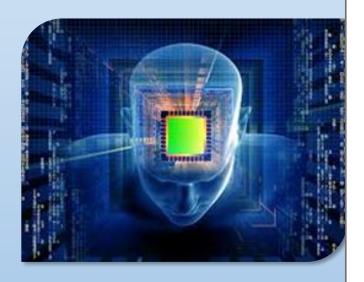
«...specialists in field of nanoelectronics, biomedical electronics, acoustics and acousto-electronics, telecommunications and industrial electronics.
Graduates confidently use modern computer design technology, are skilled in developing and operating of electronic and acoustic apparatuses, devices and systems...»



INFORMATION PACKAGE

FACULTY
OF ELECTRONICS

Kyiv, 2016

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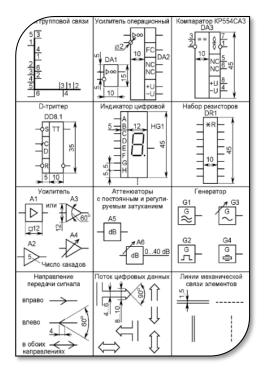
*** The information is current as for 2016/2017 academic year. In the next academic year, there may be minor changes in the list of training directions, specialties, and specializations.





1. COMMON DESCRIPTION AND THE STRUCTURE OF FACULTY

Today there is a steady tendency of transition of electronic equipment to the world



of digital electronics. Graduates of the Faculty of Electronics (FEL), on the one hand, should be qualified in service of modern electronic technics. and on the other - have sufficient qualifications, theoretical knowledge, practical skills in modern technologies and element base for creating a competitive electronic equipment.

The training of qualified professionals in electronics, electrical engineering, as well as in the areas that are related to computerization, impossible without a real scientific and technological activities of our faculty specialists. The faculty was founded in October 1962 and consisted of three departments. Today FEL enrolls more than 2,000 students, including more than 100 foreigners.

The faculty trains specialists in the field of nanoelectronics, biomedical electronics, acoustics,

and acoustoelectronics, telecommunications, and industrial electronics. Graduates confidently use modern computer design technology, are skilled in developing and operating of electronic and acoustic apparatuses, devices and systems of a wide range of destinations.

Structure

a leader in the field of solid-state electronics Ukraine established number а internationally recognized schools of science.

1. Department of Microelectronics as

Department trains experts with a degree in "Micro and Nanoelectronics" (specializations "Micro and Nanoelectronic Devises and Equipment" and "Microelectronic Information

Faculty of Electronics consists of 7 departments and 3 interdepartmental laboratories. **Research Institute of Applied Electronics** operates on the basis of faculty

Training at the department is based on a deep learning of the fundamental sciences: physics, mathematics, and informatics that allows graduates work in the industry and engage in research. Creating of new, competitive products requires not only the use of modern technology and design techniques but also the use of the ideas of functional electronics based on microcircuit principles of physical phenomena and effects in solids. Various apparatus is made using these effects: solid-state lasers,



Systems").

optical-electronic means of communication and holographic systems for processing of super-large data arrays, piezoelectric and magnetic functional elements.

2. Department of Electronic Devices and Equipment trains experts with a degree in Electronics (specialization "Electronic Devices and Equipment").

Training is carried out in the framework of educational and scientific school Physics and Technology of Electronic Devices for Information and Applied-physics Systems. On the basis of the fundamental physical and mathematical technological schemes professional education and research cycles, provides multidisciplinary Department training of bachelors, masters, and PhDs for organizationalthe research. desian. methodical, scientific and teaching activities in the field of research, design, production and operation of multipurpose electronic devices.

Research Institute of Applied Electronics engaged in the development and implementation of modern electronic equipment and devices for industry, energetics, communications and medicine. The main directions of Institute activity: control stations for protection of microprocessor controlled electric motors; parallel type compensators of reactive power based on IGBT modules; charge-discharge and charge-stabilizing devices; uninterruptible power supply systems; piezoelectric motors for automation systems; piezoceramic electrical filters; photovoltaic panels and inverters; sensors and sensor evetame of automation.

3. Department of Industrial Electronics trains experts with a degree in



Electronics (specialization "Electronic Systems"). Training of professionals is focused on development and operation of electronic equipment. Experts are trained for scientific research in the field of power electronics and computer and microprocessor technology, programming of microcontrollers, specialized systems for control of production processes.

The main directions of training at the department: development and design of microprocessor devices and control systems;

control and regulation of a wide destination; development and designing of power electronic devices and systems of transformation and adjustment of parameters of electric energy; computer methods of design and information processing; usage of information computer technology in control and display devices; operation and maintenance of multipurpose electronic equipment.



