



Faculty of Electrical Engineering
and Informatics

Annual Report 2023

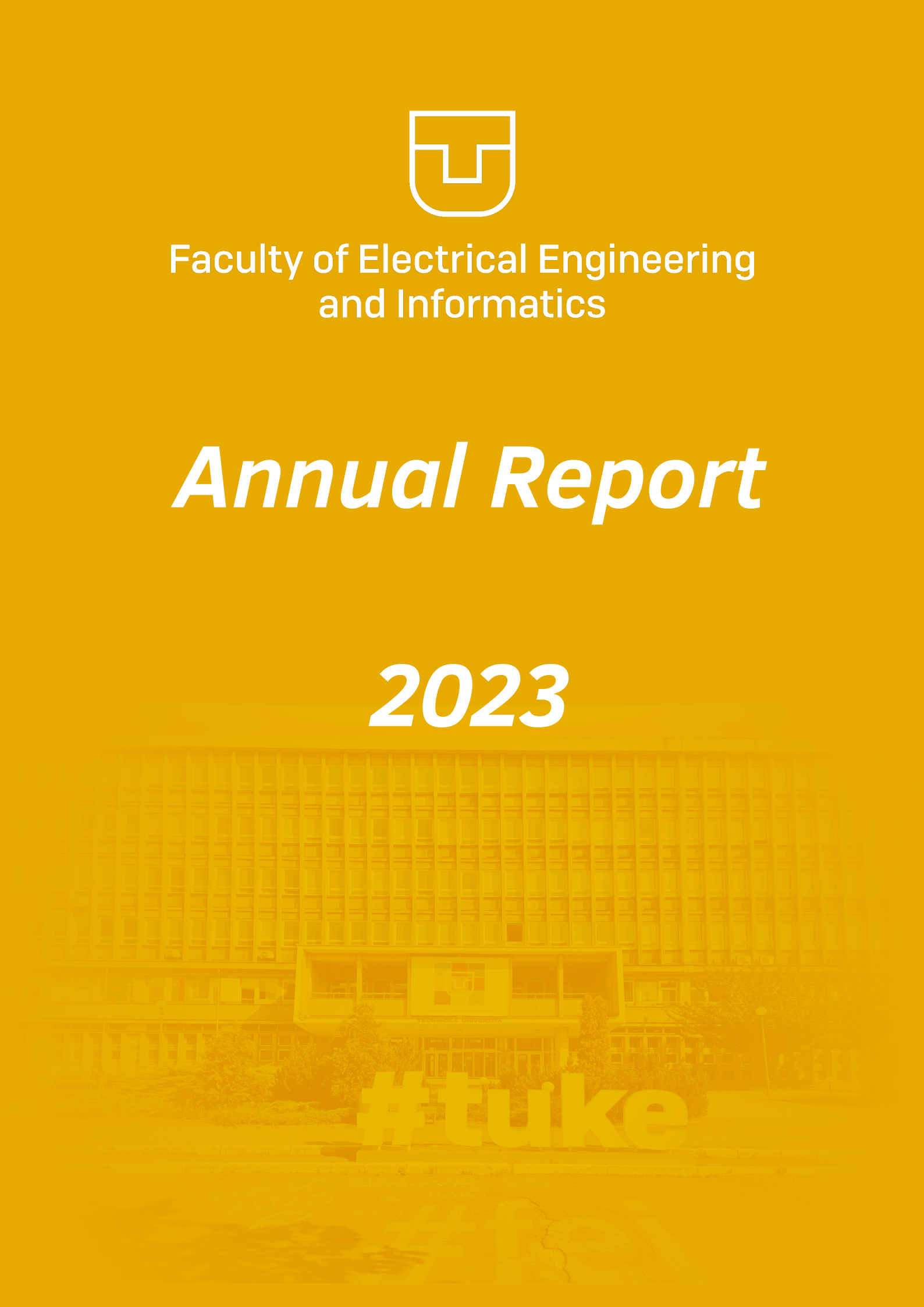
#tuke



Faculty of Electrical Engineering
and Informatics

Annual Report

2023

A large, multi-story building with a grid-like facade of windows, likely a university building, is visible in the background. The entire image is overlaid with a semi-transparent orange filter.

#tu ke

FOREWORD / WELCOME FROM THE DEAN OF THE FACULTY

Our goals:

***We intend, we want ..
“ to be an attractive
but simultaneously a
pretentious faculty for
students for whom the
diploma awarded will
open the doors on the job
market,***

***.. to be an important
research centre in field
of electrical engineering
and informatics both at
home and abroad,***

***.. to be a faculty with
friendly relations and
excellent collegial
atmosphere which
enables creative activity
of the teaching and
research staff in hand
with our students.”***



Ladies and Gentlemen,

It is my great pleasure to send you greetings from Slovakia as a Dean of Faculty of Electrical Engineering and Informatics, Technical University in Košice (TUKE). Slovakia is a country in central Europe. Our University is located in the Eastern Slovakia and we are very proud to live in the city of Košice, which is an old historical city with many historical buildings and places. Košice is also cultural and social centre of the Eastern part of the country and the second biggest city in Slovak Republic. The number of students currently attending nine TUKE faculties exceeds 11,000. Approximately 10,000 of them are full-time students, out of which there are 8,400 Bachelor students, 2,500 Master students and over 400 PhD students. Almost 670 teachers work here, and the same number of research and administrative staff.

Allow me to introduce Faculty of Electrical Engineering and Informatics, Technical University in Košice in Slovakia. Faculty is a school with approx. 3,800 students and 155 teachers and research associates. We have 77 PhD students in our courses. We offer more than 11 courses for faculty education including Bc. (BSc.), Ing. (MSc.) and PhD in two main branches: Informatics and Electrical Engineering. In this publication can find more details about particular specialization. Our teachers and

research associates are highly qualified persons and very active in educational and research projects mainly in international co-operation. Faculty takes active role in 10 educational and 5 research international projects granted by agencies from EEC countries and also participates on more than 58 research projects granted by Slovak agencies. All this activity brings very interesting and highly valuable results. We hope that this community will grow and will appreciate our skills and good conditions for study here in Košice.

The main role of this publication is to inform you about results of the Faculty for last year and warmly invite readers for mutual co-operation and international contacts. We are open to any discussions about educational and research problems and we would highly appreciate any opportunity to meet with colleagues from other countries. I would like to express a warm invitation for our potential future students and underline that we provide a high profile teaching courses by experienced teachers and research associates.

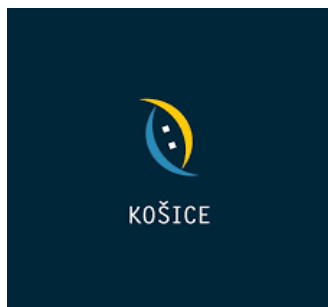
Yours Sincerely,

Prof. Ing. Liberios **Vokorokos**, PhD.

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About Košice and Technical university



Košice - metropolis of Eastern Slovakia - has more than 750 years rich history. It is an important administrative, business and industrial center, important crossing of road, railway and air traffic. The downtown has been reconstructed in last years and at present it belongs to the most beautiful and lovely cities in Slovakia. Towering over the center there is the gothic cathedral of St. Elisabeth, completed in 1508, the biggest and most important gothic monument and the only one of this kind in Eastern Europe. The town center is completed by the gothic St. Michael's Chapel

and the East Slovak Theatre - imposing construction build in Neo-Baroque style. At present, there are approx. 240 thousands inhabitants in Košice and it is the second largest city in Slovakia.

The Technical University of Košice was established in 1952, but in the fact, the origin and roots of two from their faculties go back to the 18th century and they are derived from the Mining Academy in Banská Štiavnica. The University is a state-supported institution. At present, the University consists of nine faculties. It has more than 10 600 Master's and Bachelor's degree students, about 400 PhD. students and 670 academic staff members.



The Faculty of Electrical Engineering and Informatics, has been one of the leaders in Slovak technical higher education since its establishment in 1969. Faculty consists of nine departments, one Centre of IT and a computing centre. The departments of the Faculty are located in the campus of the Technical University, which is located in 10-min. walk distance from the city

center. The Faculty is committed to providing its students with the best possible experience of education for their future career and leadership in their profession, for admission to advanced degree programs, and for lifelong learning. The faculty offers a wide variety of full-time and part-time courses, which are relevant to industry's needs. Graduates leave our departments well equipped to meet the needs of industry and development/research institutions and get their jobs with ease. Statistics: Present number of faculty staff members is 217 and among them 26 professors, 59 associate professors, 62 assistant professors, 8 research workers, 62 administrative staff and technicians. The number of BSc. students is approximately 1695, number of MSc. students is 729 and number of PhD students approximately 77, every year. relevant to industry's needs.

Number students in academic year 2023-2024

Number of Bachelours students (Bc.) (Slovak /foreign students)

1. year	2. year	3. year	Total number
1695/994	729/334	672/166	3096/1494

Number of Master of Science students (Ing.)

1. year	2. year	Total number
335/52	461/29	796/81

Total number of students

Bachelor level	Master level	PhD. level	Total number
3096/1494	796/81	77/3	3969/1578

The student numbers by study programs area (Slovak /foreign students).

Branch of study	Bc.	Ing.	PhD.	Total number
Informatics	1596/896	387/51	35/2	2018
Cybersecurity	1701/58	30/4	-	200
Intelligent Systems	238/125	36/6	16/0	290
Business informatics	245/92	71/4	-	316
Applied Electrical Engineering	125/33	-	-	125
Electrical Power Engineering	134/33	68/4	-	202
Computer networks	334/118	84/1	-	418
Physical Engineering of Advanced Materials	8/5	1/0	6/2	15
Automotive Electronics	89/42	28/3	-	117
Computer Modelling	105/88	11/6	-	116
Industrial Electrical Engineering	52/4	80/4	20/77	152
				3969

Faculty Organization and Resources

DEAN'S OFFICE

The dean's office manages the Faculty life and offers services both for the students and staff members.

Management of the Faculty (till 31. 03. 2023)

Dean: **prof. Ing. Liberios Vokorokos, PhD.**

Vice-deans: **prof. Ing. Alena Pietriková, CSc.** responsible for research and development and doctoral studies
doc. Ing. Mária Gamcová, PhD. responsible for the Faculty promotion and International Relationships
doc. Ing. Ľubomír Beňa, PhD. responsible for Bachelor and Master's studies
doc. Ing. František Babič, PhD. responsible for development and External Relations

Faculty Secretary: **Judr. Mária Girmanová Homzová** responsible for financial matters and dean's office management

Management of the Faculty (from 1.4.2023)

Dean: **prof. Ing. Liberios Vokorokos, PhD.**

Vice-deans: **doc. Ing. Martin Chovanec, PhD-** responsible for Project Coordination and Technology Transfer
doc. Ing. Emília Pietriková, PhD. responsible for Education at the First and Second Levels of Study and

Accreditation

doc. Ing. Karol Kyslan, PhD. responsible for Research and Doctoral Studies
doc. Ing. Ján Papaj, PhD. for International Relations and Faculty Promotion
doc. Ing. František Babič, PhD. responsible for development and External Relations

Faculty Secretary: **Mgr. Mária Pačilová** responsible for financial matters and dean's office management

FACULTY ACADEMIC BODIES

The Faculty Scientific Council Faculty and the faculty Academic Senate creates academic bodies of the Faculty having many control and checking functions and responsibilities that are stated in the Faculty Ruling Guide.

Faculty Scientific Board

The Scientific Board is an advisory board to the dean. The members of the Faculty Scientific Board are grouped from the vice-deans, heads of departments, professors and representatives from co-operating industrial companies. The Scientific Council plays decisive role at the Faculty development, orientation and research.

Faculty Academic Senate

The Faculty Academic Senate is the highest-level self-governmental body of the Faculty and is authorized to control and

Faculty Organization and Resources

approve activities and issues of the Faculty Presidium. Every department elects one staff member as a representative into the Faculty Staff Chamber of the Faculty Academic Senate. Students also have their representatives in the Students' Chamber.

Professors Board

Professors Board is an advisory board to the dean. The members of the Professors Board are grouped from professors and extraordinary professors of faculty. Board was created from February 1st, 2007 and prepared references for dean of faculty.

DEPARTMENTS

The faculty consists from the following departments (abbr. in Slovak language):

<i>Department of Computers and Informatics</i>	KPI
<i>Department of Cybernetics and Artificial Intelligence</i>	KKUI
<i>Department of Electric Power Engineering</i>	KEE
<i>Department of Electrical Engineering and Mechatronics</i>	KEM
<i>Department of Electronics and Multimedia Telecommunications</i>	KEMT
<i>Department of Physics</i>	KF
<i>Department of Mathematics and Theoretical Informatics</i>	KMTI
<i>Department of Theoretical and Industrial Electrical Engineering</i>	KTPE
<i>Department of Technologies in Electronics</i>	KTE

CENTRES OF EXCELLENCE

The faculty has two Centres of Excellence:

1. Centre of Information and Communication Technologies for Knowledge Systems.

WEB: <http://www.ce-ikt.fei.tuke.sk/>

The Center consists of:

- *Laboratory of Intelligent Interfaces of Communication and Information Systems*
- *Laboratory of Knowledge Technologies*
- *Laboratory of Progressive Communication Technologies*

2. Centre of Excellence of the Integrated Research and Exploitation of the Progressive Materials and Technologies in the Area of Automotive Electronics.

Head of the centre: **prof. Ing. Alena Pietriková, PhD.**

<https://www.fei.tuke.sk>

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Email: alena.pietrikova@tuke.sk

WEB: <http://ce3.fei.tuke.sk/>

The Center consists of:

- *Laboratory of Sensor and Communication Networks of Safe Automobil of the Future*
- *Laboratory of EMC Electronic Devices and Biological Systems*
- *Laboratory of Modeling and Measurement for Automotive Electronics*
- *Laboratory of Automotive Electrotechnics*
- *Technological Laboratory for Research of Progressive Materials for Automotive Electronics*

Laboratory for Modification and Testing of Properties of Progressive Materials

COMPUTER CENTRE

Address: Park Komenského 2, 042 00 Košice, Slovak Republic

Tel: ++421-55-602 4007

Fax: ++421-55-602 2249

Web: <http://www.tuke.sk/fei-PC>

E-mail: Liberios.Vokorokos@tuke.sk

Head of the Centre: **prof. Ing. Liberios Vokorokos, PhD.**

The Centre offers services in field of computer technology: it maintains and supports majority of the faculty computing facilities both in HW and in SW. It also is responsible for maintenance and operation of the faculty computer network and networks information services, four PC laboratories with more than 50 personal computers that are working 24 hours/day and is responsible for the faculty information system. Each student of the Faculty has a free access to the Internet.

Education and Course's

EDUCATION AND COURSE'S

Courses offered

The Faculty offers three types of full-time and part-time courses:

- *Bachelor's Degree courses (3 years) leading to degree Bc.*
- *Master's Degree courses (2 years) leading to degree Ing.*
- *Doctoral Study courses (4 years) leading to degree PhD.*

in various branches of study in electrical, electronic, automation and communication engineering and informatics.

Bachelor courses

Bachelor's Degree courses lasts in daily form 3 years. The graduates get more-or-less practical skills in mastering

Informatics

Cybersecurity

Intelligent Systems

Business Informatics

Applied Electrical Engineering

Electric Power Engineering

Computer Networks

Physical Engineering of Advance Materials

Automotive Electronics

Computer Modeling

Industrial Electrical Engineering

Master's Degree courses

Master's degree courses lasts in daily form 2 years. The graduates are oriented towards the selected branch of specialization:

Informatics

Cybersecurity

Intelligent Systems

Business Informatics

Electric Power Engineering

Computer networks

Physical Engineering of Advanced Materials

Automotive Electronics

Computer Modeling

Industrial Electrical Engineering

Ph.D. courses

Ph.D. courses lasts in daily form 4 years:

Industrial Electrical Engineering

Intelligent Systems

Physical Engineering of Advanced materials

Informatics

Education and Course's

Courses are available on full-time basis. One semester lasts 13 weeks and includes between 22 and 26 contact hours per week. The last semester is devoted to the independent work on final project done either at the faculty either in a real workplace situation. The learning activities cover traditional lectures, laboratory work, and seminars. Assessment methods vary from course to course and they consist of assignments, case studies, and examinations.

CREDIT-BASED SYSTEM

In all classes at the Faculty there is introduced a credit system enabling the student to choose the subjects according to their interests and to take the best pace of learning. In the first two years, there are compulsory subjects for all students giving no freedom for choice. Since the third year, except several compulsory subjects, the student can choose from the list of optional subjects. A number of credits (usually 4-7) evaluates each subject.

After passing the exam from the subject the student received the credits that are accumulated and the student should collect their minimum number (60) to pass the current year. Registration of the subjects is done before the beginning of the current academic year. The details about the subjects and allocated numbers of credits are given in the Program of Study.



Faculty of Electrical Engineering
and Informatics

*Department
of Computers
and Informatics*

Department of Computers and Informatics

Head of Department: *prof. Ing. Jaroslav Porubán, PhD.*
Email: *jaroslav.poruban@tuke.sk*
Web: *http://kpi.fei.tuke.sk/*
Phone/Fax: *+421 55 602 2576, 2577*



DEPARTMENT'S PROFILE

Department of Computers and Informatics (DCI) has been a principal body of the Faculty of Electrical Engineering and Informatics (FEI) conducting the process of education and scientific research in the area of Computer science and engineering (CSE) since 1989. DCI is one of two successors of the former Department of Technical Cybernetics at the FEI.

Education at DCI covers all forms of university studies in CSE and DCI grants bachelor (Bc), master (Ing) and doctoral (PhD) degree in Informatics study program. In addition, DCI provides a new study program Cybersecurity for bachelor and master levels. DCI consists of 5 laboratories:

- Informatics and Computer Languages Laboratory
- Software Engineering Laboratory
- Information Systems Laboratory
- Computer Networks Laboratory
- Computer Architectures and Security Laboratory



Department of Computers and Informatics

The graduates can work as system engineers, specialists for development, installation and maintenance of the information systems and technologies in wide spectrum of applications, designers of the computer systems, specialists dealing with research, development and operation of computer systems and their components.

Scientific research at DCI covers following fields:

- formal methods for design and analysis of discrete systems,
- programming paradigms and theory of programming,
- parallel and distributed programming, real time systems,
- methods, tools and methodologies of analysis and design of software systems,
- computer graphics and virtual reality systems,
- agent and service-based technologies for design and implementation of distributed software systems,
- modelling and simulation of systems,
- advanced database and information technologies,
- information systems security,
- e-learning systems, intelligent tutoring systems,
- internet of things,
- parallel architectures for specialized high performance computer systems,
- theory of design of MIMD computer architecture - data-flow,
- computer networks and advanced network infrastructures,
- transfer of the multimedia nature information with the required quality of services parameters, effective methods of quality service property parameters assessment,
- implementation of the powerful streaming technologies in the IP network environment,
- videoconference solution and voice services of the new generation,
- monitoring, control and visualization of topologies in LAN and WAN,
- virtual communication infrastructures and their use in practical, e-learning technologies and their solutions.

STAFF

Professors: **prof. Ing. Peter Drotár, PhD.**

prof. Ing. Juraj Gazda, PhD.

prof. RNDr. Valerie Novitzká, PhD.

prof. Ing. Jaroslav Porubän, PhD.

prof. Ing. Liberios Vokorokos, PhD.

Associate Professors: **doc. Ing. Norbert Ádám, PhD.**

Department of Computers and Informatics

doc. Ing. Anton Baláž, PhD.

doc. Ing. Peter Fecilák, PhD.

doc. Ing. Ján Genči, PhD.

doc. Ing. Zdeněk Havlice, CSc.

doc. Ing. Eva Chovancová, PhD.

doc. Ing. Martin Chovanec, PhD.

doc. Ing. František Jakab, PhD.

doc. Ing. Branislav Madoš, PhD.

