systems, and networks with optimized parameters, embedded computer systems, technical means of information protection in computer systems, local and distributed computer systems, artificial intelligence systems.

3. Department of Computer Systems Software provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	**Second**	**Third**
121 Software Engineering	Software Engineering of Multimedia and Information Retrieval Systems	Bachelor *EPP*	Master *EPP*	–
			Master *ESP*	
	Software Engineering	–	–	PhD *ESP*

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

Students are trained to develop the software for computer systems and networks, operating systems, technical and corporate systems, decision support systems, automated control systems, intelligent and expert systems, business software, web portals, multimedia software, database and knowledgebase, software diagnostics, and certification systems, software for information protection in computer systems and networks.

E-learning Centre is a part of the department. The purpose of its activities is an organization of distance learning through modern information technology with the use of educational materials provided by the Polish-Japanese Institute of Information Technology; video conferencing, holding of seminars, workshops, and courses on specific subjects of training in information technology (within the implementation of the project). The informational and methodological basis of the Center consists of 47 distance learning courses.

4. TRAINING AND LABORATORY BASE

Faculty computers are connected to a local network that is part of the telecommunication network of Igor Sikorsky KPI and solves the following main tasks: efficient user access to the centralized internal university resources; effective high-speed user access to information resources of global networks through the central University Internet center; effective access of external users to the centralized information resources of the University; a system of distance learning and others. All the faculty's departments have assigned training laboratories and classrooms with the necessary number of workplaces.

Training laboratory of embedded computer systems was formed to provide the educational process at the **Department of Computer Systems Software** with the support of the company Motorola, which presented more than 20 presetting boards with processors of ColdFire family and DSP-processors for digital signal processing. Since 2007, a new Laboratory of Embedded Computer Systems LECS) operates with the support of the company Freescale. The laboratory is equipped with the latest computer and office technics.

5. RESEARCH ACTIVITY

The main directions of scientific research of the ***Department of Applied Mathematics***:

1. Data Science:
   - Data mining;
   - Privacy-preserving data publishing;
   - Soft computing (non-rigid calculation = fuzzy logic, neural networks, evolutionary computation);
   - Recommender systems;
   - Non-dyed wavelet decompositions;
   - Methods of detecting fraudulent practice in contextual advertising systems.

2. Mathematical and Computer Modelling:
   - Computational methods for solving partial differential equations;
   - Computational fluid dynamics;
   - Finite element methods;
   - Regression models and the theory of identification.

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3. System Engineering:
- Development of information theory of corporate structures as a system of scientific, technological, and economic processes and models;
- Development of the theoretical fundamentals for the creation of complex geographically distributed multi-level information systems.

Department of System Programming and Specialized Computer Systems solves the following scientific problems:
- Nontraditional forms of digital information representation and its processing capabilities;
- Methods and technics for optimizing structures and algorithms of functionally oriented computing facilities;
- Real-time hardware and software algorithmic computational tools;
- Computer-based tools and information protection algorithms;
- Specialized expert systems and means of their supporting;
- Information management in computer systems and networks;
- Embedded hardware and software computing resources;
- Table, table-algorithmic, and table-recursive computational tools;
- Structures and algorithms of specialized processors;
- Dispatch of information flows in distance learning;
- Control of digital equipment for the optimal use of instrumental and temporal redundancy;
- Pseudo-random testing of digital devices, methods, and tools;
- Test feasible design of digital circuits and systems;
- The controlled generator of pseudo-random number sequences for various applications.
- Fault-tolerant multiprocessor systems, modeling their behavior in a stream of refusals.

Department of Computer Systems Software investigates the following issues:
- Methods and technics of software engineering;
- Development of software technologies;
- Software certification;
- Software reliability estimation;
- Software for computer systems and networks;
- Software data protection;
- Methods and algorithms for graphical information compression.

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6. INTERNATIONAL PROJECTS AND COLLABORATION

Department of Applied Mathematics maintains close scientific and educational ties with universities, educational and scientific institutions: Carinthia University of Applied Sciences (Austria), Polish-Japanese Institute of Information Technology (Poland), École Polytechnique Paris (France), Universite du Maine (Le Mans, France), ParisTech – Institut des Sciences et Technologies de Paris (France), Technical University of Munich (Germany), Technical University of Udine (Italy), «Angel Kanchev» University of Ruse (Bulgaria), Yerevan State University (Armenia), St. Pölten University of Applied Sciences (Austria), Xi'an Research Institute of Navigation Technology (China), University of Tallinn (Estonia), Microsoft Development Center, Copenhagen (Denmark), the Company «Freescale» (USA).

The faculty has an E-learning Center Igor Sikorsky KPI, which was established in 2005 within the framework of the UN Development Program in Ukraine in cooperation with the Polish-Japanese Institute of Information Technology.

Also, work is continuing on a student business incubator, which is based on the FAM in the framework of the international project «Supporting the economic transformation of Ukraine by the establishment of business incubators at technical universities».

Department of Applied Mathematics has joint projects not only with educational institutions but also supports scientific and industrial cooperation with many famous companies. For example, the Department collaborates with the company «Freescale» (USA), as well as with the Ukrainian company «Information Software Systems» through the development of scientific and methodological support for special-purpose processor designing.

Foreign students and postgraduates from Moldova, Turkmenistan, Turkey, Afghanistan, Vietnam, China, Lithuania, Libya, Yemen, Israel (Palestinian Authority), Iran, Mexico, Syria, Jordan, Dominican Republic, Morocco, and Peru also enrolled in the faculty together with Ukrainians.

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7. CONTACT INFORMATION

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