4. Department of Physical and Biomedical Electronics trains experts with a

degree in "Micro- and Nanosystem Engineering" (specializations "Electronic Biomedical Systems and Technologies", and "Information Technologies of Design in Electronics and Nanosystems").

The department trains professionals in field of integrated microthe and nanoelectronics. development, and implementation of computer medical diagnostic systems, computer simulation of microelectronic devices and equipment, the design of components for telecommunication systems, the creation of automatic analysis of measured data.

The advantage of teaching is the emphasis on the fundamental training of students in mathematics, programming (Assembler, C, C++, CSharp, Java, HTML, SQL), analog and digital circuity engineering, computer circuity, microcircuit technique, modern microprocessor technique, use of software for design and simulation of electronic circuits: PSpice, LTSpice, OrCAD, P-CAD, AutoCAD, MathCAD, MatLab, Mathematica, Compass, signal and image processing, medical introscopy

5. Department of Acoustics and Acoustic Electronics trains experts with a



degree in Electronics (specializations "Acoustic Multimedia Technologies and Systems", and "Bioacoustic Systems".

Students learn to use the application software for acoustic signal and image processing, mathematical and virtual modeling and design of acoustic devices and systems. Considerable attention is paid to the design of ultrasonic

computer introcopy and tomography systems, measuring and diagnostic equipment, development of acoustic instruments, equipment for home and professional recording studios and the like.

Experts in the field of acoustic medical equipment are trained to be skilled in design, operation and maintenance of ultrasonic medical devices for human health diagnostics, therapeutic ultrasound devices, hearing diagnostic devices, digital hearing aids, and others.

6. Department of Electronic and Computing Equipment Engineering trains



experts with a degree in "Telecommunication and Radio Engineering" (specializations "Information-Computing Facilities of Electronic Systems").

Department graduates are capable:

 develop information systems and electronic computing machines, "systems-on crystal" (SoC)



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- based on the single-crystal CISC, RISC and ARM microcontrollers, digital signal processors DSP and FPGA;
- develop software with the use of Arduino, C, C ++, Assembler, PHP, MySQL, Verilog and VHDL, be skilled in HTML and CSS, use applied software packages Arduino-IDE, MatLab, OrCAD, Altium Designer, Quartus II, AVR and Code Composer Studio, IAR Workbench, as well as tool for programming of measuring and control computer complexes LabVIEW;
- create databases, develop own utilities and program systems on the high-level languages, create own web pages and sites, organize various web services;
- design, deploy, adjust the setting and maintain computer networks with the use of technologies Wi-Fi, Bluetooth, Ethernet, DSL, ZigBee, personally build any kind of network: both the home and large corporative one;
- fulfill creation of electronic devices, beginning with the development of circuit, algorithmic, software and design solutions and finishing in its manufacturing.

7. Department of Acoustic Engineering and Information Registration trains experts with a degree in Electronics (specialization " Electronic and Information

Systems and Technologies of TV, Cinema and Sound Engineering").

The department graduates are capable develop and maintain modern telecommunication systems telecommunications facilities, prepare broadcast program on the basis of computer technologies, and develop, implement and use modern audio and video equipment, systems and technologies of cinematography.

2. EDUCATIONAL PROGRAMS

Levels of higher education. Training of students at the FEL is carried out at

several levels of higher education. At the first level (Bachelor's, I – IV years) the students acquire fundamental knowledge in physics, mathematics, mechanics, computer engineering, and special disciplines. During the IV year, they defend bachelor course work and receive Bachelor's qualification degree. At the second level (Magistracy, V - VI years)



training is carried out according to the Master program. Students are trained and acquire relevant skills including laboratory practice. Additionally, students have the

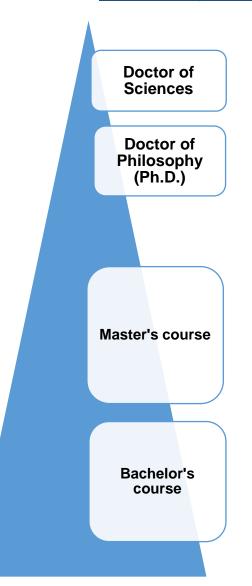


opportunity to continue their education in a graduate course, and then in a doctoral candidacy of the University.

Terms of specialists training: Bachelor (b) -4 years; Master (m) -2 years (standard terms of training at Bachelor course and Magistracy), Graduate course / Doctoral candidacy -3 years (4 years by the correspondence study).

Training of specialists is carried out on the full-time and correspondence forms of education.