Ing. Miroslav Michalko, PhD.

doc. Ing. Emília Pietriková, PhD.

doc. Ing. Branislav Sobota, PhD.

doc. Ing. William Steingartner, PhD.

doc. Ing. Csaba Szabó, PhD.

doc. Ing. Slavomír Šimoňák, PhD.

doc. Ing. Martin Tomášek, PhD.

Assistant Professors: Ing. Michaela Bačíková, PhD.

Ing. Miroslav Biňas, PhD.

Ing. Peter Gnip, PhD.

Ing. Ján Hurtuk, PhD.

Ing. Sergej Chodarev, PhD.

Ing. Ondrej Kainz, PhD.

Ing. Štefan Korečko, PhD.

Ing. Ján Perháč, PhD.

Ing. Marek Ružička, PhD.

JUDr. Ivana Semanová

Ing. Matúš Sulír, PhD.

Ing. Eugen Šlapak, PhD.

Ing. Marcel Vološin, PhD.

Researchers: Ing. Ján Juhár, PhD.

prof. Ing. Štefan Hudák, DrSc.

Ing. Dominik Lakatoš, PhD.

doc. Ing. Milan Šujanský, CSc.

Technical staff: Ing. Zuzana Dubajová

Department of Computers and Informatics

Helena Švarcová

Project UAV: **Ing. Daniel Gecášek, PhD.**

Ing. Katarína Feciláková, PhD.

Ph.D. Students:

Internal form: **Ing. Tomáš Buček**

Ing. Matúš Dopirjak

Ing. Filip Gurbál

Ing. Martin Hasin

Ing. Martin Havrilla

Ing. Máté Hireš

Ing. Marek Horváth

Ing. Dávid Jozef Hreško

Ing. Erika Abigail Katonová

Ing. Tomáš Kormaník

Ing. Tatiana Kuchčáková

Ing. Heidar Khorshidiyeh

Ing. Miroslav Murín

Ing. Miriama Mattová

Ing. Samuel Novotný

Ing. Peter Pekarčík

Ing. Róbert Rauch

Ing. Marek Ružička

Ing. Michal Solanik

Ing. Dávid Val'ko

Ing. Emira Mustafa

Moamer Alzeyani

External form: **Ing. Martin Nguyen**

Ing. Ivana Nováková

Ing. Peter Bugata

Ing. Róbert Kanász

Ing. Lukáš Vavrek

TEACHING

Department of Computers and Informatics

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Fundamentals of Algorithms and Programming	1 st	3/2	Chovancová, Biňas, Pietriková
Computer engineering and secure hardware	2 nd	2/2	Madoš
Cybersecurity	2 nd	2/2	Baláž
Foundations of Software Engineering	2 nd	2/2	Chodarev
Principles of Computer Engineering	2 nd	2/2	Ádám, Madoš
Programming	2 nd	2/2	Chovancová, Biňas
Computer system architectures	3 rd	2/2	Ádám
Data Structures and Algorithms	3 rd	2/2	Šimoňák
Data structures and algorithms in secure software	3 rd	2/2	Šimoňák
Object-Oriented Programming	3 rd	2/2	Tomášek
Operating Systems	3 rd	3/2	Genči
Operating systems and cybersecurity	3 rd	3/2	Genči
Security management	3 rd	2/2	Baláž
Component Programming	4 th	2/2	Porubän
Computer Networks	4 th	2/2	Fecilák, Michalko
Cryptography Basics	4 th	2/2	Tomášek
Database Systems	4 th	3/2	Steingartner, Perháč
Database systems and their security	4 th	3/2	Steingartner, Perháč
Formal Languages	4 th	3/2	Steingartner
Security of computer networks	4 th	2/2	Fecilák, Michalko
Internet of Things and Smart Devices	5 th	2/2	Tomášek, Biňas
Application of the Network Technologies	5 th	2/2	Fecilák, Michalko
Bachelor Project	5 th	2/6	Porubän
CCNA Security	5 th	2/2	Chovanec, Kainz
Computer network security applications	5 th	2/2	Chovanec, Michalko
Industrial and System Security	5 th	2/2	Chovancová

Department of Computers and Informatics

SAP ABAP Programming	5 nd	2/2	Baláž
Smart Systems in Informatics	5 th	2/2	Drotár, Gazda
Smart Systems in Cybersecurity	5 th	2/2	Drotár, Gazda
Software Projects Management	5 th	2/2	Szabó
User Interfaces of Software Systems	5 th	2/2	Sobota, Chodarev
Assembler	6 th	2/2	Šimoňák
Assembler for Reverse Engineering	6 th	2/2	Šimoňák
Bachelor Thesis	6 th	3/9	Porubän
Computer Games Development and Design	6 th	2/2	Sobota, Pietriková
Legal issues of cyber security	6 th	2/2	Vokorokos, Semanová
Security in Computer Systems	6 th	2/2	Vokorokos, Baláž

Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Current Trends in Informatics 1	1 st	2/2	Gazda, Tomášek
Distributed Systems	1 st	2/2	Tomášek
Routing Algorithms in Computer Networks	1 st	2/2	Jakab, Fecifak
Semantics of Programming Languages	1 st	3/2	Steingartner
Team Project	1 st	2/2	Chovancová
Computer Graphics	1 st , 3 th	3/2	Sobota
Data Processing Technologies and Systems	1 st , 3 th	2/2	Genči
Domain Specific Languages Development	1 st , 3 th	2/2	Porubän
Functional Programming	1 st , 3 th	3/2	Šimoňák, Chodarev
Modeling and Simulation	1 st , 3 th	2/2	Sobota, Korečko
Requirements Engineering	1 st , 3 th	2/2	Havlice, Szabó
Software Systems Evolution	1 st , 3 th	2/2	Szabó
Type Theory	1 st , 3 th	2/2	Novitzká, Perháč
Current Trends in Informatics 2	2 nd	2/2	Gazda, Tomášek
Diploma Project 1	2 nd	2/6	Šimoňák, Porubän
Logics for Informaticians	2 nd	2/2	Novitzká, Perháč
Metaprogramming	2 nd	2/2	Porubän, Chodarev

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<i>Modelling and Prototyping of Systems</i>	<i>2nd</i>	<i>2/2</i>	<i>Ružička, Porubän</i>
<i>Parallel Computer Systems</i>	<i>2nd</i>	<i>2/2</i>	<i>Ádám</i>
<i>Stochastic modelling and data analysis</i>	<i>2nd</i>	<i>2/2</i>	<i>Drotár, Gazda</i>
<i>Technologies based on Switched Networks</i>	<i>2nd</i>	<i>2/2</i>	<i>Fecil'ak</i>
<i>Virtual Reality Systems</i>	<i>2nd</i>	<i>2/2</i>	<i>Sobota</i>
<i>Diploma Project 2</i>	<i>3rd</i>	<i>2/6</i>	<i>Ádám, Porubän</i>
<i>Parallel Programming</i>	<i>3rd</i>	<i>2/2</i>	<i>Madoš</i>
<i>Information and Communication Security</i>	<i>3rd</i>	<i>2/2</i>	<i>Chovancová, Baláž</i>
<i>Solving Problems of Large Scale Infrastructures</i>	<i>3rd</i>	<i>2/2</i>	<i>Kainz</i>
<i>Diploma Thesis</i>	<i>4th</i>	<i>9/9</i>	<i>Porubän</i>

LABORATORIES

- Laboratory of Intelligent Interfaces for Information and Communication Systems (LIRKIS)
- Computer Networks Laboratory (www.cnl.sk)
- Computer Architectures and Security Laboratory
- Operating Systems Laboratory
- Software Engineering Laboratory
- Information Systems Laboratory
- Informatics and Computer Languages Laboratory
- Administration and Operational Support

RESEARCH PROJECTS

- List of current research and educational projects:
- Towards an ecologically valid symbiosis of BCI and head-mounted VR displays: focus on collaborative post-stroke neurorehabilitation (ReHaB), CHIST-ERA 20-BCI-004, duration: 2022–2024, coordinator: doc. Ing. Branislav Sobota PhD.
- Modern Approach to Teaching Classes at the University Level in Theoretical Computer Science, EEA and Norway Grants FBR-PDI-025, duration 2023–2024, coordinator: Ing. Ján Perháč PhD.
- Application of new principles in the education of IT specialists in the field of formal languages and compilers, Cultural and Educational Grant Agency, KEGA 030TUKE-4/2023, duration: 2023–2025, coordinator: doc. Ing. William Steingartner, PhD.
- Predictive allocation of edge computing resources for autonomous driving, Slovak Research and Development

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Agency APVV SK-CZ-RD-21-0028, duration 2022–2025, coordinator: prof. Ing. Juraj Gazda PhD.

- European Research Network on Formal Proofs, COST (European Cooperation in Science and Technology) CA20111, duration 2021–2025, coordinator: Ing. Ján Perháč PhD.
- Promoting Sustainability as a Fundamental Driver in Software Development Training and Education, ERASMUS+ KA203 - Strategic partnership for higher education 2020-1-PT01-KA203-078646, duration 2020–2023, coordinator: doc. Ing. Csaba Szabó PhD.
- Intelligent operating and processing systems for UAV, European Regional Development Fund, OPVaI-VA/DP/2018/1.2.1-04, duration: 2019–2023, coordinator: doc. Ing. František Jakab PhD.
- Research in the SANET network and possibilities of its further use and development, European Regional Development Fund, OPVaI-VA/DP/2018/1.1.3-05, duration: 2020–2023, coordinator: doc. Ing. František Jakab PhD.
- Methodological and content innovation of teaching selected subjects in the field of information and communication technologies oriented to the needs of practice based on the use of modern videoconferencing and collaboration tools, Cultural and Educational Grant Agency, KEGA 035TUKÉ-4/2019, duration: 2021–2023, coordinator: doc. Ing. František Jakab PhD.
- Implementation of modern methods and forms of teaching in the field of cybersecurity to the requirements of practice, Cultural and Educational Grant Agency, KEGA 002TUKÉ-4/2021, duration: 2021–2023, coordinator: doc. Ing. Anton Baláž, PhD.
- Innovation in the education process of cyber security courses in the context of the requirements of practice, Cultural and Educational Grant Agency, KEGA 060TUKÉ-4/2022, duration: 2022–2024, coordinator: Ing. Miroslav Michalko, PhD.
- Collaborative virtual reality technologies in the educational process, Cultural and Educational Grant Agency, KEGA 048TUKÉ-4/2022, duration: 2022–2024, coordinator: doc. Ing. Branislav Sobota, PhD.
- Lowering Programmers' Cognitive Load Using Context-Dependent Dialogs, Research Grant Agency VEGA 1/0630/22, duration: 2022–2024, coordinator: prof. Ing. Jaroslav Porubán, PhD.
- International Cooperation in Computer Science, CEEPUS No. CII-HU-0019-01-0506 (H81), duration: since 2005, coordinator: Ing. Csaba Szabó, PhD.
- Cisco Networking Academy Program – Regional Academy at DCI FEI TU, Cisco No. 8250, duration: since 1999, coordinator: doc. Ing. František Jakab, PhD.
- Cisco Networking Academy Program – Academy Support Center/Instructor training center/Cisco Academy DCI FEI TU, Cisco No. 8250, duration: since 1999, coordinator: doc. Ing. František Jakab, PhD. and Ing. Peter Fecíľak, PhD.
- Trustworthy human–robot and therapist–patient interaction in virtual reality, Slovak Research and Development

Department of Computers and Informatics

Agency APVV-21-0105, duration 2022–2026, coordinator: doc. Ing. Branislav Sobota, PhD.

CO-OPERATION

Co-operation in Slovakia

- Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava
- Faculty of Mathematics, Physics and Informatics, Comenius University Bratislava
- Faculty of Management Science and Informatics, University of Žilina
- Department of Informatics, Armed Forces Academy of gen. M. R. Štefánik in Liptovský Mikuláš
- Department of Informatics, University in Trenčín
- Department of Informatics, Matej Bel University in Banská Bystrica
- Institute of Computer Science, Pavol Jozef Šafárik University in Košice
- Institute of Informatics, Slovak Academy of Sciences, Bratislava
- Department of Informatics, Constantine the Philosopher University, Nitra
- Slovak Technical Museum, Košice

International Co-operation

- University of Ostrava, Czech Republic
- VŠB – Technical University of Ostrava, Czech Republic
- University of West Bohemia in Pilsen, Czech Republic
- Czech Technical University In Prague, Czech Republic
- Brno University of Technology, Czech Republic
- University of Hradec Králové, Czech Republic
- Masaryk University, Brno, Czech Republic
- Information Systems Institute, Technical University of Vienna, Austria
- Johannes Kepler University, Linz, Austria
- Alpen-Adria University, Klagenfurt, Austria
- University Koblenz-Landau, Germany
- University of Alcalá, Alcalá de Henares (Madrid), Spain
- University of Salamanca, Spain
- Eötvös Loránd University, Budapest, Hungary
- Budapest University of Technology and Economics, Budapest, Hungary

Department of Computers and Informatics

- University of Szeged, Hungary
- Technical University of Gdansk, Poland
- Warsaw University of Technology, Warsaw, Poland
- Czestochowa University of Technology, Poland
- University of Oradea, Romania
- Babes-Bolyai University, Cluj-Napoca, Romania
- University of Maribor, Slovenia
- International Solomon University Kiev, Ukraine
- The National University of T. Schevchenko, Kiev, Ukraine
- Kharkov National University of Radioelectronics, Ukraine
- Uzhgorod National University, Ukraine
- ISTASE, Universite de St-Etienne, France
- Paisii Hilendarski University, Plovdiv, Bulgaria
- Politecnico di Milano Dipartimento di Electronica, Milano, Italy
- University of Rome, Italy
- Polytechn. Eng. College, Subotica, Serbia
- University of Jyväskylä, Finland
- Jyväskylä University of Applied Sciences, School of Information Technology, Finland
- University of Minho, Portugal
- Instituto Politécnico de Bragança, Bragança, Portugal
- NTNU, Institutt for Telematikk, Trondheim, Norway
- Bay Zoltán Nonprofit Ltd. for Applied Research, Institute for Logistics and Production Engineering (BAY-LOGI), Miskolc, Hungary
- University of Novi Sad, Faculty of Sciences, Novi Sad, Serbia
- Institute For Language and Speech Processing, Athena Research Center, Athens, Greece
- Digital EUROPE, EUROPEAN SCHOOLNET, Belgium, Brussels
- Cisco Technical Assistance Center Krakow, Poland
- Erasmus Centre for Entrepreneurship, Rotterdam, Netherlands
- Science and Engineering Institute, Dubai, United Arab Emirates
- BAYLOGI, Miskolc, Hungary
- University of Amsterdam, Netherlands
- Radboud University Nijmegen, Netherlands
- University of Rijeka, Croatia

Department of Computers and Informatics

- University of Coimbra, Portugal
- University of Oslo, Norway

Visitors to the Department

- A.Univ.-Prof. DI Dr. Wolfgang Schreiner, Johannes Kepler University Linz, Austria
- Dr. inż. Olga Siedlecka-Lamch, Czestochowa University of Technology, Poland
- Dr. inż. Sabina Szymoniak, Czestochowa University of Technology, Poland
- Dr. hab. Elżbieta Gawrońska, Czestochowa University of Technology, Poland
- prof. Milan Klement, Palacký University Olomouc, Czech Republic
- prof. Mirosław Kurkowski, Cardinal Stefan Wyszyński University in Warsaw, Poland
- dr. Tomasz Kulpa, Cardinal Stefan Wyszyński University in Warsaw, Poland
- prof. Wiesław Kubiś, Cardinal Stefan Wyszyński University in Warsaw, Poland
- Dr. Joanna Kandzia, Cardinal Stefan Wyszyński University in Warsaw, Poland
- Mgr. Ewa Maliniak, Cardinal Stefan Wyszyński University in Warsaw, Poland
- Mgr. Iwona Rowicka-Pałuba, Cardinal Stefan Wyszyński University in Warsaw, Poland
- Mgr. Katarzyna Jakubczyk-Sierszeń, Cardinal Stefan Wyszyński University in Warsaw, Poland
- Mgr. Marta Schmidt, Cardinal Stefan Wyszyński University in Warsaw, Poland
- Joachim Tilsted Kristensen, MSc., University of Oslo, Norway
- Lars-Bo Vadgaard, MSc., University of Oslo, Norway
- Prof. Eric Bartley Jul, University of Oslo, Norway
- Ass. Prof. Michael Kirkedal Thomsen, University of Oslo, Norway
- doc. Dr. Ing. Dušan Kolář, Brno University of Technology, Czech Republic
- prof. Ing. Róbert Lórencz, CSc., Czech Technical University in Prague, Czech Republic
- prof. Ing. Jiří Šafařík, CSc., University of West Bohemia, Pilsen, Czech Republic
- doc. Ing. Giang Nguyen Thu, PhD., Slovak University of Technology in Bratislava, Slovak Republic
- doc. Ing. Ján Lang, PhD., Slovak University of Technology in Bratislava, Slovak Republic
- prof. Ing. Valentino Vranić, PhD., Slovak University of Technology in Bratislava, Slovak Republic
- Ing. Katarína Jelemenská, PhD., Slovak University of Technology in Bratislava, Slovak Republic
- Ing. Fedor Lehocki, PhD., MPH., Slovak University of Technology in Bratislava, Slovak Republic
- doc. Mgr. Michal Kováč, MSc., PhD., Slovak University of Technology in Bratislava, Slovak Republic
- Ing. Lukáš Kohútka, PhD., Slovak University of Technology in Bratislava, Slovak Republic
- doc. Ing. Jarmila Škrinárová, PhD., Matej Bel University in Banská Bystrica, Slovak Republic
- PaedDr. Mgr. Vladimír Siládi, PhD., Matej Bel University in Banská Bystrica, Slovak Republic

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- prof. Ing. Marcel Harakaľ, PhD., Armed Forces Academy of General Milan Rastislav Štefánik, Liptovský Mikuláš, Slovak Republic

Visits of Staff Members to Foreign Institutions

- Ing. Ján Perháč, PhD., WG3 meeting, West University of Timisoara, Romania
- doc. Ing. Csaba Szabó, PhD., ERASMUS+, Juraj Dobrila University of Pula, Croatia
- Ing. Róbert Rauch, Czech Technical University in Prague, Czech Republic
- Ing. Dávid Jozef Hreško, Université Côte d'Azur, Nice, French Republic
- Ing. Marek Ružička, PhD., MAREW 2023, University of Pardubice, Czech Republic
- Ing. Matúš Dopiriak, MAREW 2023, University of Pardubice, Czech Republic
- doc. Ing. Peter Fecíľak, PhD., EMEA Cisco Networking Academy, Paris, French Republic
- Ing. Martin Nguyen, ICRC 2023, Nagoya, University of Tokyo, Japan
- Ing. Daniel Gecášek, PhD., ICRC 2023, Nagoya, University of Tokyo, Japan
- doc. Ing. William Steingartner, PhD., MMPE '23, Politechnika Częstochowska, Poland
- Ing. Ján Perháč, PhD., PAT 23 Thematic School, University of Strasbourg, French Republic
- doc. Ing. William Steingartner, PhD., Johannes Kepler University Linz, Austria
- Ing. Matúš Sulír, PhD., EASE 2023, University of Oulu, Finland
- Ing. Štefan Korečko, PhD., SusTrainable Summer School 2023, University of Coimbra, Portugal
- doc. Ing. Csaba Szabó, PhD., SusTrainable Summer School 2023, University of Coimbra, Portugal
- doc. Ing. Miroslav Michalko, PhD., Czech-Slovak Technology Summit 2023, Mikulov, Czech Republic
- doc. Ing. Csaba Szabó, PhD., CEEPUS, Babes Bolyai University of Cluj Napoca, Romania
- doc. Ing. William Steingartner, PhD., ABDIS 2023, Universitat Politècnica de Catalunya · Barcelona Tech - UPC, Spain
- Ing. Ján Perháč, PhD., Joint WG4-WG5 meeting, Department of Computer Science and Technology, University of Cambridge, United Kingdom
- Ing. Ján Perháč, PhD., SISY 2023, Juraj Dobrila University of Pula, Croatia
- doc. Ing. William Steingartner, PhD., CECIIS 2023, Faculty of Organization and Informatics (FOI) Varaždin, University of Zagreb, Croatia
- prof. RNDr. Valerie Novitzká, PhD., CECIIS 2023, Faculty of Organization and Informatics (FOI) Varaždin, University of Zagreb, Croatia
- prof. Ing. Juraj Gazda, PhD., Stockholm University, Sweden
- Ing. Matúš Dopiriak, Compass Tech Summit 2023, Budapest, Hungary
- Ing. Marek Ružička, PhD., Compass Tech Summit 2023, Budapest, Hungary

Department of Computers and Informatics

- Ing. Matúš Sulír, PhD., SPLASH 2023, Cascais, Portugal
- Ing. Ján Perháč, PhD., University of Oslo, Norway
- doc. Ing. William Steingartner, PhD., University of Oslo, Norway
- Ing. Sergej Chodarev, PhD., University of Oslo, Norway
- Ing. Samuel Novotný, University of Oslo, Norway
- Ing. Ján Perháč, PhD., The University of Danang, Vietnam
- Ing. Michaela Bačíková, PhD., The University of Danang, Vietnam
- Ing. Marek Ružička, AI 2023, University of Cambridge, United Kingdom
- Ing. Eugen Šlapak, PhD., IRC 2023, University of California, Irvine, USA
- Ing. Marcel Vološin, PhD., IRC 2023, University of California, Irvine, USA
- Ing. Matúš Dopiriak, IRC 2023, University of California, Irvine, USA

Membership in International Organizations and Societies

- Genči, J., Havlice, Z., Hudák, Š., Korečko, Š., Novitzká, V., Porubán, J., Sobota, B., Šujanský, M., Tomášek, M.: Members of the CSSS - Czech and Slovak Society for Simulation
- Genči, J.: Members of Association for Computing Machinery, New York, USA
- Hudák, Š.: Member of Publishing Board of Communications of The International Solomol University: Mathematical Methods in Cybernetics, Kiev, Ukraine
- Jakab, F.: Member of EMEA NetAcad team, Bedfont Lakes, Feltham, Middlesex, United Kingdom
- Jakab, F.: Member of the Institute of Electrical and Electronics Engineers
- Novitzká, V.: Member of European Association of Programming Languages and Systems
- Novitzká, V.: Member of Common Framework Initiative, European Strategic Programme for Research in Information Technology WG 29432
- Novitzká, V.: Member of European Association of Theoretical Computer Science
- Paralič, M.: Member of the Institute of Electrical and Electronics Engineers
- Steingartner, W.: Member of the program committee of the international conference CECIIS – Central European Conference on Intelligent and Information Systems, Croatia
- Šujanský, M.: Member of CSSIM/Scientific Association

Membership in Slovak Organizations and Societies

- Ádám N., Bačíková M., Baláž A., Biňas M., Drotár P., Fecifák P., Gazda J., Genči J., Gnip P., Havlice Z., Hudák Š., Hurtuk J., Chodarev S., Chovancová E., Jakab F., Kainz O., Korečko Š., Madoš B., Michalko M., Novitzká V., Perháč

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J., Pietriková E., Porubän J., Steingartner W., Sobota B., Sulír M., Szabó Cs., Šimoňák S., Šlapak E., Šujanský M., Tomášek M., Vokorokos L., Vološin M.: Members of the SSAKI - „Slovak Society for Applied Cybernetics and Informatics”

- Genči, J., Havlice, Z., Novitzká, V., Sobota, B.: Members of the Slovak Society for Computer Science (SSCS)
- Genči, J.: The Second TU Košice representative in EUNIS-SK
- Havlice, Z.: Scientific board of the Faculty of Electrical Engineering and Informatics, Technical University of Košice
- Havlice, Z.: Scientific board of the Faculty of Faculty of Management Science and Informatics, Technical University of Žilina
- Havlice, Z.: State Examination Commission for state exams in the study field Computer Engineering and Informatics at the Faculty of Electrical Engineering and Informatics of Technical University of Košice
- Havlice, Z.: State Examination Commission for state exams in the study field Applied Informatics and Automation in Industry at the Faculty of Materials Science and Technology of Slovak University of Technology in Bratislava
- Hudák, Š.: Member of Slovak Commission for Defense of DrSc dissertation in the scientific field Computer Engineering and Informatics
- Hudák, Š.: Member of the Common Scientific Commission for Defense of PhD dissertation in the field „Computer Tools and Systems“
- Hudák, Š.: Member of examinational board for AMBI project In Slovak Republic EXIN.SR
- Jakab, F.: Communication Technology Forum in SR (since 1997, Head of the application section, www.ctf.sk)
- Jakab, F.: Chairman of Committee on Business-Academic Cooperation, American Chamber of Commers in Bratislava
- Jakab, F.: Coordinator of the Cisco Networking Academy program for Slovakia
- Jakab F.: Member of Košice IT Valley association board of directors
- Jakab F.: Member of working group ICT – Research and development, Ministry of Education
- Šujanský, M.: Member of the Board of the SSAKI - „Slovak Society for Applied Cybernetics and Informatics”
- Šujanský, M.: EUNIS – the Board of the Association for Information Technologies
- Vokorokos, L.: Member of the Common Scientific Commission for Defense of PhD dissertation in the field „Computer Tools and Systems“.
- Vokorokos, L.: Member of the editorial board of the scientific international journal “Transport and Logistics International Journal”.
- Vokorokos, L.: Vice-chairman of the editorial board of the scientific journal - “Transactions of the Universities of Košice”.
- Vokorokos, L.: Member of the editorial board of the scientific journal “Acta Avionica”.

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- Vokorokos, L.: Member of the Scientific board at the Technical University of Košice.
- Vokorokos, L.: Member of the Scientific board at the Faculty of Electrical Engineering and Informatics, Technical University of Košice.
- Vokorokos, L.: Member of the Common Scientific Commission for Defense of PhD dissertation in the field "Informatics".
- Vokorokos, L.: Member of the Board for development and informatization of the Technical University in Košice
- Vokorokos, L.: Member of the Expert group for informatization and development, TU-FEI, Košice

CONTRACTS, INTERNATIONAL SCIENTIFIC PROJECT

Cooperation with companies:

- Košice IT Valley
- Accenture Slovakia
- AT&T Global Network Services Slovakia
- bart.sk
- Blue Lemons
- BSH Drives and Pumps
- CherryPeak
- CIVITTA Slovakia
- Cisco (www.cnl.sk)
- Continental Automotive Systems Slovakia
- Creative Industry Košice
- Deutsche Telekom IT Solutions Slovakia
- ELCOM
- EP Commodities
- Erste Digital
- ESET
- ESTEN
- Forvio
- FPT Slovakia
- GlobalLogic Slovakia
- Hotovo

Department of Computers and Informatics

- IBM Slovensko
- IEE Sensing Slovakia
- iiTeam
- Infobip
- JER
- LYNX
- matsuko
- Ness Digital Engineering
- Nordics.io
- NXT Soft
- ProWeb Consulting
- R-SYS
- Servo
- Semikron Danfoss
- Senacor Technologies AG
- Siemens Healthineers
- Solar Turbines Slovakia
- TRONITY GmbH
- Telegrafia
- TRONITY GmbH
- TRUE Performance
- U.S. Steel Košice
- Vacuumlabs
- Visma Labs
- Východoslovenská distribučná
- Zoom International

Cooperation with the Stredná priemyselná škola dopravná, Košice

THESES

Thesis Type	Bachelor	Master	Doctoral
Number	177	133	8

Department of Computers and Informatics

OTHER ACTIVITIES

Symposia, Workshops, Conferences, Seminars

- ICETA 2023 – 21st Year of International Conference on Emerging eLearning Technologies and Applications, October 26 - 27, High Tatras, Slovakia
- Current Trends in Informatics and Cybersecurity – regular seminars for students by researchers and commercial partners

Activities in cooperation with commercial partners

- Live IT Projects 2023, February 3, Košice – presentation of student projects developed in cooperation with IT companies
- Game Jam 2023, April, 4–16
- Networking Academy Games (NAG 2023), April, 21
- Košice 2.0 | Challenger Ideator, May 30
- Namakaný deň 2023, November, 8
- Lab IT Creativity 2, June 15, Košice – presentation of projects developed by local high school students in collaboration with university students and IT companies
- Erste Digital Košice Hackathon 2023, November, 10–11
- Slovenská sporiteľňa | Challenger Ideator, December, 15

PUBLICATIONS

Patents

- SOBOTA, Branislav - GUZAN, Milan: Riadenie virtuálneho prostredia virtuálno-reality jaskyne s využitím chaosu Patent č. 289135/ Banská Bystrica: ÚPV SR - 2023. - 6 s.. Available at: <https://wbr.indprop.gov.sk/WebRegistre/Patent/Detail/77-2018>

Books and Chapters

- SOBOTA, Branislav - HUDÁK, Marián - MATTOVÁ, Miriama: Počítačová grafika Návod na cvičenia : 2.prepracované vydanie/ - 2. preprac. vyd. - Košice : Technická univerzita v Košiciach - 2023. - 205 s.. - ISBN 978-80-553-4417-1
- SOBOTA, Branislav - PIETRIKOVÁ, Emília: Computer Science for Game Development and Game Development for Computer Science / - 1. vyd. - London : IntechOpen - 2023. - 142 s.. - ISBN 978-1-83769-733-5

Department of Computers and Informatics

- PIETRIKOVÁ, Emília - SOBOTA, Branislav: Game development and testing in education Chapter 7/ - 2023. In: Game Development and Testing in Education. - London (Veľká Británia) : IntechOpen s. 113-139 [print, online]. - ISBN 978-1-83768-060-3 Available at: <http://dx.doi.org/10.5772/intechopen.108529>
- SOBOTA, Branislav - PIETRIKOVÁ, Emília: Introductory Chapter: Game Development and Computer Science / - 2023. In: Computer Science for Game Development and Game Development for Computer Science. - London (Veľká Británia) : IntechOpen s. 1-5 . - ISBN 978-1-83769-733-5 Available at: <http://dx.doi.org/10.5772/intechopen.1002301>
- SOBOTA, Branislav - PIETRIKOVÁ, Emília: The Role of Game Engines in Game Development and Teaching / - 2023. In: Computer Science for Game Development and Game Development for Computer Science. - London (Veľká Británia) : IntechOpen s. 61-68 . - ISBN 978-1-83769-733-5 Available at: <http://dx.doi.org/10.5772/intechopen.1002257>

Journals

- BUGATA, Peter - DROTÁR, Peter: Feature selection based on a sparse neural-network layer with normalizing constraints / - 2023. In: IEEE Transactions on Cybernetics. - Piscataway (USA) : Institute of Electrical and Electronics Engineers Roč. 53, č. 1 (2023), s. 161-172 [print, online]. - ISSN 2168-2267 Available at: <http://dx.doi.org/10.1109/tcyb.2021.3087776>
- CHODAREV, Sergej - ILYAS, Sharoon: Metamodel-based language definition with Python / - 2023. In: IPSI Transactions on Internet Research. - Belehrad (Srbsko) : IPSI Roč. 19, č. 1 (2023), s. 32-38 [online, print]. - ISSN 1820-4503 Available at: <http://dx.doi.org/10.58245/ipsi.tir.2301.06>
- GURBÁL, Filip - PORUBĀN, Jaroslav: Collecting Code Coverage from UI Testing / - 2023. In: IPSI Transactions on Internet Research. - Belehrad (Srbsko) : IPSI Roč. 19, č. 1 (2023), s. 55-58 [online, print]. - ISSN 1820-4503 Available at: <http://dx.doi.org/10.58245/ipsi.tir.2301.09>
- KLOSKA, Matej - GRMANOVÁ, Gabriela - ROZINAJOVÁ, Viera: Expert Enhanced Dynamic Time Warping Based Anomaly Detection / - 2023. In: Expert Systems with Applications : An International Journal. - Oxford (Veľká Británia) : Pergamon Press Roč. 225 (2023), s. [1-14] [print, online]. - ISSN 0957-4174 Available at: <http://dx.doi.org/10.1016/j.eswa.2023.120030>
- KIREŠOVÁ, Simona - GUZAN, Milan - SOBOTA, Branislav: Using low-cost sensors for measuring and monitoring particulate matter with a focus on fine and ultrafine particles / - 2023. In: Atmosphere. - Bazilej (Švajčiarsko) : Multidisciplinary Digital Publishing Institute Roč. 14, č. 2 (2023), s. [1-22] [online]. - ISSN 2073-4433 (online) Available at: <http://dx.doi.org/10.3390/atmos14020324>
- TSIMBOLYNETS, Vitalii - PERHÁČ, Ján: Visualization tool for structural operational semantics of simple imperative language / - 2023. In: IPSI Transactions on Internet Research. - Belehrad (Srbsko) : IPSI Roč. 19, č. 1 (2023),

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- s. 66-74 [online, print]. - ISSN 1820-4503 Available at: <https://doi.org/10.58245/ipsi.tir.2301.11>
- RUŽIČKA, Marek - BEČVÁŘ, Zdeněk - GAZDA, Juraj: Energy Consumption Optimization for UAV Base Stations With Wind Compensation / - 2023. In: IEEE Communications Letters. - New York (USA) : Institute of Electrical and Electronics Engineers Roč. 27, č. 4 (2023), s. 1210-1214 . - ISSN 1089-7798 Available at: <http://dx.doi.org/10.1109/lcomm.2023.3249630>
 - KANÁSZ, Róbert - GNIP, Peter - ZORIČÁK, Martin - DROTÁR, Peter: Bankruptcy prediction using ensemble of autoencoders optimized by genetic algorithm / - 2023. In: PeerJ. Computer science. - San Francisco (USA) : PeerJ INC, 2015 Roč. 9 (2023), s. [1-23] [online]. - ISSN 2376-5992 (online) Available at: <http://dx.doi.org/10.7717/peerj-cs.1257>
 - STEINGARTNER, William - RADAKOVIĆ, Davorka - ZSIGA, Richard: Some aspects about visualization of natural semantics for a selected domain-specific language / - 2023. In: IPSI Transactions on Internet Research. - Belehrad (Srbsko) : IPSI Roč. 19, č. 1 (2023), s. 46-54 [online, print]. - ISSN 1820-4503 Available at: <https://doi.org/10.58245/ipsi.tir.2301.08>
 - ALZEYANI, Emira Mustafa Moamer - SZABÓ, Csaba: A study on the effectiveness of agile methodology using a dataset / - 2023. In: Acta Electrotechnica et Informatica. - Košice (Slovensko) : Fakulta elektrotechniky a informatiky Roč. 23, č. 1 (2023), s. 3-10 [print, online]. - ISSN 1335-8243 Available at: <https://sciendo.com/article/10.2478/aei-2023-0001>
 - KUBÁK, Matúš - NEMEC, Peter - ŠTEFKO, Róbert - VOLOŠIN, Marcel: On competition and transparency in public procurement during the COVID-19 pandemic in the European Union / - 2023. In: E + M. Ekonomie a management = E&M Economics and Management. - Liberec (Česko) : Technická univerzita v Liberci Roč. 26, č. 2 (2023), s. 4-23 [print, online]. - ISSN 1212-3609 Available at: <http://dx.doi.org/10.15240/tul/001/2023-2-001>
 - VOLOŠIN, Marcel - ŠLAPAK, Eugen - BEČVÁŘ, Zdeněk - MAKSYMUK, Taras - PETÍK, Adam - LIYANAGE, Madhusanka - GAZDA, Juraj: Blockchain-based route selection with allocation of radio and computing resources for connected autonomous vehicles / - 2023. In: IEEE transactions on intelligent transportation systems. - Piscataway (USA) : Institute of Electrical and Electronics Engineers Roč. 24, č. 7 (2023), s. 7230-7243 [print, online]. - ISSN 1524-9050 Available at: <https://doi.org/10.1109/TITS.2023.3255301>
 - CHOVANEC, Martin - HASIN, Martin - HAVRILLA, Martin - CHOVANCOVÁ, Eva: Detection of HTTP DDoS Attacks Using NFStream and TensorFlow / - 2023. In: Applied sciences. - Bazilej (Švajčiarsko) : Multidisciplinary Digital Publishing Institute Roč. 13, č. 11 (2023), s. [1-24] [online]. - ISSN 2076-3417 (online) Available at: <http://dx.doi.org/10.3390/app13116671>
 - LIPOVSKÝ, Branislav - ŠIMOŇÁK, Slavomír: Performance comparison of cpu and gpgpu calculations using three simple case studies / - 2023. In: Computer Science Journal of Moldova. - Kishinev (Moldavská republika) :

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Inst Mathematics & Computer Science Roč. 31, č. 1 (2023), s. 125-140 . - ISSN 1561-4042 Available at: <http://dx.doi.org/10.56415/csjm.v31.07>

- VARGA, Damián - ŠIMOŇÁK, Slavomír: A Study on Petri Net Supporting Tools for System Modeling and Analysis / - 2023. In: Journal of Information and Organizational Sciences = JIOS. - Varaždín (Chorvátsko) : Sveučilište u Zagrebu Roč. 47, č. 1 (2023), s. 203-222 [print, online]. - ISSN 1846-3312 Available at: <https://jios.foi.hr/index.php/jios/article/view/1884>
- SOBOTA, Branislav - KOREČKO, Štefan - MATTOVÁ, Miriama: Web-Based 3D Virtual Environments Utilization in Primary and Secondary Education of Children with Multiple Impairments / - 2023. In: Electronics. - Bazilej (Švajčiarsko) : Multidisciplinary Digital Publishing Institute Roč. 12, č. 13 (2023), s. [1-18] [online]. - ISSN 2079-9292 (online) Available at: <http://dx.doi.org/10.3390/electronics12132792>
- HIREŠ, Máté - DROTÁR, Peter - PAH, Nemuel Daniel - NGO, Quoc Cuong - KUMAR, Dinesh Kant: On the inter-dataset generalization of machine learning approaches to Parkinson's disease detection from voice / - 2023. In: International Journal of Medical Informatics : The International Journal of Medical Informatics is the official journal of the European Federation for Medical Informatics (EFMI) and IMIA. - Amsterdam (Holandsko) : Elsevier Roč. 179 (2023), s. [1-9] [print]. - ISSN 1386-5056 Available at: <http://dx.doi.org/10.1016/j.ijmedinf.2023.105237>
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- BEDNÁROVÁ-GIBOVÁ, Klaudia - MADOŠ, Branislav - FERNANDA TARAZONA MONTERO, Maria - ALEJANDRA BERNAL RESTREPO, Fiorella: Investigating Translators' Work-related Happiness: Slovak Sworn and Institutional Translators as a Case in Point / - 2023. In: Revista Ciencias Sociales Y Education. - Medellin (Kolumbia) :

Department of Computers and Informatics

Universidad de Medellín Roč. 23, č. 12 (2023), s. 419-451 . - ISSN 2256-5000 Available at:

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Other publications

Publication Type	Journals		Textbooks	Conferences		Patents	Other
	Foreign	Home	Home	Foreign	Home	Domestic	
Number				21	42		12



Faculty of Electrical Engineering
and Informatics

*Department
of Cybernetics
and Artificial
Intelligence*

Department of Cybernetics and Artificial Intelligence

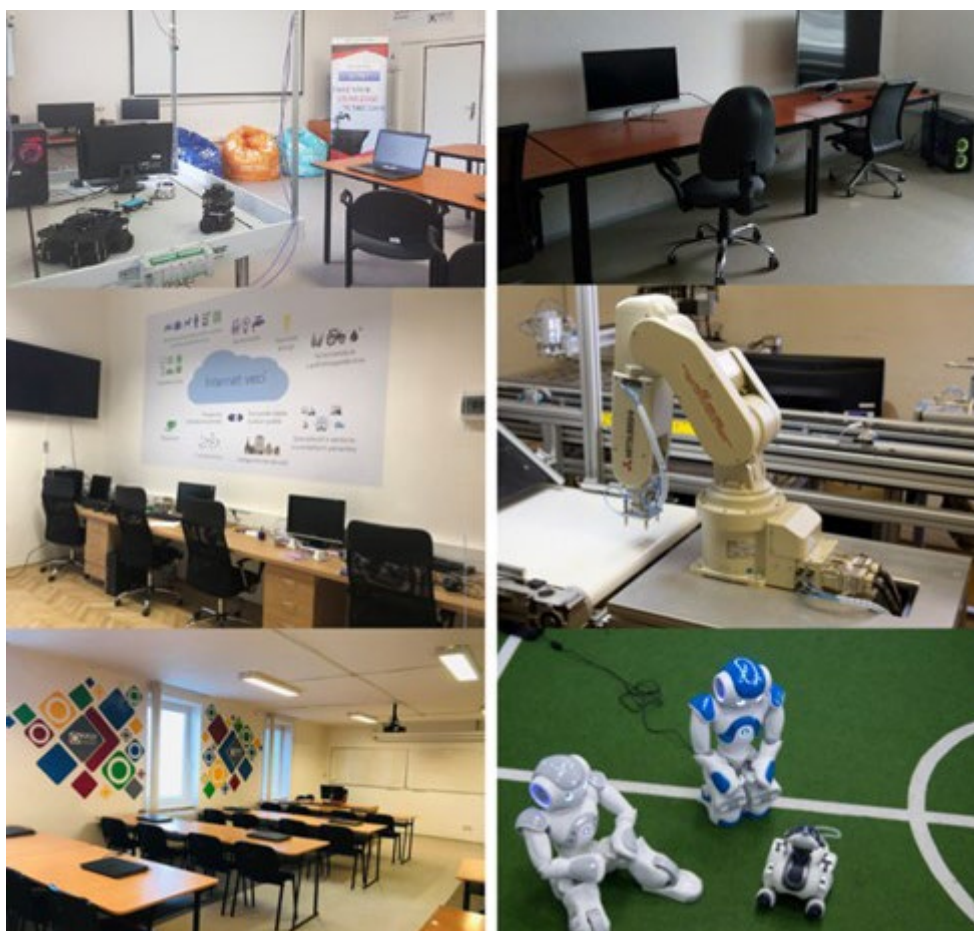
Head of Department: *Assoc. Prof. Ing. Peter Papcun, PhD.*
Email: *peter.papcun@tuke.sk*
Web: *kkui.fei.tuke.sk*
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DEPARTMENT'S PROFILE

The Department of Cybernetics and Artificial Intelligence (DCAI) is responsible for education in two study programs: Intelligent Systems (bachelor, master, and PhD), and Business Informatics (bachelor and master), and cooperates on the PhD program in Computer Science.