Areas and specialties of students training at the FEL:



- Biological and Medical Devices and Systems
- Solid-State Electronics
- Vacuum, Plasma, and Quantum Electronics
- Information Technology
- Applied Acoustics and Sound Engineering
- Semiconductor Power Converters
- Micro and Nanoelectronic Devices and Equipment
- Microelectronic Information Systems
- Information Technologies of Design in Electronics and Nanosystems
- Electronic Biomedical Systems and Technologies
- Acoustic Multimedia Technologies and Systems
- Bioacoustic Systems
- Electronic and Information Systems and Technologies of TV, Cinema and Sound Engineering
- Electronic Devices and Equipment
- Electronic Systems
- Information and Computing Facilities of Electronic Systems





Graduates of FEL are fluent in:

modern computer technology design,

develop and operate:

- electronic and acoustic instruments,
- multipurpose devices and systems.

Students acquire knowledge and skills of:

electronic systems

acoustics and acoustoelectronics

industrial electronics

biomedical electronics

telecomunication systems

3. TRAINING AND LABORATORY BASE

Laboratory of Display Devices operates at the *Department of electronic instruments and devices*, in which a number of high-tech digital X-ray image processing devices for industrial and medical purposes were developed.

A hardware video processor VP-063 is designing at the laboratory for operation as a part of industrial X-ray TV flaw detection systems. There are significant results in the field of format conversion of television images. Students and graduate students under the supervision of department teachers carry out these developments.





Training at the *Department of Industrial Electronics* is provided by:

- Laboratory of the Theory of Electrical Circuits and Electromagnetic Systems;
- Laboratory of Electronic and Microprocessor Devices and Systems;
- Laboratory of Computer and Internet Technology;
- Laboratory of Power Electronic Devices and Systems;
- Laboratory of Microprocessor Control Systems MicroGrid and SmartGrid;
- Laboratory of Power Electronic Systems;
- Laboratory of Devices and Systems for Information Display and Registration;
- Laboratory of Computer Equipment and Computer Systems;
- Laboratory of electronic computer systems.

Department of Physical and Biomedical Electronics has two modern computer classes, educational computerized Laboratory of Computational Methods in Electronics, Laboratory of Diagnostics, Laboratory of Microwave Physics, Laboratory of Biotechnology, Laboratory of Solid-State Electronics, Laboratory of Metrology, Laboratory of Analog and Digital circuitry, Laboratory of the Theory of Electronic Circuits.

Department of Acoustics and Acoustic Electronics has the Laboratory of Examination and Correction for providing advice to students, organizations and individuals for the acoustic examination and correction, as well as the implementation of educational and practical projects.

Department of Electronic and Computing Equipment Engineering uses in the



learning process some modern laboratory facilities in the form of evaluation modules of type DE2, DE5 from the firm ALTERA, BeagleBoard on the base of OMAP3, BeagleBone Black on the base of ARM Cortex A8, circuit boards on the base of platforms C28x, C55x, C64x and MSP430, ASLK-PRO from the firm **TEXAS** INSTRUMENTS, C51, AVR from the firm STM32 ATMEL. from the firm STMicroelectronics, Arduino

portable solutions for wireless technologies in the form of ZigBee-modules Tmote Sky, microcomputers Intel Galileo and Intel Edison, telecommunication facilities Cisco.

Official Training Center of Teaching of PLD Designing Technologies from ALTERA and Educational Laboratory of TEXAS INSTRUMENTS, Scientific Training Center "Lean production" operate at the department, as well as 6 teaching and research



laboratories: Laboratory of Digital Technology Digital Lab, Laboratory of Microprocessor Devices, Laboratory of the Physical Fundamentals of Microelectronics, Laboratory of Information Technologies, Laboratory of Analog and Digital Electronics, and Open Laboratory LAMPA on its base.

Department of Acoustic Engineering and Information Registration has modern laboratories: Laboratory of the Functional Units of Telecommunication Systems and EMC, Laboratory of Measuring Systems, Laboratory of Radio Receivers, Laboratory of Power Supply and Electromagnetic Compatibility of Electronic Equipment, Laboratory of Magnetic Recording, Laboratory of Ultrasonic Transducers of Physical Quantities, Laboratory of Equipment and Operation of Motion Pictures Apparatus, Laboratory of Applied and Broadcast Television, Laboratory of Computing and Computer Technologies of the Audio-Visual Content Processing. Department has a certificate for student's training according to the educational program of Cisco.