The main research topics at the DCAI are intelligent and cognitive robotics with the aim to develop learnable collaborative robot systems, interactive intelligent environment able to perceive and recognise activities and events, cloud computation, data science, knowledge management, semantic technologies, intelligent decision support systems, mobile technologies,



Department of Cybernetics and Artificial Intelligence

pervasive computing, processing and analysis of the large volume and continuous data in real-time, Internet of things, Industry 4.0, modern control theory and fault tolerant control design, cyber-physical systems, under-actuated and actuated nonlinear dynamical systems, flexible manufacturing systems, collective intelligence and computer vision.

The predecessor of the Department was founded in 1964. Department of Cybernetics and Artificial Intelligence was adapted in 1989. Currently it has 24 staff members and 15 internal PhD. students. The Department is involved in a number of research and educational projects (see below).

STAFF

Professors: **prof. Ing. Dušan Krokavec, CSc.**
prof. Ing. Kristína Machová, PhD.
prof. RNDr. Eva Ocelíková, CSc.
prof. Ing. Ján Paralič, PhD.
prof. Ing. Ján Sarnovský, CSc.
prof. Ing. Peter Sinčák, CSc.
prof. Ing. Iveta Zolotová, CSc.

Associate Professors: **doc. Ing. František Babič, PhD.**
doc. Ing. Peter Bednár, PhD.
doc. Ing. Marek Bundzel, PhD.
doc. Ing. Peter Butka, PhD.
doc. Ing. Anna Filasová, CSc.
doc. Ing. Anna Jadlovská, PhD.
doc. Ing. Ján Jadlovský, CSc.
doc. Ing. Marián Mach, CSc.
doc. Ing. Peter Papcun, PhD.
doc. Dr. Ing. Ján Vaščák

Assistant Professors: **Ing. Anna Biceková, PhD.**
Ing. Erik Kajáti, PhD.
Ing. Ján Magyar, PhD.
Ing. Martin Sarnovský, PhD.
Ing. Martina Szabóová, PhD.

Researchers: **Ing. Maroš Hliboký**

Department of Cybernetics and Artificial Intelligence

Ing. Viera Maslej Krešňáková, PhD.

Technical Staff: **Tatiana Baňasová**

Ing. Lenka Ličková

Internal Ph.D. Students: **Ing. Viliam Balara**

Ing. Nikola Hrabovská

Ing. Maroš Krupáš

Ing. Miroslava Matejová

Ing. Ľubomír Ulbrík

Ing. Tomáš Adam

Ing. Alexander Brecko

Ing. Dušan Herich

Ing. Maroš Hliboký

Ing. Stanislav Husár

Ing. Oliver Lohaj

Ing. Kristián Mičko

Ing. Tomáš Tkáčik

Ing. Jakub Ivan Vanko

Ing. Dominik Vranay

External Ph.D. Students: **Ing. Radoslav Kavický**

Ing. Peter Písarčík

Ing. Matúš Smolko

Ing. Maroš Stredanský

Ing. Jozef Rešetár

Ing. Dušan Zagata

Ing. Miroslava Hrešková

Ing. Ladislav Pomšár

TEACHING

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Foundations of Intelligent Systems</i>	<i>2nd</i>	<i>3/2</i>	<i>Bundzel, Papcun</i>
<i>Introduction to Business Informatics</i>	<i>2nd</i>	<i>1/2</i>	<i>Paralič, Babič</i>

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Industry 4.0.	2 nd	2/2	Zolotová, Kajáti
Programming in Python	2 nd	2/2	Magyar
Basics of economics	2 nd	2/2	Biceková
Industrial informatics in applications	3 rd	2/2	Jadlovská
Intelligent Space and IoT	3 rd	2/2	Papcun
Simulation Systems	3 rd	2/2	Jadlovská
Project Management	3 rd	2/2	Babič
Foundations of Python Language	3 rd	2/2	Magyar
Applications of Web Technologies	3 rd	2/2	Bednár
Analysis and Design of Information Systems 1.	3 rd	2/2	Babič, Sarnovský M.
Artificial Intelligence	3 rd	2/2	Sinčák, Machová
Programming in C#	3 rd	2/2	Magyar
Application of database systems	4 th	2/2	Kajáti
Analysis and Design of Information Systems 2.	4 th	1/2	Bednár
Sensors and actuators	4 th	2/2	Jadlovský
Knowledge-Based Systems	4 th	2/2	Machová
Intelligent systems and mobile robotics	4 th	2/2	Vaščák
Fuzzy Systems	4 th	2/2	Vaščák
Neural Networks	4 th	2/2	Sinčák
Supervision Systems and HMI	4 th	2/2	Zolotová, Kajáti
Machine Learning	4 th	2/2	Machová
Scheduling and Logistics	4 th	2/2	Paralič
Languages for Data Analytics	4 th	2/2	Butka
Intelligent Robotics	5 th	2/2	Papcun
Business Analytics	5 th	2/2	Butka
Application of logic in intelligent systems	5 th	2/2	Mach
Computer Systems	5 th	2/2	Jadlovský
Computer Vision	5 th	2/2	Bundzel
Computer Systems in Control	5 th	2/2	Jadlovský
Optimization in Economic Processes	5 th	2/2	Filasová

Department of Cybernetics and Artificial Intelligence

<i>Development of intelligent mobile solutions</i>	5 th	2/2	<i>Babič, Butka</i>
<i>Business Informatics in practice</i>	6 th	2/2	<i>Babič</i>
<i>Machine Learning II</i>	6 th	2/2	<i>Mach</i>
<i>IT Management</i>	6 th	2/2	<i>Sarnovský M.</i>
<i>Repetition of the field of study</i>	6 th	2/2	<i>Papcun, Szabóová</i>
<i>Fundamentals of cloud technologies</i>	6 th	1/2	<i>Zolotová</i>

Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Team Project</i>	1 st	0/3	<i>Zolotová</i>
<i>Multiagent and network control systems</i>	1 st	2/2	<i>Kajáti</i>
<i>Architectures of Industrial Information Systems</i>	1 st	2/2	<i>Zolotová, Papcun</i>
<i>Knowledge Discovery</i>	1 st	2/2	<i>Paralič</i>
<i>Fundamentals of Deep Learning</i>	1 st	2/2	<i>Sinčák</i>
<i>Heuristic Optimization Processes</i>	1 st	2/2	<i>Mach</i>
<i>Mathematics for intelligent systems</i>	1 st	2/2	<i>Szabóová</i>
<i>Engineering Econometrics</i>	1 st	2/2	<i>Krokavec</i>
<i>Control and Artificial Intelligence</i>	2 nd	2/2	<i>Jadlovská</i>
<i>Technologies for Big Data Processing</i>	2 nd	2/2	<i>Bednár, Sarnovský M.</i>
<i>Hybrid Computational Intelligence</i>	2 nd	2/2	<i>Vaščák</i>
<i>Evolutionary Algorithms</i>	2 nd	2/2	<i>Mach</i>
<i>Distributed Control Systems</i>	2 nd	2/2	<i>Jadlovský</i>
<i>Hybrid Computational Intelligence</i>	2 nd	2/2	<i>Vaščák</i>
<i>Machine Learning</i>	2 nd	2/2	<i>Machová</i>
<i>Current trends in Business Informatics</i>	2 nd	2/1	<i>Babič, Paralič</i>
<i>Knowledge Management</i>	3 rd	2/2	<i>Paralič, Bednár</i>
<i>Management Information Systems</i>	3 rd	2/2	<i>Jadlovský</i>
<i>Navigation methods in robotics</i>	3 rd	2/2	<i>Vaščák</i>
<i>Advanced Methods of Computer Vision</i>	3 rd	2/2	<i>Bundzel</i>
<i>Semantic and Social Web</i>	3 rd	2/2	<i>Machová</i>
<i>Languages for Intelligent Systems</i>	3 rd	2/2	<i>Mach</i>

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<i>Advanced Methods for Data Analysis</i>	3 rd	1/2	<i>Bednár</i>
<i>Main Knowledge of the Field Intelligent Systems and Their Use</i>	4 th	0/2	<i>Zolotová</i>
<i>Main Knowledge of the Field of Business Informatics and Their Use</i>	4 th	0/2	<i>Butka</i>

RESEARCH TEAMS

- Data science – primarily focused on methods and models for analysis of different types of data, including big data, various aspects of data analytic models and processes in different application domains. (<https://hi.kkui.fei.tuke.sk/>)
- Fault-tolerant and Robust Control – primarily focused on innovative control design techniques exploiting convex optimization problems with constraints and disturbance suppression, models and algorithms for processing and synthesis of robust control of dynamical systems working under system model uncertainties and severe failure conditions and design, implementation and experimental verification of methods guarantying system fault tolerance and reconfiguration structures of control.
- Modern Control Techniques and Industrial Informatics – primarily focused on methods and developing resources for hybrid modeling and control of cyber-physical systems, new methods and algorithms for modeling, identification, control and diagnostics of under-actuated and actuated nonlinear dynamical systems, research and development of flexible manufacturing systems, automated and robotic production lines and the design of diagnostic systems focused on diagnostics of vibration and chatter for the cyber systems. (<http://kyb.fei.tuke.sk/lab/en/>)
- Intelligent Cybernetic Systems – primarily focused on machine learning algorithms, collective intelligence, and optimization, and computer vision, intelligent and cognitive robotics, smart living, intelligent space topics, sensors nets, intelligent gateways and processing with IoT/IoE and cloud technologies in smart industry, and multi-robotics systems and navigation. (<http://ics.fei.tuke.sk/>)
- Intelligent Technologies and Systems – primarily focused on intelligent robotics (to develop learnable collaborative robot systems), interactive intelligent environment able to perceive and recognise activities or events, and cloud computation (AI bricks – modular services providing functionality of selected artificial intelligence methods). (<http://www.cloudai.sk/>)

RESEARCH AND EDUCATIONAL PROJECTS

<https://www.fei.tuke.sk>

Department of Cybernetics and Artificial Intelligence

- LifeBots Exchange – creating a new reality of care and welfare through the inclusion of social robots, H2020-MSCA-RISE-2018 project 824047, duration: 2019-2023, project leader for TUKE: Marek Bundzel
- ALICE experiment at the CERN LHC: The study of strongly interacting matter under extreme conditions (Experiment ALICE na LHC v CERNe: Štúdium silno interagujúcej hmoty v extrémnych podmienkach), ALICE TUKE - No. 0410/2022, Agreement for the co-financing of the ALICE CERN research and development project for duration: 2022 - 2026, members: Ján Jadlovský (project leader, Team leader TUKE-CERN), Anna Jadlovská, Slávka Jadlovská (Deputy Team Leader TUKE-CERN), Tomáš Tkáčik, Dominika Lišková, Filip Pazdič, Mikuláš Kožlej, Michal Klima
- Feasibility study of data-driven Autonomous Service for Prediction of Ionospheric Scintillations (ASPIS), granted by European Space Agency (ESA), 6th PECS Call, contract no. 400137046/22/NL/SC, TUKE as subcontractor (prime contractor: Institute of Experimental Physics, Slovak Academy of Sciences) duration: 2022 - 2023, members from TUKE: Peter Butka (project/team leader for TUKE), Viera Krešňáková
- Proposal for Slovak universities curriculum adaptation toward S2P market (SK-S2P-Edu), granted by European Space Agency (ESA), 7th PECS Call, contract no. 4000139660/22/NL/SC/rp, TUKE as prime contractor, duration: 2022-2024, project leader: Peter Butka, other members from TUKE: Martin Sarnovský, Viera Krešňáková
- EPIC - EP Innovation centre, 2023, project leaders: Erik Kajáti, Iveta Zolotová
- Processing and analysis of ultrasonographic video recordings using artificial intelligence, Slovak Research and Development Agency project no. APVV-20-0232, duration: 2021 - 2024, members: František Babič (project leader), Marek Bundzel, Ján Magyar, Ján Paralič, Martina Szabóová, Martin Sarnovský, Michal Kolárik, Viera Anderková, Maroš Hliboký
- Modermed: Multimodal Detection of Toxic Behaviour in Social Media, Slovak Research and Development Agency project no. APVV-23-0414, duration: 2023 - 2027, members: Kristína Machová (project leader), Ján Paralič, Marián Mach, František Babič, Peter Bednár, Peter Butka, Martin Sarnovský, Martina Szabóová, Michal Kolárik, Oliver Lohaj, Jakub Ivan Vanko, Tomáš Adam, Miroslava Matejová
- ENISaC - Edge eNabled Intelligent Sensing and Computing, Slovak Research and Development Agency project no. APVV-20-0247, duration: 2021-2025, members: Iveta Zolotová (project leader), Peter Papcun, Jan Vaščák, Erik Kajáti, Alexander Brecko, Kristián Mičko, Dušan Herich, Ľubomír Urblík, Maroš Krupáš
- EDEN - Edge-enabled intelligent systems, , Scientific Grant Agency project No. 1/0480/22, duration: 2022 - 2025, members: Peter Papcun (project leader), Iveta Zolotová, Ján Vaščák, Erik Kajáti, Alexander Brecko, Kristián Mičko, Dušan Herich, Ľubomír Urblík, Maroš Krupáš
- Distributed fault diagnosis of structural non-distributed systems, Scientific Grant Agency project No. 1/0483/21,

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duration: 2021 – 2023, members: Dušan Krokavec (project leader), Anna Filasová

- Interpretable data analysis models to support decision making, Scientific Grant Agency project No. 1/0685/21, duration: 2021 – 2024, members: Ján Paralič (project leader), František Babič, Kristína Machová, Peter Butka, Peter Bednár, Martin Sarnovský, Miroslav Smatana, Viera Maslej Krešňáková, Anna Biceková, Zuzana Pella, Ľudmila Pusztová, Juliana Ivančáková, Michal Kolárik, Viera Anderková, Oliver Lohaj, Jakub Ivan Vanko, Tomáš Adam, Miroslava Pavlusová, Lenka Kališková
- Basic research on deep learning methods for image processing (DL4VISION), Scientific Grant Agency project No. 1/0394/22, duration: 2022 – 2025, project leader: Peter Sinčák
- Research of advanced data-analytical models for the analysis of the influence of various factors on the course of the COVID-19 disease and their usability, Scientific Grant Agency project No. 1/0259/24, duration: 2024 – 2027, members: František Babič (project leader), Ján Paralič, Peter Bednár, Anna Biceková, Michal Kolárik, Viera Anderková, Miroslava Matejová, Oliver Lohaj, Jakub Ivan Vanko
- Drones for the future: practical education and research (DronEd), 2023 – 2024, TatraBanka foundation, members: Erik Kajáti (project leader), Peter Papcun, Maroš Krupáš, Ľubomír Urbík
- ArtiPark 2 - Artificial Parkinson, 2022 – 2023, TatraBanka foundation, members: Michal Podžuban (project leader), Ladislav Pomšár, Iveta Zolotová, Erik Kajáti, Peter Papcun
- Siemens Heathineers - Intelligent Health Lab, 2019 – 2023, Iveta Zolotová (project leader), Ladislav Pomšár, Peter Papcun, Erik Kajáti, Ján Vaščák, Alexander Brecko
- AIT-HMC-I5.0 - AI based approaches and enabling IT technology for human-machine collaboration in Industry 5.0, 2023, TUKE grant, members: Maroš Krupáš (project leader), Ľubomír Urbík, Saahil Chand
- Indoor localization and navigation using UWB technology, 2023, FEI grant, members: Ľubomír Urbík (project leader), Dušan Herich, Kristián Genčúr, Filip Havel, Matej Lábaj
- National scholarship program - SAIA 2023 - University of Auckland, New Zealand, awarded Maroš Krupáš
- Support in the field of education and research activity, Siemens Healthcare, a.s. Bratislava, 2021 – 2024, project leader: Iveta Zolotová
- Support in the field of education and research activity, BETAMONT s.r.o. Zvolen, 2022 – 2024, project leader: Peter Papcun

CO-OPERATION

Co-operation in Slovakia

- Department of Automatic Control Systems Bratislava, Slovak University of Technology, Bratislava
- Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava

Department of Cybernetics and Artificial Intelligence

- Institute of Computer Science, University of P.J. Šafárik, Košice
- Institute of Physics, University of P.J. Šafárik, Košice
- Kempelen Institute of Intelligent Technologies, Bratislava
- Institute of Computer Science, Slovak Academy of Sciences in Bratislava
- Department of Biophysics IEP Slovak Academy of Science
- Institute of Experimental Physics, Slovak Academy of Sciences
- Department of applied informatics (Centre for Cognitive Science), Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava
- Division of Astronomy and Astrophysics, Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, including their owned and operated Astronomical and Geophysical observatory in Modra
- Department of Control and Information Systems, Faculty of Electrical Engineering, University of Zilina
- Accenture Košice
- Americká obchodná komora na Slovensku
- Astros Solutions s.r.o., Bratislava
- bart.sk Košice
- Betamont Slovakia
- BSH, Michalovce
- Control Systems Slovakia
- Elcom Prešov
- Erste Group IT International GmbH Bratislava
- Exponea Bratislava
- Fpt Slovakia: FPT Group
- Freudenberg IT
- GlobalLogic Slovakia
- Gymbeam Košice
- IBM Slovakia
- IT Valley Košice
- Magna Powertrain, Košice
- Microsoft Slovakia
- Ness Košice Development Center
- Pixel Federation
- Promiseo Košice
- Siemens Heattheeners, Košice