4. RESEARCH ACTIVITY

The main researching areas of the Department of Microelectronics:

- physics of semiconductor and dielectric materials;
- the synthesis of new materials for electronics;
- renewable sources of energy, photovoltaics;
- piezoelectric devices and equipment;
- microelectronic sensors, the functional elements of the electronics:
- dielectric microwave components and devices;
- new semiconductor devices; •
- computer technology;
- ultrasonic sensors, vibration sensors;
- microwave measuring cell for tg measuring in the range 5.20 GHz;
- the microstructure of composite materials;
- device for power supply controlling of computers;
- new amorphous semiconductors and composites.

Areas of research at the Department of Industrial Electronics:

- analysis and synthesis of gate transducers of fixed and variable structure;
- the mathematical basis of microprocessor control algorithms and digital signal processing;
- devices and systems of power electronics;

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energy-efficient power management in electrical complexes and systems MicroGrid and SmartGrid.









НТУУ «КПІ́»

ФЕЛ Факультет електроніки

Permanent seminars (once or twice per month) of the National Academy of Sciences of Ukraine "Semiconductor transducers in the industrial electronic devices" is organized by the department. Academic staff, students, and postgraduates have the possibility to test the results of their scientific investigations.

Scientific teams and laboratories that work at the Department of Physical and Biomedical Electronics:

- Team on biomedical electronics and signal analysis;
- Team on micro- and nanoelectronics;
- Team on microwave electronics:
- Laboratory of Biophysics;
- Research group of subtle onsets of the heart electrical activity.

Research projects that are carried out at the Department of Acoustics and Acoustic Electronics:

- systems of automatic speech recognition;
- acoustic elements of security systems;
- identification of interlocutors;
- secret voice recording system.



The main researching areas of the Department of Microelectronics:

- image processing in industrial machine vision and medical systems;
- measuring transducers of physical quantities on the surface acoustic wave;
- visualization and positioning of nano-sized objects;
- sources of charged and neutral particles;

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• X-ray television systems for non-destructive quality control of products.

Research directions of the Department of Electronic and Computing **Equipment Engineering**

- development and improvement of modern audiology methods and means of prevention and early diagnosis of human organ of hearing disorders and their metrological support;
- the design of microprocessor devices and control systems, problem-oriented systems of various functional purpose;
- study ways of building and construction of modern portable electronic computing mean for image processing to detect, identify, capture and tracking of objects





- based on SoC ("System-on-a-Chip"), NoC ("Network-on-a-Chip"), ARM and DSP technology;
- research in the field of intelligent electronic information systems, including artificial intelligence, expert systems, fuzzy systems and decision support systems;
- development of the theory of descriptive environments and research of its application to the design and development of complex informatics technology systems;
- intelligent information networks, the methodology of construction of multiinformation networks, intelligent control and monitoring system in multiservice networks:
- computer telephony systems, coding and synthesis of speech in IP-telephony, the IP network security systems;
- implementation of methods of modern "lean production", including the management of quality, environment, occupational safety and occupational health, food safety, information security, integrated management systems, industrial management systems based on international standards of ISO 9000, ISO 14000, ISO 22000, ISO 27000, OHSAS18000; SA8000 and IRIS.

Areas of research at the Department of Acoustic Engineering and Information Registration:

- use of technologies and technics of intelligent networks for distance exchange of information;
- networks and multi-channel telecommunication systems;
- systems and technical means of radio and television broadcasting, electroacoustics and voice informatics, multimedia equipment;
- systems and technical facilities of information protection in telecommunication systems;
- satellite and mobile communication systems;
- use of modern technologies and means of the information recording and reproducing in systems of industrial, public and household applications;
- system and equipment for reproducing of audio and video for various groups of people;
- systems and technical means for recording and processing of scientific, technical and industrial information;
- operational management and service of audio and video equipment;
- systems of compression of lingual and video information;
- electromagnetic compatibility of radio electronic devices.





5. INTERNATIONAL PROJECTS AND COLLABORATION

Faculty of Electronics participates in the program of dual master's degree in Microelectronics together with the Electronics Packaging Lab (IAVT) of the Dresden University of Technology (Germany). The contracts on student exchange and agreements on research cooperation are signed with the KTH Royal Institute of Technology, Stockholm (Sweden); Korea Institute of Science and Technology (South Korea); Central School of Electronics,

The Faculty has a long history of international cooperation and is well known in the world. Many teachers and students are members of international organizations CODATA and IEEE

Paris (France); College of Engineering, Korea University (South Korea); Yonsei College of Electronics (South Korea); Parthenope University of Naples (Italy).

International relations between the *Department of Industrial Electronics* and foreign educational institutions and scientific organizations consist of the activity in two directions: training of foreigner and inter-university cooperation.