Department of Cybernetics and Artificial Intelligence

- US Steel Košice
- ui42 Bratislava
- VSE Holding, člen Innogy
- Východoslovenská distribučná, člen Innogy

International Co-operation

- Department of Software Engineering and Interactive Systems, Vienna University of Technology, Austria
- University of Regensburg, Germany
- University of Dortmund, Germany
- Waseda University, Tokyo, Japan
- Technical University of Czestochowa
- Tokyo Institute of Technology, Japan
- Kyushu Institute of Technology, Japan
- University Pablo de Olavide of Seville, Spain
- Université Joseph Fourier Grenoble, IUT 1 (Institut Universitaire de Technologie 1), Grenoble, France
- Heudiasyc UMR CNRS 6599, UTC, Compiègne, France
- Université Henri Poincaré, Laboratoire CRAN (Centre de Recherche en Automatique de Nancy), Nancy 1, France
- Department of Informatics, Technical University Ostrava, Czech Republic
- Department of Control Systems and Instrumentation, Faculty of Mechanical Engineering Technical University Ostrava, Czech Republic
- Department of Cybernetics and Biomedical Engineering, Technical University Ostrava, Czech Republic
- Department of Cybernetics, Czech Technical University Prague, Czech Republic
- Department of Control Engineering, Czech Technical University, Prague, Czech Republic
- Institute of Information Theory and Automation, Academy of Sciences of Czech Republic, Prague, Czech Republic
- Department of Information Engineering, Faculty of Economics and Management, Czech University of Agriculture, Prague, Czech Republic
- Faculty of Informatics and Management, University of Hradec Králové, Czech Republic
- Dept. of Computer Science and Engineering, Faculty of Applied Sciences, University of West Bohemia, Plzeň
- The Technical Faculty of IT and Design, Aalborg University, Denmark
- Faculty of Mechanical Engineering, Department of Automation, Institute of Information, University of Miskolc, Hungary
- Óbuda University, Budapest, Hungary

Department of Cybernetics and Artificial Intelligence

- Budapest University of Technology and Economics, Hungary
- Hungarian Academy of Sciences, Computer and Automation Research Institute, Hungary
- Regional Association of the Hungarian Academy of Sciences, Miskolc, Hungary
- Laboratory for Industry 4.0 Smart Manufacturing Systems (LI4.0) , University of Auckland, New Zealand
- Center for Innovation in Design and Technology, Monterrey, Mexico

Membership in International Organizations and Societies

- Bundzel M.: IEEE, Computational Intelligence Society
- Krokavec, D.: Member of the International Federation of Automatic Control IFAC Technical Committee TC 1.4 Stochastic Systems and TC 6.4 Fault Detection, Supervision & Safety of Technical Processes
- IEEE Student Branch – Lojka, Miškuf, Hvizdoš, Mocnej, Ferenčík, Kajáti
- Ocelíková, E.: CSSSCzech and Slovak Society for Simulation
- Machová, K.: ACM – Association of Computer Machinery
- Papcun P.: IEEE, Automation and Robotic Society
- Paralič, J.: IEEE – senior member, ACM – Association for Computing Machinery,
- Sarnovský, J.: INESInternational Network of Engineers and Scientists for Global Responsibility
- Sarnovský, J.: Principia Cybernetica Web PRNCYB-L
- Sarnovský, J.: SWIISupplementary Ways for Improving International Stability
- Sinčák P.: European Society of Neural Networks
- Sinčák P.: IEEE, Computational Intelligence Society
- Vaščák, J.: IEEE – senior member, Computational Intelligence Society
- Zolotová, I.: IEEE – senior member, IEEE SMC Society, IEEE Educational Society

Membership in Slovak Organizations and Societies

- The whole Department of Cybernetics and Artificial Intelligence is a team member of:
Slovak Society for Cybernetics and Informatics
Slovak AI Society
- Filasová, A.: Slovak Society for Cybernetics and Informatics
- Butka, P.: Slovak Astronomical Society at the Slovak Academy of Sciences
- Krokavec, D.: Slovak Electrical Engineering Society
- Jadlovská, A; Ocelíková, E.; Sarnovský, J.: Slovak Society for Cybernetics and Informatics
- Paralič, J.: Slovak Society for Computer Science

Department of Cybernetics and Artificial Intelligence

International Networks and Exchange Programs

- SocratesErasmus agreement between TU of Košice and Czech University of Life Sciences, Prague, Czech Republic. Contact person: Eva Ocelíková
- Socrates Erasmus agreement between TU of Košice and University Pablo de Olavide, Sevilla, Spain. Contact person: Ján Vaščák
- SocratesErasmus agreement between TU of Košice and University Hradec Kralove, Czech Republic. Contact person: Ján Vaščák

Visits of Staff Members to Foreign Institutions

- J. Magyar, Helsinky, Fínsko, 5.-9.2.
- M. Szabóová, Helsinky, Fínsko, 5.-9.2.
- MEng. D. Vranay, Helsinky, Fínsko, 5.-9.2.
- P. Papcun, Budapešť, Maďarsko, 14.-15. 2.
- M. Bundzel, Sevilla, Španielsko, 2.4.-5.5.
- M. Hliboký, Nice, Francúzsko, 20.-23.3.
- T. Tkáčik, Ženeva, Švajčiarsko, 25.3.-6. 4.
- P. Sinčák, Miškolc, Maďarsko, 5.4.
- P. Sinčák, Pécs, Maďarsko, 25.-26.4.
- P. Sinčák, Miškolc, Maďarsko, 4.-5.5.
- P. Papcun, Veszprém, Maďarsko, 21.-24.5.
- P. Papcun, Ostrava, ČR, 8.-9.6.
- O. Lohaj, Tallin, Estónsko, 14.-28.7.
- J. I. Vanko, Tallin, Estónsko, 14.-28.7.
- D. Herich, Praha, ČR, 18.-21.6.
- D. Krokavec, Praha, ČR, 15.-17.6.
- T. Tkáčik, Ženeva, Švajčiarsko, 26.6.-16.7.
- M. Hliboký, Praha, ČR, 18.-21.6.
- K. Machová, Sevilla, Španielsko, 27.6.-1.7.
- M. Bundzel, Uaxactun, Guatemala, 19.7.-20.9.
- M. Krupáš, Auckland, Nový Zéland, 12.8.-15.10.
- Ľ. Urblík, Auckland, Nový Zéland, 12.8.-12.9.
- D. Krokavec, Lefkada Island, Grécko, 5.-12.8.
- K. Machová, Lisabon, Portugalsko, 8.9.-10.10.

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- M. Mach, Lisabon , Portugalsko, 8.9.-10.10.
- N. Hrabovská, Londýn, Veľká Británia, 9.-19.9.
- J. Magyar, Tokio, Japonsko, 26.8.-4.9.
- P. Bednár, Tokio, Japonsko, 26.8.-4.9.
- T. Tkáčik, Ženeva, Švajčiarsko, 15.-24.9.
- A. Jadlovská, Ostrava, ČR, 4.-7.9.
- Dr. J. Vaščák, Pula, Chorvátsko, 19.-24.9.
- P. Papcun, Brno, ČR, 4.10.
- M. Hliboký, Tokio, Japonsko, 12.10.-11.11.
- P. Bednár, Ludwigsburg, Nemecko, 16.-18.10.
- Dr. J. Vaščák, Da Nang, Vietnam, 22.-28.10.
- T. Tkáčik, Ženeva, Švajčiarsko, 30.10.-19.11.
- P. Sinčák, Budapešť, Maďarsko, 6.11.
- P. Sinčák, Miškolc, Maďarsko, 10.-10.11.
- A. Biceková, Budapešť, Maďarsko, 20.-21.11.
- M. Szabóová, Budapešť, Maďarsko, 20.-21.11.
- L. Kališková, Budapešť, Maďarsko, 20.-21.11.
- M. Bundzel, Trondheim, Nórsko, 25.11.-17.12.
- P. Sinčák, Miškolc, Maďarsko, 14.12.

THESES

Thesis Type	Bachelor	Master	Doctoral
Number	108	55	5

OTHER ACTIVITIES

- Picnic TUKE 2023
- Open day TUKE 2023
- World Robot Olympiad 2023 – organization of Slovak national round and participation at the world final as judge

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PUBLICATIONS

Journals

- MIKULECKÝ, Peter - PUNČOCHÁŘOVÁ, Anna - BABIČ, František - BUREŠ, Vladimír - ČECH, Pavel - HUSÁKOVÁ, Martina - MLS, Karel - NACHÁZEL, Tomáš - PONCE, Daniela - ŠTEKEROVÁ, Kamila - TRIANTAFYLLOU, Ioanna - TUČNÍK, Petr - SUNANDA, Vijaya - ZANKER, Marek: Dealing with risks associated with tsunamis using indigenous knowledge approaches / - 2023. In: International Journal of Disaster Risk Reduction. - Amsterdam (Holandsko) : Elsevier Science Roč. 86 (2023), s. [1-21] [online]. - ISSN 2212-4209 (online)
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- HLIBOKÝ, Maroš - MAGYAR, Ján - BUNDZEL, Marek - MALÍK, Marek - ŠTEVÍK, Martin - VETEŠKOVÁ, Štefánia - DZIAN, Anton - SZABÓOVÁ, Martina - BABIČ, František: Artifact Detection in Lung Ultrasound: An Analytical Approach / - 2023. In: Electronics. - Bazilej (Švajčiarsko) : Multidisciplinary Digital Publishing Institute Roč. 12, č. 7 (2023), s. [1-17] [online]. - ISSN 2079-9292 (online)
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- KROKAVEC, Dušan - FILASOVÁ, Anna: Interval observers design for systems with ostensible metzler system matrices / - 2023. In: Frontiers in Aerospace Engineering. - Lausanne (Švajčiarsko) : Frontiers Media Roč. 2, č. 1 (2023), s. [1-10] . - ISSN 2813-2831 (online)
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Other publications

Publication Type	Journals		Textbooks	Conferences		Patents	Other
	Foreign	Home	Home	Foreign	Home	Domestic	
Number				9	39		27



Faculty of Electrical Engineering
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DEPARTMENT'S PROFILE

The Department of Electric Power Engineering at Technical University of Košice is one of the profiling departments of Faculty of Electrical Engineering and Informatics. It was founded on the 1st October 1973 as an independent science and research unit of the faculty. The most important structural changes of the department were:

- *Integration of the department with the Department of Electrical Heating and Electrochemistry on the 1st September 1981*
- *Incorporation of the Department of High Voltage Engineering into the Department of Electric Power Engineering*



These structural changes influenced the department activities and staff changes. The Department of Electric Power Engineering currently has 4 professors, 6 associate professors, 6 assistant professors, 2 scientific research employee

Department of Electric Power Engineering

and 6 internal PhD students.

According to the latest accreditation, the Department of Electric Power Engineering guarantees these study programmes:

- *Electric Power Engineering in bachelor, master and doctoral degree courses*
- *Electrical Engineering in bachelor degree course.*

The department is responsible for education of fundamental subjects of the study programmes: Transmission and Distribution of Electricity, Electric Power Plants, Electric Power System Operation, Electric Installation and Substation, Diagnostics of Electrical Power Engineering Equipments, Unconventional Power Sources, Electro Heat and Lighting Engineering.

The department offers education of electrical engineers, self-employed electrical engineers and electrical engineers for activities supervision or operation supervision in the range for electrical devices without voltage constraint including lightning conductors for objects without detonation risk.

The department enhances and improves educational process in cooperation with foreign universities through ERASMUS programmes.

The department staff has worked on several national and international grant projects, focused on:

- Control of Electric power system of Slovak Republic and electricity market in conditions of European Union
- Utilisation of artificial intelligence elements for electric power engineering control processes
- Electrical relays and electric power system stability
- Solving of overhead power lines mechanics in three dimensional space
- Illumination of spaces and lighting sources
- Photovoltaic devices with optimal efficiency and photovoltaic system properties
- Diagnostics of electric power equipment
- High quality results of science and research activities of the department staff are provided by the extensive cooperation with the electric power companies (SEPS, VSE, VSD, Siemens, ABB, ZSE, SSE, Landis+Gyr, Schneider Electric and many others).

The Department of Electric Power Engineering at FEI TU of Košice is the only department in Slovakia with accredited study programmes in all three-degree levels of university studies.

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prof. Ing. Juraj Kurimský, PhD.

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doc. Dr. Ing. Bystrík Dolník

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doc. Ing. Dušan Medved', PhD.

doc. Ing. Jaroslav Petráš, PhD.

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Ing. Marián Mešter, PhD.

Ing. Marek Pavlík PhD.

Ing. Ján Zbojovský, PhD.

Ing. Róbert Štefko, PhD.

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Ing. Peter Havran, PhD.

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Ing. Ľuboš Šárpataky (until 23.08.2023)

Ing. Miloš Šárpataky (until 23.08.2023)

Ing. Róbert Štefko (until 23.08.2023)

Ing. Marek Bobček (since 01.09.2023)

Ing. Ardian Hyseni (since 01.09.2023)

Ing. František Margita (since 01.09.2023)

TEACHING

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Fundamentals of Electrical Engineering</i>	1 st	2/2	<i>Cimbala</i>
<i>Fundamentals of Algorithms and Programming</i>	1 st	0/2	<i>Zbojovský</i>
<i>Introduction to Engineering</i>	1 st	2/0	<i>Kolcun</i>

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<i>Fundamentals of environmental engineering</i>	<i>2nd</i>	<i>2/2</i>	<i>Pavlík</i>
<i>Programming</i>	<i>2nd</i>	<i>2/2</i>	<i>Petráš</i>
<i>Power transmission</i>	<i>3rd</i>	<i>2/2</i>	<i>Kurimský</i>
<i>Fundamentals of designing in electric power engineering</i>	<i>3rd</i>	<i>1/2</i>	<i>Zbojovský</i>
<i>Faults in Electric Power System</i>	<i>4th</i>	<i>2/2</i>	<i>Beňa</i>
<i>Light – technology</i>	<i>4th</i>	<i>2/1</i>	<i>Beňa</i>
<i>Electric Power Plants</i>	<i>4th</i>	<i>2/1</i>	<i>Kolcun</i>
<i>Database systems - SQL Oracle</i>	<i>4th</i>	<i>2/1</i>	<i>Petráš</i>
<i>Measurement in electric power engineering</i>	<i>4th</i>	<i>2/1</i>	<i>Kurimský</i>
<i>Conversion of Electrical Energy</i>	<i>4th</i>	<i>2/2</i>	<i>Medveď</i>
<i>Bachelor Project</i>	<i>5th</i>	<i>0/8</i>	<i>(Supervisors)</i>
<i>Electrical installation and substation</i>	<i>5th</i>	<i>2/3</i>	<i>Džmura</i>
<i>High Voltage Engineering</i>	<i>5th</i>	<i>2/3</i>	<i>Kolcunová</i>
<i>Operation of electric power plants</i>	<i>5th</i>	<i>2/1</i>	<i>Džmura</i>
<i>Economy in the electric power engineering</i>	<i>5th</i>	<i>2/2</i>	<i>Zbojovský</i>
<i>Professional experience in an enterprise</i>	<i>5th</i>	<i>0/8</i>	<i>Džmura</i>
<i>Bachelor Thesis</i>	<i>6th</i>	<i>0/12</i>	<i>(Supervisors)</i>
<i>Electrical relaying in the electric power system</i>	<i>6th</i>	<i>2/3</i>	<i>Čonka</i>
<i>Unconventional energy sources</i>	<i>6th</i>	<i>2/1</i>	<i>Pavlík</i>
<i>Prophylactics of power engineering equipment</i>	<i>6th</i>	<i>2/2</i>	<i>Kolcunová</i>
<i>Electrotechnical capability</i>	<i>6th</i>	<i>2/2</i>	<i>Pavlík</i>

Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Automatization in Electric Power Engineering</i>	<i>7th</i>	<i>2/1</i>	<i>Cimbala</i>
<i>Quality and reliability of electric power delivery</i>	<i>7th</i>	<i>2/2</i>	<i>Dolník</i>
<i>Optimisation of Electric Power System Operation</i>	<i>7th</i>	<i>2/2</i>	<i>Kolcun</i>
<i>Overvoltages in Electric Networks</i>	<i>7th</i>	<i>2/2</i>	<i>Dolník</i>
<i>Simulation in Electric Power System</i>	<i>7^t</i>	<i>2/2</i>	<i>Medveď</i>
<i>Electrical power network</i>	<i>7th</i>	<i>2/2</i>	<i>Beňa</i>

Department of Electric Power Engineering

<i>Thesis project 1</i>	<i>8th</i>	<i>0/4</i>	<i>(Supervisors)</i>
<i>Electric power system operation control</i>	<i>8th</i>	<i>2/2</i>	<i>Kolcun</i>
<i>Transient stability of power system</i>	<i>8th</i>	<i>2/2</i>	<i>Džmura</i>
<i>Electric power systems and the environment</i>	<i>8th</i>	<i>2/2</i>	<i>Király</i>
<i>Design of the illuminating systems</i>	<i>8th</i>	<i>1/1</i>	<i>Beňa</i>
<i>Thesis project 2</i>	<i>9th</i>	<i>0/8</i>	<i>(Supervisors)</i>
<i>Diagnostic in electric power engineering</i>	<i>9th</i>	<i>2/2</i>	<i>Kolcunová</i>
<i>Protection Systems in Electric Power System</i>	<i>9th</i>	<i>2/1</i>	<i>Kurimský</i>
<i>Automated electrical installation systems</i>	<i>9th</i>	<i>2/1</i>	<i>Petráš</i>
<i>Electromagnetic compatibility</i>	<i>9th</i>	<i>2/2</i>	<i>Dolník</i>
<i>Designing in the electrical power engineering</i>	<i>9th</i>	<i>2/2</i>	<i>Király</i>
<i>Master Thesis</i>	<i>10th</i>	<i>0/18</i>	<i>(Supervisors)</i>
<i>Management of Electric Power Enterprises</i>	<i>10th</i>	<i>2/0</i>	<i>Cimbala</i>
<i>Main Knowledge of Study Field of Electrical Engineering and its Use</i>	<i>10th</i>	<i>0/4</i>	<i>(Supervisors)</i>

Postgraduate study (PhD..)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Theoretic electric power engineering (4)</i>	<i>1st</i>	<i>0/10</i>	<i>Cimbala, Kolcun, Kolcunová, Kurimský, Beňa, Dolník, Džmura, Medved', Petráš, Čonka</i>
<i>Scientific Activity 1 (4)</i>	<i>1st</i>	<i>0/10</i>	<i>(Supervisors)</i>
<i>Electricity supply system analysis (4)</i>	<i>2nd</i>	<i>0/10</i>	<i>Cimbala, Kolcun, Kolcunová, Kurimský, Beňa, Dolník, Džmura, ,Medved', Petráš, Čonka</i>
<i>Subject of specialised area (4)</i>	<i>3rd</i>	<i>0/10</i>	<i>Cimbala, Kolcun, Kolcunová, Kurimský, Beňa, Dolník, Džmura, Medved', Petráš, Čonka</i>
<i>Scientific Activity 2 (4)</i>	<i>3rd</i>	<i>0/10</i>	<i>(Supervisors)</i>
<i>Scientific Activity 3 (4)</i>	<i>5th</i>	<i>0/10</i>	<i>(Supervisors)</i>
<i>Scientific Activity 4 (4)</i>	<i>6th</i>	<i>0/10</i>	<i>(Supervisors)</i>
<i>Scientific Activity 5 (4)</i>	<i>7th</i>	<i>0/10</i>	<i>(Supervisors)</i>

Department of Electric Power Engineering

LABORATORIES

- Three PC Laboratories (LVT I, LVT II and LVT III)
- Laboratory of Electrical Relays
- Laboratory of Environmental Protection
- Laboratory of Electrical Power Network
- Laboratory of Lighting Engineering
- Laboratory of High Voltage Engineering
- Laboratory of Diagnostics and Prophylactics
- Laboratory of Electrostatics
- Laboratory of Partial Discharges
- Laboratory of Smart Electrical Installations Systems
- Laboratory of Electric Power System Operation
- Laboratory of Electro-magnetic Compatibility
- Laboratory of Gas Insulators
- Laboratory of Photovoltaics
- Laboratory of Dielectric Spectroscopy
- Laboratory LAV6 – Measurement workstation of OZE
- Laboratory of Renewable Energy Sources
- Laboratory SMART INDUSTRY LAB
- EMC chamber

RESEARCH PROJECTS

- *Nano-functionalization of liquids for oil transformers. Slovak Research and Development Agency (APVV) No. APVV- 22-0115, duration: 2023 - 2027, co-ordinator: Cimbala, R.*
- *Nanofluids in Electrical Engineering. Slovak Research and Development Agency (APVV) No. APVV-18-0160, duration: 2019 - 2023, co-ordinator: Cimbala, R.*
- *Electricity self-sufficiency in conditions of liberalized electricity market. Slovak Research and Development Agency (APVV) No. APVV-19-0576 duration: 2020 - 2024, co-ordinator: Kolcun, M.*
- *Energy management improvement of hybrid photovoltaic systems of local objects with storage batteries. Slovak Research and Development Agency (APVV) No. SK-UA-21-0024 duration: 2022 - 2023, co-ordinator: Kolcun, M.*
- *Dynamic allocation of electricity capacities. Slovak Research and Development Agency (APVV) No. APVV-21-0312 duration: 2022 - 2024, co-ordinator: Medveď, D. Incorporation of the Department of High Voltage Engineering into the Department of Electric Power Engineering*

Department of Electric Power Engineering

- *Structure and dynamics of magnetic fluids in an electric field. Scientific grant agency project (S.G.A.) No. 2/0011/20, duration: 2020-2023, co-ordinator: Kurimský, J.*
- *Research into the possibilities of implementing Wide Area Monitoring Systems (WAMS) into the electricity system. Scientific grant agency project (S.G.A.) No 1/0757/21, duration: 2021-2023, co-ordinator: Kolcun, M.*
- *Research of changes in electrophysical properties of modern insulating materials for high-voltage technology during multifactor degradation. Scientific grant agency project (S.G.A.) No 1/0154/21, duration: 2021-2023, co-ordinator: Cimbala, R.*
- *Transfer of knowledge from the field of innovative human interfaces for smart building control into education process. Cultural and Educational Grant Agency project (KEGA) No. 013TUKE-4/2021, duration: 2021 - 2023, co-ordinator: Petráš, J.*
- *Diagnostic and monitoring of the battery storage system. Faculty of Electrical Engineering Technical University of Košice (FEI TUKE) No. FEI-2023-94, duration: 2023, co-ordinator: Bucko, S.*

CO-OPERATION

Co-operation in Slovakia

- Institute of Experimental Physics, Slovak Academy of Sciences, Košice
- Slovak Power Plants, Inc. (SE, a.s.), Bratislava
- Power Plant EVO, Vojany
- Power Plant ENO, Nováky
- Hydro Power Plants VET, Trenčín
- Nuclear Power Plant EBO, Jaslovské Bohunice
- Nuclear Power Plant EMO, Mochovce
- Heat and Power Plant TEKŮ, Košice
- Slovak Electric Transmission System, Inc. (SEPS, a.s.), Bratislava
- VSE – Eastern Slovakia Power Engineering, Inc., Košice
- VSD – Eastern Slovakia Distribution, Inc., Košice
- SSE - Central Slovakia Power Engineering, Inc., Žilina
- ABB Ltd., Bratislava
- Research Institute of Nuclear Power Plants, Inc. (VUJE, a.s.), Trnava
- Slovak Gas Industry, Division Slovtransgaz, Nitra
- U.S. Steel, Košice
- Siemens Ltd., Bratislava
- Hasma, Ltd.,
- Schneider Electric Slovakia, Ltd.,
- ZSE - Western Slovakia Power Engineering, Inc.,

Department of Electric Power Engineering

- SAG ELV Slovensko, Inc.,
- Landis + Gyr, Ltd.,

Visitors to the Department

- Dr. Ervin Rácz – ÓBUDA University Budapest, Hungary
- MSc. Zoltán Varga – ÓBUDA University Budapest, Hungary
- Dr. Judith Pálfi – ÓBUDA University Budapest, Hungary
- Dr. hab. Ing. Piotr Bogusz – Rzeszow University of Technology, Poland
- Dr. hab. Ing. Mariusz Korkosz – Rzeszow University of Technology, Poland
- Dr. György Molnár – ÓBUDA University Budapest, Hungary

International Co-operation

- Graz University of Technology, Austria
- Czestochowa University of Technology, Poland
- Technical University of Riga, Latvia
- Technical University of Tallinn, Estonia
- West Bohemian University, Pilsen, Czech Republic
- VŠB Technical University, Ostrava, Czech Republic
- Czech Technical University, Prague, Czech Republic
- Brno University of Technology, Czech Republic
- ÓBUDA University, Budapest, Hungary
- Technical University of Varna, Bulgaria
- ABB Brno, Czech Republic
- Rzeszów University of Technology, Poland

Visits of Staff Members to Foreign Institutions

- Džmura, J.: VŠB-Technical University of Ostrava, Czech Republic, 15.-18.01.2023
- Petráš, J.: VŠB-Technical University of Ostrava, Czech Republic, 15.-18.01.2023
- Bucko, S.: Riga Technical University, Latvia, 07.-14.5.2023
- Čonka, Z.: Riga Technical University, Latvia, 07.-14.5.2023
- Király, J.: Riga Technical University, Latvia, 07.-14.5.2023
- Medveď, D.: Riga Technical University, Latvia, 07.-14.5.2023
- Pavlík, M.: Riga Technical University, Latvia, 07.-14.5.2023

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- Varnavčinová, J.: Riga Technical University, Latvia, 07.-14.5.2023
- Zbojovský, J.: Riga Technical University, Latvia, 07.-14.5.2023
- Petráš, J.: Riga Technical University, Latvia, 14.-20.5.2023
- Kolcun, M.: Riga Technical University, Latvia, 15.-22.5.2023
- Kolcunová, I.: Riga Technical University, Latvia, 15.-22.5.2023
- Čonka, Z.: Universitatea Politehnica Timisoara, Romania, 23.-26.5.2023
- Štefko, R.: Universitatea Politehnica Timisoara, Romania, 23.-26.5.2023
- Bucko, S.: Conference EPE 2023, Brno University of Technology, Czech Republic, 24.-26.5.2023
- Medveď, D.: Conference EPE 2023, Brno University of Technology, Czech Republic, 24.-26.5.2023
- Pavlík, M.: Conference EPE 2023, Brno University of Technology, Czech Republic, 24.-26.5.2023
- Zbojovský, J.: Conference EPE 2023, Brno University of Technology, Czech Republic, 24.-26.5.2023
- Šárpataky, M.: University of Granada, Spain, 11.-17.6.2023
- Kolcun, M.: Conference CIRED 2023, Rome, Italy, 12.-17.6.2023
- Kolcunová, I.: Conference CIRED 2023, Rome, Italy, 12.-17.6.2023
- Bucko, S.: Trade Show Power 2 Drive, Munich, Germany, 14.-16.6.2023
- Čonka, Z.: Trade Show Power 2 Drive, Munich, Germany, 14.-16.6.2023
- Pavlík, M.: Trade Show Power 2 Drive, Munich, Germany, 14.-16.6.2023
- Pavlík, M.: University of West Bohemia, Plzeň, Czech Republic, 21.-24.6.2023
- Petráš, J.: University of West Bohemia, Plzeň, Czech Republic, 21.-24.6.2023
- Zbojovský, J.: University of West Bohemia, Plzeň, Czech Republic, 21.-24.6.2023
- Čonka, Z.: Sapientia Hungarian University of Transylvania, Cluj-Napoca, Romania
- Kolcun, M.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Zbojovský, J.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Pavlík, M.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Čonka, Z.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Medveď, D.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Kolcunová, I.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Varnavčinová, J.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Kramolišová, D.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Király, J.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Štefko, R.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Bobček, M.: ÓBUDA University Budapest, Hungary, 18.-20.10.2023
- Cimbala, R.: Brno University of Technology, Czech Republic, 06.-08.11.2023

Department of Electric Power Engineering

- Hyseni, A.: University of West Bohemia, Plzeň, Czech Republic, 29.10.-01.11.2023
- Pavlík, M.: University of West Bohemia, Plzeň, Czech Republic, 29.10.-01.11.2023
- Petráš, J.: University of West Bohemia, Plzeň, Czech Republic, 29.10.-01.11.2023
- Zbojovský, J.: University of West Bohemia, Plzeň, Czech Republic, 29.10.-01.11.2023
- Čonka, Z.: Czech Technical University in Prague, Czech Republic, 12.-13.12.2023
- Beňa, Ľ.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Kolcun, M.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Király, J.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Medveď, D.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Čonka, Z.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Pavlík, M.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Bobček, M.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Štefko, R.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Margita, F.: Rzeszow University of Technology, Poland, 07.-08.12.2023
- Membership in International Organizations and Societies
- Cimbala, R.: Working Group: Insulation Diagnostics, Manchester, United Kingdom
- Cimbala, R.: Working Group „Static Electricity in Process Industry”, Basel, Switzerland
- Cimbala, R.: Institute of Electrical and Electronic Engineers (IEEE), Dielectric and Electrical Insulation Society, USA
- Cimbala, R.: Member of CIGRE Committee, France
- Kolcun, M.: Member of Czech and Slovak National CIGRE Committee
- Kolcun, M.: Member of Czech Committee CIRED
- Kolcun, M.: Member of Slovak WEC Committee
- Kolcun, M.: Member of Editorial Board Journal of Elektrotechnika v praxi, Czech Republic
- Kolcun, M.: Member of Editorial Board Power and Electrical Engineering, Riga, Latvia
- Kolcun, M.: Member of Editorial Board Journal Rynek Energii, Lublin, Poland
- Kolcun, M.: Honorary Professor of Óbuda University Budapest, Hungary
- Kolcunová, I.: Honorary Professor of Sankt - Petersburg Power Education Institute of Power Engineering, State Department of Russian Federation, Russia
- Kolcun, M.: nomination of Dr.h.c. Czestochowa University of Technology, Poland
- Cimbala, R.: Member of Scientific Board EEA - Electrotehnica Electronica Automatica, Romania
- Džmura, J.: Member of Scientific Board EEA - Electrotehnica Electronica Automatica, Romania
- Petráš, J.: Member of Scientific Board EEA - Electrotehnica Electronica Automatica, Romania

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- Čonka, Z.: Member of AD&TE research group at Óbuda University in Budapest
- Zbojovský, J.: Member of Scientific Board CANDO EPE Óbuda University in Budapest
- Kolcun, M.: Member of Editorial Board Journal Vestnik KGEU, Kazan, Russia
- Kolcun, M.: Member of Editorial Board Journal Problemy Energetiky, Kazan, Russia

Membership in Slovak Organizations and Societies

- Cimbala, R.: Member of Technical Standardization Commission of Slovak Republic - Cables and Electroinsulation Materials, TK No. 53
- Cimbala, R.: Member of WG Electrical Machine Diagnostics, US Steel Košice
- Cimbala, R.: Member of Scientific Council, TU FEI Košice
- Cimbala, R.: Member of Editorial Board EEN – Elektroenergetika, TU Košice, FEI
- Kolcun, M.: Member of Editorial board journal Acta Electrotechnica et Informatica
- Kolcun, K.: Chairman of Editorial Board EEN – Elektroenergetika, TU Košice, FEI
- Kolcunová, I.: Association of Technical Diagnostics
- Kolcunová, I.: Slovak Centre of IEEE
- Kolcunová, I.: Member of Technical Standardization Commission of Slovak Republic - Cables and Electroinsulation Materials, TK No. 53
- Kolcunová, I.: Member of WG for Electrical Machine Diagnostics, US Steel Košice
- Kolcunová, I.: Member of Editorial Board EEN – Elektroenergetika, TU Košice, FEI
- Kurimský, J.: Member of WG for Electrical Machine Diagnostics, US Steel Košice
- Kurimský, J.: Executive Editor of EEN – Elektroenergetika, TU Košice, FEI
- Beňa, Ľ.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Bucko, S.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Cimbala, R.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Čonka, Z.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Dolník, B.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Džmura, J.: Chairman of Slovak Electrotechnical Society, TU FEI Košice
- Kolcun, M.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Kolcunová, I.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Medveď, D.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Pavlík, M.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Petráš, J.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Zbojovský, J.: Member of Slovak Electrotechnical Society, TU FEI Košice

Department of Electric Power Engineering

THESES

Bachelor's Theses

- Baňački S.: Diagnostics of photovoltaic cells, (Bucko, S.)
- Čorňák, D.: Analysis of connecting renewable energy sources to the distribution system, (Pavlík, M.)
- Fertál, M.: Design of microgrid with integrated vehicle charging infrastructure with Vehicle 2 Grid functionality, (Király, J.)
- Fortuna, E.: Community Energy in the Slovak Republic Conditions, (Beňa, Ľ.)
- Havrila, D.: Design of industrial electrical installations, (Topor, M.)
- Hrabkovský, M.: Thermal aging of the combined oil - paper system, (Cimbala, R.)
- Jakubčo, L.: The electrical installation design of a bungalow, (Zbojovský, J.)
- Kemeník, L.: Smart Grids, (Kolcun, M.)
- Kordovaník, M.: The impact of load type in LV network, (Bucko, S.)
- Kračun, K.: Operation of photovoltaic systems, (Pavlík, M.)
- Kramár, P.: Design of the modernization of public lighting. (Beňa, Ľ.)
- Kriššák, M.: Future of hydrogen technologies, (Medved', D.)
- Larin, D.: Calculation of the operating modes of the 35 kV network with the connection of a photovoltaic power plant with a power of 8.8 MW, (Beňa, Ľ.)
- Lukačín, M.: Modeling of electromagnetic fields, (Zbojovský, J.)
- Maník, M.: Design of a low-voltage switchgear for industrial use, (Pavlík, M.)
- Marhefka, L.: Possibilities of using alternative sources of electricity in the distribution system. (Romaňák, J.)
- Mechír, R.: Artificial intelligence in KNX/EIB system control, (Petráš, J.)
- Minarik, P.: Modeling of discharges on the surface of solid dielectrics, (Kolcunová, I.)
- Mitsoda, R. A.: Study of the thermoelectric phenomenon in ionic liquids, (Kurimský, J.)
- Pallaj, Ľ.: Partial discharge signal evaluation by transform methods, (Petráš, J.)
- Pasternak, V.: Electrical design due to STN 33 2000-7-710, (Király, J.)
- Rešetár, M.: Self-sufficiency of electric power engineering, (Medved', D.)
- Szomosi, V.: Possibilities of using the electrolyzer for power engineering purposes, (Medved', D.)
- Šenitko, M.: PV power plant design for industrial object, (Špak, E.)
- Vaľko, M.: Partial discharges in transformer oil with an admixture of nanoparticles, (Kurimský, J.)

Department of Electric Power Engineering

Master's Theses

- Adzima, J.: Using hydrogen for the electricity production, (Beňa, Ľ.)
- Andraš, M.: Comparison of AC and DC island operation of LV network, (Medveď, D.)
- Aštary, K.: Diagnostics of insulators in various environmental conditions, (Dolník, B.)
- Balla, L.: Laboratory test equipment for RRM machine in E-plan environment, (Dolník, B.)
- Beliš, P.: Use of a high-temperature conductor with a composite core and application in practice, (Beňa, Ľ.)
- Benko, P.: Analysis of electric car charging, (Džmura, J.)
- Bobček, M.: Application of WAMS in the electricity system, (Čonka, Z.)
- Bodnár, P.: Preparation of a training facility for the KNX system, (Džmura, J.)
- Firkal', R.: Macroscopic manifestations of ferrofluids induced by external physical fields, (Kurimský, J.)
- Foriš, P.: Vehicle - to - grid technology (V2G), (Kolcun, M.)
- Gabriš, P.: Analysis of transport phenomena in polymers, (Cimbala, R.)
- Galliková, V.: Processing of lighting design using Dialux evo software, (Pavlík, M.)
- Glajc, K.: Dielectric properties of magnetic fluids in alternating current magnetic field, (Dolník, B.)
- Gurník, P.: Optimization and maintenance impact on a failure rate of MV LV GO, (Romaňák, J.)
- Haborák, K.: The impact of prosumers on the distribution network, (Medveď, D.)
- Hančák, R.: Formation and development of discharges on the surface of solid dielectrics, (Kolcunová, I.)
- Hrivniak, P.: Influence of temperature and moisture on the electrical strength of oil-paper insulation, (Kolcunová, I.)
- Hyseni, A.: Benford's law in electric power engineering, (Petráš, J.)
- Ildža, J.: Measurement of the Earth's magnetic fields, (Džmura, J.)
- Jančík, J.: Modeling of energy measured data in the Microsoft Power BII, (Kolcun, M.)
- Jarolin, M.: Energy saving measures proposal for the Košice Football Arena., (Čonka, Z.)
- Juššík, L.: The influence of consideration of deployed sources in ES of SR on the calculation of maximum short-circuit currents in ES of SR, (Király, J.)
- aľamár, D.: Design and realization of the electrical part of the machine for the production of coolers, (Beňa, Ľ.)
- Kán, M.: Application of the diagnostic method "frequency analysis of insulation systems of current measuring transformers" in SEPS conditions, (Cimbala, R.)
- Karabinoš, M.: PV hybrid systems and GUI interface design for electronic load, (Čonka, Z.)
- Kaščák, J.: Shielding the electromagnetic fields after application of protective coatings, (Zbojovský, J.)
- Kmec, R.: Innovative methods of KNX/EIB system control, (Petráš, J.)
- Kocian, K.: Classification and qualification of electricity service suppliers, (Király, J.)
- Kolibab, D.: Design of a presentation panel with the iNELS system, (Džmura, J.)
- Kozák, Š.: Guaranteed energy service, (Džmura, J.)

Department of Electric Power Engineering

- Lonc, Š.: KNX/EIB system and artificial intelligence, (Petráš, J.)
- Margita, F.: Use of WAM systems to determine the ampacity of overhead transmission lines, (Beňa, L.)
- Meglés, M.: Protection of external HV lines by automated elements, (Ivan, J.)
- Mikloš, J.: Design of a manufacturing plant electrical system, (Topor, M.)
- Nagy, M.: Electrification design of a multifunctional and residential building, (Mikloš, J.)
- Ondruško, T.: Analysis the sources of high-frequency radiation, (Zbojovský, J.)
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- MEDVEĎ, Dušan - MARTINKO, Dávid - KOLCUN, Michal - KIRÁLY, Jozef - SHAVOLKIN, Olexandr - SHVEDCHYKOVA, Iryna: Analysis of dynamic events in the network during the operation of a sofc hydrogen fuel cell / - 2023. In: EPE 2023: proceedings. - Brno (Czech Republic): Vysoké učení technické v Brně pp. [1-6], ISBN 979-8-3503-3592-4, <http://dx.doi.org/10.1109/epe58302.2023.10149241>.
- ZBOJOVSKÝ, Ján - PAVLÍK, Marek - KOLCUNOVÁ, Irida: Investigation of thermal stress impact to the dielectric properties of the oil-paper insulation system / - 2023. In: EPE 2023: proceedings. - Brno (Czech Republic): Vysoké učení technické v Brně pp. 346-350, ISBN 979-8-3503-3592-4, <http://dx.doi.org/10.1109/epe58302.2023.10149308>.
- VADÁSZ, Pavol - PLEŠINGEROVÁ, Beatrice - MEDVEĎ, Dušan - SUČIK, Gabriel - BAKAJSOVÁ, Radka: Effect of intensification of the dendromass combustion process on corrosion of high-alumina refractory linings / - 2023. In: 27th international Meeting of Thermophysics 2022. - United States (USA): AIP Publishing, pp. 162-172, ISSN 0094-243X, <http://dx.doi.org/10.1063/5.0164305>.