Department performs joint projects with foreign partners:

- RMEI (Reseau Mediterraneen des ecoles d'Ingenieurs) preparation of project documentation of the European Tempus program and joint research project Med-Tracking;
- Technical University Dresden scientific work and training of young scientists, graduate, and post-graduate students, joint research on the transmission of information signals on the electric grids;
- The Aristotle University of Thessaloniki, Greece internship program «Open source tools for multimedia development»);
- University of Zielona Góra, the Maritime Academy of Gdynia (Poland), Ritsumeikan University, Kyoto (Japan), Tallinn University of Technology (Estonia), Georgian Technical University, Tbilisi (Georgia) - joint research in the field of power electronics, converter equipment, systems and algorithms of signal control and processing, participation in competitions of joint Ukrainian-Japanese research projects;
- Riga Technical University, Latvia (scientific training, inter-university cooperation agreements, review of articles and co-organization of international conferences);
- Wroclaw University of Technology (academic mobility of students and scientific and pedagogical personnel in the framework of Erasmus+ project, joint research).

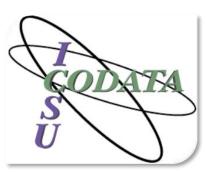




Department of Microelectronics cooperates with Germany (Berlin Federal Institute for Materials Research and Testing, universities of Aachen, Duisburg), France (universities of Paris, Limoges), Czech Republic (University and the Institute of Physics in Prague), the Netherlands (Delft University), Portugal (University of Aveiro).

Department of Electronic Device and Equipment provides students with the opportunity, starting from the second year, to participate in the program "Double Diploma", established in cooperation with the Technical University Dresden (Technische Universitet Dresden). The fourth and fifth-year students who have successfully enrolled in the program and have mastered German language course, TRAINS in the laboratories of the Technical University Dresden, as well as perform their course and degree projects. Students who have successfully completed a training course on the program "Double Diploma" on a competitive basis can go to graduate school at Technical University Dresden.

Students and teachers of the *Department of Physical and Biomedical Electronics*



are members of the international scientific organizations: Institute of Electrical and Electronic Engineers (Engineering in Medicine and Biology Society, Microwave Society, Communication Society), CODATA.

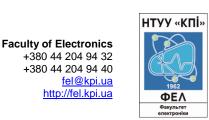
Scientific collaboration between FEL and research groups at foreign academic and scientific research centers and companies is in progress, namely: with the Institute of Biomedical Engineering TU Dresden on the

analysis of heart rhythm variability and classification of sleep stages; with Tesco (Seoul, Republic of Korea) for the development and production of equipment for telecommunication systems testing.

part of the double degree programs, undergraduate students have the possibility of simultaneous theoretical and practical training both in the Igor Sikorsky KPI and in Germany or South Korea. Students of the Department take part in two double degree programs: with the Technical Dresden University in the field "Production of micro- and nanoelectronic devices," "Biomedical Electronics" and with the Korea Advanced Institute of Science and Technology.

Department has the agreements on international exchanges with the following foreign educational institutions:
Royal University of Technology, Stockholm (Sweden),
Ecole Centrale d'Electronique, Paris (France),
College of Engineering,
Korea University (S. Korea),
College of Electronics,
Yonsei University (S. Korea),
Parthenope University of Naples (Italy)





Department of Electronic and Computing Equipment Engineering fruitfully cooperates with leading international companies in the field of electronics as Altera (USA) and Texas Instruments (USA).

Two international educational and research centers operate at the *Department of* Electronic and Computing Equipment Engineering: Ukrainian official training center for design technology of company ALTERA (USA), Training laboratory of Texas Instruments (USA).

Department of Electronic and Computing Equipment Engineering fruitfully cooperates with leading international companies in the field of electronics as Altera (USA) and Texas Instruments (USA).



The work of the official Training Center for Product Design Technologies from Altera in Ukraine is performed on the basis of new educational and scientific laboratory Digital Lab technologies within the frame of international program ATPP

(Altera Training Partner Program). The activity of the Texas Instruments Training Laboratory is performed according to the international program Texas Instruments.

The Department is also cooperating with the Belgian company Melexis. Students are training in techniques of digital design and testing of integrated microchips in general Educational and Scientific Laboratory Igor Sikorsky KPI - Melexis.



In addition, the Department organizes and conducts international seminars in the enterprises of Republic of Belarus and Kazakhstan in the form of training of internal auditors in quality management systems, energy management, environmental management and the management of the food industry in accordance with the requirements of the international standards ISO9001, ISO19011, ISO50001, ISO22000,

ISO22002 and ISO14001.





6. CONTACT INFORMATION

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