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- MARTINKO, Dávid - MEDVEĎ, Dušan - KOLCUN, Michal: Predicted impact of future penetration levels of domestic pv and battery sizes on low-voltage grid consumption balances / - 2023. In: EPE 2023: proceedings. - Brno (Czech Republic): Vysoké učení technické v Brně pp. [1-6], ISBN 979-8-3503-3592-4, <http://dx.doi.org/10.1109/epe58302.2023.10149226>.
- ŠÁRPATAKY, Miloš - RAJŇÁK, Michal - ZBOJOVSKÝ, Ján - KURIMSKÝ, Juraj: Ac breakdown voltage thermal dependence in magnetic fluids / - 2023. In: EPE 2023: proceedings. - Brno (Czech Republic): Vysoké učení technické v Brně pp. 351-355, ISBN 979-8-3503-3592-4, <http://dx.doi.org/10.1109/epe58302.2023.10149231>.
- LIPTAI, Pavol - NAGY, Šimon - DOLNÍK, Bystrík - VINDT, Tomáš - ORÁČ, Dušan: Využitie ZnO ako druhotnej suroviny, z EOP úletov, v polovodičových produktoch / - 2023. In: Oceláři: Sborník konference. - Ostrava (Czech Republic): Tanger, pp. 124-130, ISBN 978-80-88365-10-5

EXPERT'S ACTIVITY FOR PRACTICE

of Department of Electric Power Engineering

Diagnostic of High Voltage Power Devices

- diagnostic measurements of insulating systems of high voltage rotating machines by DC methods
- diagnostic measurements of insulating systems of high voltage rotating machines by partial discharge measurements and phase-resolved partial discharge analysis
- DC diagnostics of high voltage cables, bushes and cable terminators
- diagnostics of high voltage transformers
- localisation of PD sources on high voltage devices by means of high-frequency detection
- advising activities
- Special Measurement in Electric Power Engineering
- measurement of electric power lines parameters (positive sequence impedance, zero sequence impedance, inductance and capacitance)
- measurement of power device grounding (appraisal of grounding system quality from the aspect of impedance, system integrity and magnitude of contact voltage and step voltage)
- measurement of basic power quality indices
- design and review of relays operation

Expertise and judge activity in electric power engineering focused on:

- Appraisal of extensive earthing systems quality on the basis of:
- measurement of the impedance,

Department of Electric Power Engineering

- measurement of the touch voltage and step voltage,
- measurement of the wholeness.
- Determination of overhead transmission line parameters and cable parameters, namely
- measurement of the line impedance Z (positive sequence, negative sequence and zero sequence components),
- measurement of the line capacitance,
- measurement of the mutual reactance (X_{0m}).
- Measurement of the earth impedance of overhead line towers (without disconnecting earthing conductor),
- Inspection of the electrical equipments and appliances.
- Designing in electrical engineering.



Faculty of Electrical Engineering
and Informatics

*Department
of Electrical
Engineering
and Mechatronics*

Department of Electrical Engineering and Mechatronics

Head of Department: *prof. Ing. Daniela Perduková, PhD.*
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Web: *http://kem.fei.tuke.sk*
Phone/Fax: *+421 55 602 2279 / 55 633 0115*

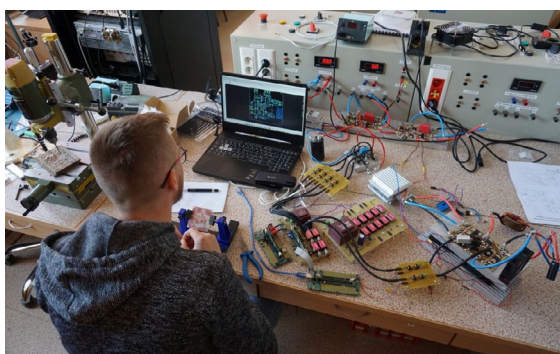


DEPARTMENT'S PROFILE

The Department was established at foundation of the Faculty of Electrical Engineering in 1969 as the Department of Electrical Drives but originally it presents a continuation of the Department of Electrical Engineering established at foundation of the Technical University of Kosice (1953). Through the years the name of the department was changed in order to express closer its activities and development.

Staff members of the department are experienced in wide areas of electrical engineering, incl. automotive electrical engineering, mechatronics, and robotics what they utilise in teaching and research. Currently, the department is responsible for education and research in area of electrical engineering, namely in fields of power and industrial electronics, electrical machines and apparatuses, sensors, electromechanical systems, controlled drives, multi-motor drives, control systems, and industrial and automotive mechatronic systems up to drives of robots.

The Department offers all types of university courses: bachelor, master and Ph.D. courses.



Department of Electrical Engineering and Mechatronics

STAFF

Professors: **prof. Ing. Jaroslav Dudrik, PhD. (till December 2023)**

prof. Ing. Pavol Fedor, PhD.

prof. Ing. Daniela Perduková, PhD.

Associate Professors: **doc. Ing. František Ďurovský, PhD.**

doc. Ing. Želmíra Ferková, PhD.

doc. Ing. Peter Girovský, PhD.

doc. Ing. Ján Kaňuch, PhD.

doc. Ing. Karol Kyslan, PhD.

doc. Ing. Milan Lacko, PhD.

doc. Ing. Marek Pástor, PhD.

doc. Ing. Jaroslava Žilková, PhD.

Assistant Professors: **Ing. Ján Bačík, PhD.**

Ing. Peter Bober, PhD.

Ing. Viktor Šlapák, PhD.

Ing. Viktor Petro (since October 2023)

Senior Scientists: **Ing. Peter Hajsák**

doc. Ing. Viliam Fedák, PhD.

doc. Ing. Michal Girman, PhD.

doc. Ing. Michal Kostelný, CSc.

prof. Ing. Pavel Záskalický, PhD.

Technical Staff: **Zuzana Olexová**

Full time Ph.D. Students: **Ing. Stanislav Alexovič (till August 2023)**

Ing. Juraj Biľanský (till June 2022)

Ing. Tomáš Basarik (since September 2023)

Ing. Dávid Bodnár

Ing. Daniel Gordan (since September 2023)

Ing. Tadeáš Kmecik (since September 2023)

Ing. Daniel Marcin

Ing. Adrián Marcinek (till August 2023)

Ing. Lukáš Pancurák

Ing. Viktor Petro (till August 2023)

Department of Electrical Engineering and Mechatronics

Ing. Richard Olexa (till June 2022)

TEACHING

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Fundamentals of Electrical Engineering	1 st	2/2	Kaňuch
Computer Applications	3 rd	2/2	Perduková
Electrical Machines	3 rd	2/2	Záskalický
Automotive Electrical Systems	3 rd	2/2	Žurovský
Industrial Electronics	3 rd	2/2	Kaňuch
Electrical Drives	4 rd	2/2	Žilková
Fundamentals of Microcomputer programming	4 th	2/2	Lacko
Modeling and Simulation in Electrical Engineering	4 th	2/2	Fedák
Power Electronics	4 th	3/3	Pástor
Sensors and Measurement of Nonelectrical Quantities	4 th	2/2	Girovský
Industrial Control Systems	4 th	2/2	Fedor
Pneumatic and Hydraulics Systems	4 th	2/2	Bober
Controlled Electrical Drives	5 th	2/2	Žurovský
Fundamentals of Robotics	5 th	2/2	Žilková
ManMachine Interface	5 th	2/2	Perduková
Bachelor Project	5 th	0/8	Supervisor
Bachelor Thesis	6 th	3/9	Supervisor
Simulation of Production Systems	6 th	2/2	Bober
Modeling of Electromechanical Systems	6 th	2/2	Fedák
Projecting of Electrical Systems	6 th	2/2	Lacko

Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Power Semiconductor Systems	1 st	2/2	Dudrik
Non-linear Electro-Mechanical Systems	1 st	2/2	Fedor

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Servosystems	1 st	2/3	Kyslan
Dynamic Phenomena of Electrical Machines	1 st	2/2	Záskalický
Electrical Machines for Automation	1 st	2/2	Ferková
Technology of Production in Electronics	1 st	2/2	Slosarčík
Signal Processors	1 st	2/3	Lacko/Šlapák
Applications of Digital Signal Microcontrollers	2 nd	2/3	Šlapák
Vehicle Mechatronics	2 nd	2/2	Đurovský
Construction and Design of Converters	2 nd	2/2	Dudrik
Control of Assembly Lines with Programming Controllers	2 nd	2/2	Fedor
Diploma Project 1	2 nd	0/4	Supervisor
Diploma Project 2	3 rd	2/6	Supervisor
Mechatronic Production Systems	3 rd	2/2	Đurovský
Intelligent Control of Electrical Systems	3 rd	2/2	Žilková
Three-Dimensional Modelling and Simulation	3 rd	2/2	Ferková
Technology of Production in Electrotechnics	3 rd	2/2	Girman
Design of Documentation in Electrical Engineering	3 rd	1/3	Lacko
Diploma Thesis	4 th	9/9	Supervisor

Undergraduate and Graduate Study for Foreign Students (in English)

All subjects listed above are offered in English language for foreign students.

Ph.D Postgraduate Course on Electrical Systems

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Power Electronics	1 st	2/0	Dudrik
Ph.D. Project I	1 st	0/2	Supervisor
Foreign Language I	1 st	2/0	Dept. of Foreign Languages
Servosystems	2 nd	2/0	Fedor
Ph.D. Project II	2 nd	0/2	Supervisor
Foreign Language II	2 nd	2/0	Dept. of Foreign Languages
Ph.D. Project III	3 rd	0/4	Supervisor

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<i>Subject of Specialization</i>	<i>3rd</i>	<i>2/0</i>	<i>According to the subject</i>
<i>Scientific Activity</i>	<i>3rd</i>	<i>0/8</i>	<i>Supervisor</i>
<i>Ph.D. Project IV</i>	<i>4th</i>	<i>0/2</i>	<i>Supervisor</i>
<i>Scientific Activity</i>	<i>4th</i>	<i>0/8</i>	<i>Supervisor</i>
<i>Ph.D. Project IV</i>	<i>5th</i>	<i>0/2</i>	<i>Supervisor</i>
<i>Scientific Activity</i>	<i>5th</i>	<i>0/8</i>	<i>Supervisor</i>
<i>Ph.D. Thesis</i>	<i>5th</i>	<i>0/9</i>	<i>Supervisor</i>

LABORATORIES

- Power Electronics Laboratory
- Simulation Systems Laboratory (COSMOS, ProEngineer, MATLAB, PSpice, and applied SW, ABBRobotStudio, EPLAN, AVL)
- Laboratory of Industrial Automation
- Laboratory of Electrical Machines and Electrical Drives
- Laboratory of Controlled Electrical Drives
- Automotive Electrical Engineering Laboratory
- Laboratory of Electrical Devices and Applied Electronics
- Laboratory of Electric Drives Applications
- BSH Motor Control Laboratory
- Virtual Laboratory of Mechatronic Systems Control: <http://andromeda.fei.tuke.sk>

RESEARCH PROJECTS

- Development of Modular Traction Battery and Optimization of Electrical Power Consumption in Electric Midibus. Project supported by the Slovak Research and Development Agency under the contract No. APVV-18-0436. Principal investigator: LACKO, M. (2019–2023)
- HIL Emulator for Small Hydropower Plant Control. Project supported by the Slovak Research and Development Agency under the contract No. APVV-19-0210. Principal investigator: PERDUKOVÁ, D. (2020–2023).
- Experimental Validation of Predictive Control of Permanent Magnet Synchronous Machine. Project supported by the Faculty of Electrical Engineering and Informatics, Technical University of Kosice, Slovakia, under the Grant FEI-2023-98. Principal investigator: PANCURÁK, L. (2023).
- Research on High-efficiency Electromechanical Systems with Applications for Electromobility, Project VEGA

Department of Electrical Engineering and Mechatronics

1/0363/23, Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences, Principal investigator: KYSLAN, K. (2023-2025).

CO-OPERATION

Co-operation in Slovakia

- The Department co-operates with many industrial enterprises in Slovakia having joint projects at modernising of the electrical drive systems, control and mechatronic applications: U.S.STEEL Košice, SIEMENS, ABB, BSH Drives and Pumps Michalovce, Redox Prešov, Křižík Prešov, Schneider Electric Slovakia, Spell Procont Prešov, Spinea Prešov, Vonsch Brezno, Kybernetika Košice, TEK O Košice, ENERGO CONTROL Košice, ŽP Podbrezová, Bukóza Hencovce, Embraco Slovakia Spišská Nová Ves, Slovak Union for Quality, Innovation and Design Q-IMPULZ, Košice, SEZ Krompachy, DATAKON Košice, STATON Turany, ROŠERO-P, Sp.N.Ves, ComAp, s.r.o. Košice, Siemens Healthcare Košice, Mitsubishi Electric, s.r.o. Košice, SOLUTIONS JMD s.r.o., Košice.

International Co-operation

- University of Zagreb, Croatia
- Brno University of Technology, Czech Republic
- Technical University of Liberec, Czech Republic
- VŠB -Technical University of Ostrava, Czech Republic
- West Bohemian University, Pilsen, Czech Republic
- University of Technology and Economy, Budapest, Hungary
- University of Miskolc, Hungary
- Silesian University of Technology, Gliwice, Poland
- Széchenyi István University, Győr, Hungary
- Delft University of Technology, The Netherlands
- Czech Academy of Science, Prague, Czech Republic.
- University of Oradea, Romania
- University of Maribor, Slovenia
- University of Zagreb, Croatia
- University of Novi Sad, Serbia
- CAG Electric Machinery, Český Brod, Czech Republic
- Wrocław University of Technology, Wrocław, Poland

Department of Electrical Engineering and Mechatronics

Visits of Staff Members to Foreign Institutions

- BODNÁR, D.: TU Delft (NL). April 2022 – January 2023.
- FEDOR, P.: VSB-Technical University of Ostrava (CZ), May 2023, November 2023
- FERKOVÁ, Ž.: Technical University of Liberec (CZ), January 2023.
- FERKOVÁ, Ž.: Conference Ansys 2023, TechSoft Engineering Praha (CZ). June 2023
- FERKOVÁ, Ž.: University of Technology Brno (CZ), June 2023.
- GIROVSKÝ, Automation Academy Eggelsberg - B&R Campus, B&R Headquarters, Eggelsberg (Austria), 7.2 – 9.2.2023
- KAŇUCH, J.: PEMINE 2023, Gliwice (PL), September 2023.

Membership in International Organizations, Societies and Committees

- DUDRIK, J.; FERKOVÁ, Ž., KYSLAN: IEEE members.
- FEDÁK, V.: Power Electronics and Motion Control Council (PEMC). Vice chairman and AwardCom chair.
- FEDÁK, V.: Member of the Expert evaluation jury for awarding products within the ZLATÝ AMPER competition for the most beneficial exhibit at the 30th International trade fair on electrical engineering, electronics, automation, communication and safety technology AMPER 2024. Brno (CZ). May 19-21, 2024.
- PERDUKOVÁ, D.: Member of Programme Committee: 18th International Conference on Soft Computing Models in Industrial and Environmental Applications – SOCO 2023, Salamanca, Spain, 5.-7. September 2023.

Membership in Slovak Professional Bodies

- FEDÁK, V.; KAŇUCH, J.; ZÁSKALICKÝ, P.; FEDOR, P.; FERKOVÁ, Ž.; GIROVSKÝ, P.; HAJŠÁK, P.; LACKO, M.; PERDUKOVÁ, D.: members of The SES (Slovak Electrotechnical Society), Branch at FEI TU Košice.
- FERKOVÁ, Ž.: Member of Technical Standards Commission on Electrical Machines in Slovak Republic.
- PERDUKOVÁ, D.: Council of the Secondary Technical School for EE, Košice (delegate of the FEI TU Košice).
- PERDUKOVÁ, D.: Program Committee of 22th Scientific Conference of Young Researchers of the Faculty of Electrical Engineering and Informatics, Technical University of Košice – SCYR 2023.
- PERDUKOVÁ, D.: Member of board for the PhD. Study in Electrical Engineering at FEI TU Košice.

National Educational Projects

Editorial Boards

- BOBER, P.: Editorial board of journal "Quality Innovation Prosperity" (Kvalita, Inovácia, Prosperita), ISSN 1335-1745 (print), ISSN 1338-984X (online).

Department of Electrical Engineering and Mechatronics

- DUDRIK, J.: Member of the Series Editorial Board of Annals of the Academy of Romanian Scientists.
- DUDRIK, J.: Editorial board of Transactions on Electrical Engineering, Czech Republic, ISSN 1805-3386.
- FEDÁK, V.: Editorial board of the Journal "Przegląd Elektrotechniczny" (Polish Academy of Sciences, Warsaw, <http://www.red.pe.org.pl/>), ISSN 0033-2097, e-ISSN 2449-9544.
- FEDOR, P.: Editorial board of Acta Electrotechnica et Informatica – AEI. Journal of the Faculty of Electrical Engineering and Informatics. ISSN 1335-8243.
- KYSLAN, K.: Associate Editor of journal „Power Electronics and Drives“, Wrocław, Poland, ISSN 2543-4292.
- PERDUKOVÁ, D.: Editorial board of Elektroenergetika journal, ISSN 1337-6756.
- ZÁSKALICKÝ, P.: Editorial board of Acta Technica CSAV. Journal of Czech Academy of Science, Prague. Czech Republic. ISSN 0001-7043.
- ZÁSKALICKÝ, P.: Editorial board of KOMEL, Branżowy ośrodek badawczo-rozwojowy Maszyn elektrycznych, Katowice, Poland. ISSN 0239-3646.

Defended Theses in 2023

- ALEXOVIČ, S.: Autonomous control of UAV in GPS denied environment. Supervisor: Lacko, M.
- BILANSKÝ, J.: Models of electric vehicle battery systems. Supervisor: Lacko, M.
- MARCINEK, A.: Control of Multiport Power Converters. Supervisor: Pástor, M.
- OLEXA, R.: Modeling and Control of Small Hydropower Plants. Supervisor: Fedor, P.
- PETRO, V.: Sensorless Control of Permanent Magnet Synchronous Machine for Low-Speed Operation. Supervisor: Kyslan, K.

THESES

<i>Thesis type</i>	<i>Bachelor</i>	<i>Master</i>	<i>Doctoral</i>
<i>Number</i>	32	31	5

OTHER ACTIVITIES

Symposia, Workshops, Conferences

2023 International Conference on Electrical Drives and Power Electronics (EDPE 2023), 24-27 September 2023, Hotel Atrium, The High Tatras, Slovakia. organized by the department.

Projects for Industry

Department of Electrical Engineering and Mechatronics

- Training on frequency converters. For Siemens Large Drives s.r.o., Košice. Co-ordinator: Ďurovský, F., 2023.
Compositions for Dissertation Examinations

Student Competitions and Rewards

- MARCINEK, A.: SCYR 2023. Dean Prize for Survey or Progress, Electrical & Electronics Engineering Section, 3rd year PhD students

Compositions for Dissertation Examinations

- BODNÁR, D.: Power management of electric vehicles. Supervisor: Ďurovský, F.

PUBLICATIONS

Books and book chapters

- MERVA, Tomáš - VIRGALA, Ivan - GIROVSKÝ, Peter: **Soft Actor-Critic in robotic arm position control within ROS.** 2022. In: Novus Scientia 2022. Košice (Slovensko): Technická univerzita v Košiciach p. 128-133 [online]. - ISBN 978-80-553-4085-2.
- ZGODAVOVÁ, K. - LENGYELOVÁ, K. - BOBER, P. - VINCZE, T.: (2023). **Integrated Management System Role-Play Simulation: Training and Development Tool.** In: de Oliveira Matias, J.C., Oliveira Pimentel, C.M., Gonçalves dos Reis, J.C., Costa Martins das Dores, J.M., Santos, G. (eds) Quality Innovation and Sustainability. ICQUIS 2022. Springer Proceedings in Business and Economics. Springer, Cham. https://doi.org/10.1007/978-3-031-12914-8_16

Textbooks

Scientific Journals

Journals indexed in Thomson Reuters "Current Contents" database

- BILANSKÝ, Juraj - LACKO, Milan - PÁSTOR, Marek - MARCINEK, Adrián - ĎUROVSKÝ, František: Improved Digital Twin of Li-Ion Battery Based on Generic MATLAB Model. 2023. In: Energies. Basel (Switzerland): Multidisciplinary Digital Publishing Institute Vol. 16, Issue 3 (2023), p. [1-21] [online]. ISSN 1996-1073 (online). Access: <http://dx.doi.org/10.3390/en16031194>.
- PÁSTOR, Marek - LACKO, Milan - DUDRIK, Jaroslav - MARCINEK, Adrián: Soft-Switching Full-Bridge DC-DC Converter with Energy Recovery Capacitor Snubber. 2023. In: Energies. Basel (Switzerland). Multidisciplinary Digital Publishing Institute Vol. 16, Issue 4 (2023), p. [1-18] [online]. ISSN 1996-1073 (online): Access: <http://dx.doi.org/10.3390/en16041591>.
- FERKOVÁ, Želmíra - BOBER, Peter: Influence of the rotor geometry on efficiency and torque ripple of switched

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reluctance motor controlled by optimized torque sharing functions. 2023. In: *Machines*. Basel (Switzerland): Multidisciplinary Digital Publishing Institute Vol. 11, Issue 6 (2023), p. [1-17] [online]. ISSN 2075-1702 (online). Access: <http://dx.doi.org/10.3390/machines11060613>.

- JANKOWSKA, Kamila - DYBKOWSKI, Mateusz - PETRO, Viktor - KYSLAN, Karol: Classification of speed sensor faults based on shallow neural networks. 2023. In: *Applied sciences*. Basel (Switzerland): Multidisciplinary Digital Publishing Institute Vol. 13, Issue 12 (2023), p. [1-20] [online]. ISSN 2076-3417 (online). Access: <https://doi.org/10.3390/app13127263>.
- KYSLAN, Karol - SMOLEŇ, Pavol - ŠLAPÁK, Viktor - ĎUROVSKÝ, František: A nonlinear controller for point-to-point position controll. 2023. In: *Energies*. Basel (Switzerland): Multidisciplinary Digital Publishing Institute Vol. 16, Issue 17 (2023), p. [1-16] [online]. ISSN 1996-1073 (online). Access: <https://doi.org/10.3390/en16176339>.

Foreign Journals

- KAŇUCH, Ján - GIROVSKÝ, Peter: Three-stator disk synchronous motor with permanent magnets. 2023. In: *Maszyny Elektryczne: Zeszyty Problemowe*. Katowice (Poland): Łukasiewicz - Instytut Przemysłu Organicznego. Vol. 1, Issue 128 (2023), p. 27-33 [print]. ISSN 0239-3646.
- ŠLAPÁK, Viktor - ĎUROVSKÝ, František - IVAN, Jozef - HRIC, Matúš: Emulation of mechanical loads in electric drives – an overview of methods. 2023. In: *Power Electronics and Drives*. Warsaw (Poland): SCIENDO Vol. 8, Issue 1 (2023), p. 53-64. ISSN 2543-4292 (online). Access: <http://dx.doi.org/10.2478/pead-2023-0004>.
- PERDUKOVÁ, Daniela - FEDOR, Pavol - FEDOR, Marek: A New High-Quality Dynamic Identification Structure for IM Parameters. 2023. In: *Mathematical modeling. International scientific journal*. Sofia (Bulgaria): Scientific-technical union of mechanical engineering industry 4.0. Vol. 7, Issue 1 (2023), p. 23-26 [print, online]. ISSN 2535-0986. Access: <https://stumejournals.com/journals/mm/2023/1/pdf>.

Journals indexed in Web of Science or Scopus databases

- PERDUKOVÁ, Daniela - FEDOR, Pavol: Multi-motor drive non-parametric black-box fuzzy model. 2023. In: *MM Science Journal*. Praha (Czech Republic): MM Publishing Vol June 2023, p. 6446-6452 [print, online]. ISSN 1803-1269. Access: http://dx.doi.org/10.17973/mmsj.2023_06_2023009.
- KAŇUCH, Ján - GIROVSKÝ, Peter - ŽILKOVÁ, Jaroslava - PÁSTOR, Marek: Design and measurement of a frequency converter with spwm modulation of output voltage for a two-phase induction motor. 2023. In: *Elektronika ir Elektrotechnika = Electronics and Electrical Engineering: Electrical Engineering: Elektros Inžinerija: Research Journal*. Kaunas (Lithuania): Kauno Technologijos Universitetas. Vol. 29, Issue 3 (2023), p.11-18 [print]. ISSN 1392-1215: Access: <https://doi.org/10.5755/j02.eie.33865>.

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National Journals

- PETRO, Viktor - KYSLAN, Karol: Bezsnímačové riadenie synchrónneho motora s permanentnými magnetmi pre nízke rýchlosti. 2023. In: QuoVadis Research @ FEI. Košice (Slovakia): Technická univerzita v Košiciach, Vol. 6, Issue 2 (2023), p. 80-86 [print, online]. ISSN 2585-9587. Access: <http://quovadis.fei.tuke.sk/quovadis-v6-n2.pdf>.
- ALEXOVIČ, Stanislav - LACKO, Milan - BAČÍK, Ján ml.: 3D Mapping with a Drone Equipped with a Depth Camera in Indoor Environment. 2023. In: Acta Electrotechnica et Informatica. Košice (Slovakia): Fakulta elektrotechniky a informatiky. Vol. 23, Issue 1 (2023), p. 18-24 [print, online]. ISSN 1335-8243. Access: <https://sciendo.com/article/10.2478/aei-2023-0003>.
- ALEXOVIČ, Stanislav - LACKO, Milan: 3D mapovanie dronom vybaveným hĺbkovou kamerou v prostredí bez prístupu GPS navigácie. 2023. In: QuoVadis Research @ FEI. Košice (Slovakia): Technická univerzita v Košiciach, Vol. 6, Issue 1 (2023), p. 4-11 [print, online]. ISSN 2585-9587. Access: <http://quovadis.fei.tuke.sk/quovadis-v6-n1.pdf>.
- PERDUKOVÁ, Daniela - FEDOR, Pavol - FEDOR, Marek: Hydraulic Turbine Modelling Including a Fuzzy Model of Efficiency. 2023. In: Acta Electrotechnica et Informatica. Košice (Slovakia): Fakulta elektrotechniky a informatiky, Vol. 23, Issue 1 (2023), p. 25-31 [print, online]. ISSN 1335-8243.

Patents and Utility Models

- FEDOR, Pavol - PERDUKOVÁ, Daniela - BOBER, Peter: Zapojenie obvodu identifikácie rotorového toku a momentu asynchrónneho stroja. Patent No. 289110. - Banská Bystrica: ÚPV SR - 2023. 6 s. Spôsob prístupu: <https://wbr.indprop.gov.sk/WebRegistre/Patent/Detail/50044-2019?csrt=4640889482284414069>.

Other publications (papers in conference proceedings, etc.)

Publication Type	Journals		Textbooks	Conferences		Patents	Other
	Foreign	Home	Home	Foreign	Home	Domestic	
Number							26



Faculty of Electrical Engineering
and Informatics

*Department
of Electronics
and Multimedia
Telecommunications*

Department of Electronics and Multimedia Telecommunications

Head of Department: *doc. Ing. Matúš Pleva, PhD.*
Email: *E-mail: matus.pleva@tuke.sk*
Web: *http://www.kemt.fei.tuke.sk/*
Phone/Fax: *+421 55 602 3208 / +421 55 632 3989*



DEPARTMENT'S PROFILE

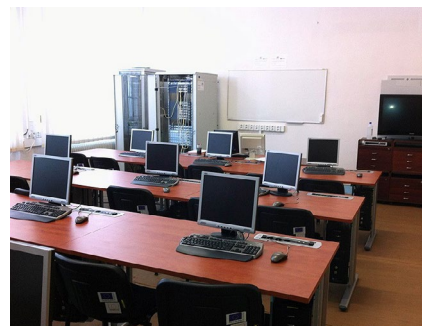
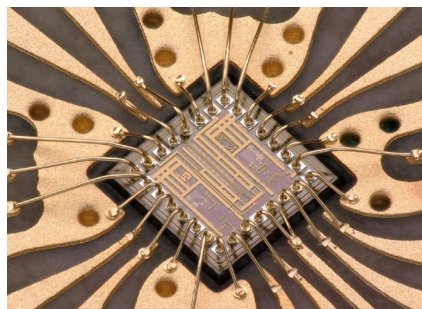
The Department of Electronics and Multimedia Telecommunications was founded in 1969. The original name of department was Department of Electronics. The Department offers and guarantees three types of full-time courses:

Bachelor's Degree course lasts in normal way 3 years and is leading to degree Bc. The graduates get more-or-less practical skills in mastering

- Computer Networks.

Master's Degree course lasts in normal way 2 years and is leading to degree Ing. The graduates get theoretical and practical skills in specialization

- Computer Networks.



Doctoral Study course lasts in normal way 3 years and is leading to degree PhD. The graduates get erudition in scientific area

- Informatics.

Department of Electronics and Multimedia Telecommunications

The Department of Electronics and Multimedia Telecommunications together with Department of Technologies in Electronics offers one type of full-time courses in bachelor's and master's degree course: Automotive Electronics.

Teaching and research activities of the department are focused on advanced technologies of computer networks, electronics, telecommunications and smart measuring systems. In addition to the theoretical and practical basics, the teaching is more concentrated on basics of computer and software engineering, operating and database systems, computer networks, transmission media, computer systems architecture, mobile and satellite technologies and services, automotive electronics, digital processing and transmission of multimedia signals (image, video, speech), cryptography and security in computer and telecommunication networks, optoelectronics and optical communication, sensor systems, interactive telecommunications systems and services.

STAFF

Professors: **Dr.h.c. prof. Ing. Anton Čižmár, CSc.**

prof. Ing. Miloš Drutarovský, CSc.

prof. Ing. Pavol Galajda, CSc.

prof. Ing. Jozef Juhár, PhD.

prof. Ing. Ján Šaliga, PhD.

Emeritus Professors: **prof. Ing. Dušan Levický, CSc.**

prof. Ing. Stanislav Marchevský, CSc.

prof. Ing. Linus Michaeli, DrSc. (until June 30, 2023)

Associate Professors: **doc. Ing. Gabriel Bugár, PhD.**

doc. Ing. Ľubomír Doboš, CSc.

doc. Ing. Ján Gamec, CSc.

doc. Ing. Mária Gamcová, PhD.

doc. Ing. Stanislav Ondáš, PhD.

doc. Ing. Ľuboš Ovseník, PhD.

doc. Ing. Ján Papaj, PhD.

doc. Ing. Matúš Pleva, PhD.

Assistant Professors: **Ing. Iveta Gladišová, CSc.**

Ing. Renát Haluška, PhD.

Ing. Jakub Oravec, PhD.

Ing. Daniel Hládek, PhD.

Ing. Ján Staš, PhD.

Department of Electronics and Multimedia Telecommunications

Ing. Marianna Kocúrová, PhD.

Support staff: **Ing. Martina Dragošková**

Ing. Zuzana Bugárová

Viera Šumáková (until June 30, 2023)

Ph.D. students:

Internal form: **Ing. Samuel Andrejčík**

Ing. Matúš Čavojský

Ing. Maroš Harahus

Ing. Patrik Jurík

Ing. Jozef Kromka

Ing. Natália Kurkina

Ing. Antónia Jusková

Ing. Eva Kupcová

Ing. Zuzana Sokolová

External form: **Ing. Peter Strnisko**

TEACHING

Undergraduate Study (Bc.) - Automotive Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Basics of electronics</i>	<i>2nd</i>	<i>3/2</i>	<i>Gamec, Gamcová</i>
<i>Electronics I.</i>	<i>3rd</i>	<i>3/2</i>	<i>Gamec, Gamcová</i>
<i>Signals and systems</i>	<i>3rd</i>	<i>3/2</i>	<i>Gamcová, Gladišová</i>
<i>Electronics II.</i>	<i>4th</i>	<i>3/2</i>	<i>Galajda</i>
<i>Measurement in electronics</i>	<i>4th</i>	<i>2/3</i>	<i>Šaliga</i>
<i>Programming measurement systems</i>	<i>5th</i>	<i>2/2</i>	<i>Šaliga</i>
<i>Automotive electronics</i>	<i>5th</i>	<i>3/2</i>	<i>Gamec</i>
<i>Electronics III.</i>	<i>6th</i>	<i>2/2</i>	<i>Šaliga</i>
<i>Optoelectronics</i>	<i>6th</i>	<i>2/2</i>	<i>Ovseník</i>

Undergraduate Study (Bc.) - Automotive Electronics

Department of Electronics and Multimedia Telecommunications

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Programming	2 nd	2/2	Juhár, Hládek
Communication technologies basics	2 nd	2/2	Čížmár, Pleva
Principles of the computer engineering	2 nd	2/2	Pleva
Computer system architectures	3 rd	2/2	Drutarovský
Data structures and algorithms	3 rd	2/2	Juhár, Hládek
Operating systems	3 rd	2/2	Pleva
Introduction to computer networks	3 rd	2/2	Bugár, Oravec
Scientific project I.	4 th	0/6	Drutarovský
Basics of electronics and logic circuits	4 th	2/2	Galajda
Database systems	4 th	2/2	Ondáš
Introduction to digital communications	4 th	2/2	Doboš
Computer networks	4 th	2/2	Bugár, Oravec
Transmission media	4 th	2/2	Ovseník
Multimedia signals in communication networks	4 th	2/2	J, Staš
Bachelor project	5 th	2/6	Galajda
Computer networks applications	5 th	2/2	Bugár, Oravec
Object-oriented programming	5 th	2/2	Ondáš
Programming of measuring systems	5 th	2/2	Šaliga
Mobile technologies and services	5 th	2/2	Doboš
Audio applications programming	5 th	2/2	Juhár
Web technologies	5 th	2/2	Papaj
Optoelectronics	6 th	2/2	Ovseník
Security in computer systems	6 th	2/2	Drutarovský
Speech interactive communication systems	6 th	2/2	Ondáš
Basics of the software engineering	6 th	2/2	Ondáš
Cloud technologies fundamentals	6 th	2/2	Juhár, Hládek, Staš

Graduate study (Ing.) - Automotive Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
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Department of Electronics and Multimedia Telecommunications

Digital signal processing	1 th	2/2	Gamcová, Gladišová
Advanced measurement systems	1 th	2/2	Šaliga
Photonic systems	1 th	2/2	Ovseník
ECAD design tools	1 th	2/2	Galajda
Microwave circuits and systems	2 nd	2/2	Gamec
Active and passive safety systems	2 nd	2/2	Gamec
Communication systems	2 nd	2/2	Šaliga, Gladišová
Design tools of digital systems	2 nd	2/2	Galajda
Digital image processing	3 rd	2/2	Gamcová, Kováč
Radars in cars	3 rd	2/2	Gamcová

Graduate study (Ing.) - Computer Networks

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Scientific project II	1 th	0/6	Drutarovský
Digital signal processing	1 th	2/2	Juhár, Gladišová
Digital systems and internet of things	1 th	2/2	Galajda
Localization in the wireless and mobile networks	1 th	2/2	Doboš
Technologies and systems for data processing	1 th	2/2	Ondáš, Staš
Project management	1 th	2/2	Ondáš
Routing algorithms in the computer networks	1 th	2/2	Bugár
Diploma project 1	2 nd	2/4	Galajda
Technologies based on switched networks	2 nd	2/2	Papaj, Bugár
Microwave circuits and systems	2 nd	2/2	Gamec
Speech and audio signal processing and transmission	2 nd	2/2	Juhár, Ondáš
Optical communication systems and networks	2 nd	2/2	Ovseník
Mobile communications	2 nd	2/2	Papaj
Theory of the communication systems	2 nd	2/2	Čížmár, Papaj
Designing tools for digital systems	2 nd	2/2	Galajda
Diploma project 2	3 rd	2/6	Galajda
Vehicular communication networks	3 rd	2/2	Gamec
Biometric security systems	3 rd	2/2	Pleva

Department of Electronics and Multimedia Telecommunications

Security of the information and communication systems	3 rd	2/2	Drutarovský
Sensor networks	3 rd	2/2	Ovseník
Cognitive networks	3 rd	2/2	Bugár
Current trends in communication technologies	3 rd	2/2	Juhár

Graduate study (PhD.) - Informat

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Theory of computer engineering and computer networks	1 th	0/10	Čížmár
Research activities 1	1 th	0/10	Juhár
Modern communication systems	2 nd	0/10	Čížmár
Specialization subject	3 rd	0/10	Juhár
Research activities 2	3 rd	0/10	Juhár
Research activities 3	5 th	0/10	Juhár
Research activities 4	6 th	0/10	Juhár
Research activities 5	7 th	0/10	Juhár

LABORATORIES

- Laboratory of biometric security systems
- Laboratory of communication electronics
- Measurement laboratory
- Laboratory of microwaves and UWB systems
- Laboratory of mobile communications
- Laboratory of optoelectronic systems
- Laboratory of computer networks
- Laboratory of speech and multimedia technologies
- Laboratory of speech communication technologies
- Laboratory of embedded systems

RESEARCH PROJECTS

- Multi3Generation: Multi-task, Multilingual, Multi-modal Language Generation (COST Action IC CA18231)

Department of Electronics and Multimedia Telecommunications

- A Multilingual Repository of Phraseme Constructions in Central and Eastern European Languages (COST Action IC CA22115)
- Network of IoT Robo Clubs - NitroClubs.eu (Erasmus+ 2020-1-BG01-KA202-079200)
- NewEnergySolutionsinCarpathianArea(ENICross-borderCooperationProgrammeHUSKROUA/1702/6.1/0014)
- Technologies to Support Response Generation for Multilingual Intelligent Agent (Project of the Slovak Research and Development Agency, No. SK-TW-21-0002)
- The Role of Early Diagnostic and Therapeutic Supportive Tools for Children with Hearing Disabilities and Speech Disorders (Project of the Slovak Research and Development Agency, No. APVV-22-0261)
- Extension of the autonomous applications of monitoring through multi-band UWB sensors (Project of the Slovak Research and Development Agency, No. APVV-22-0400)
- Person Monitoring by UWB Sensor Systems Operating in Real Conditions (Project of the Ministry of Education, Science, Research and Sport of the SR, No. VEGA 1/0584/20)
- Automatic Speech Processing Technologies for Support in Crisis Situations (Project of the Ministry of Education, Science, Research and Sport of the SR, No. VEGA 2/0165/21)
- Research and Development of Compressed Sensing Methods for Sensoric and Test Applications (Project of the Ministry of Education, Science, Research and Sport of the SR, No. VEGA 1/0413/22)
- Artificial Intelligence, Robust MANET and Multi-hop D2D Networks Integrated into 6. Generation Networks (Project of the Ministry of Education, Science, Research and Sport of the SR, No. VEGA 1/0260/23)
- Dynamic Allocation of Communication and Computing Resources Based on Multi-Access Edge Computing Using Artificial Neural Networks (Project Of The Ministry Of Education, Science, Research And Sport Of The SR, No. VEGA 1/0685/23)

CO-OPERATION

Co-operation in Slovakia

- CTRL s.r.o., Košice
- Elcom s.r.o., Prešov
- Institute of Informatics, Slovak Academy of Science, Bratislava
- Deutsche Telekom IT Solutions Slovakia, Košice
- Tatrabanka a.s.
- Slovak Telekom, a.s.
- VUS - Výskumný ústav spojov, n.o., Banská Bystrica
- ZŤS výskumno-vývojový ústav Košice, a.s.

Department of Electronics and Multimedia Telecommunications

- Deloitte Advisory, s.r.o., Bratislava
- ITMG, s.r.o., Senec
- Innovatrics, s.r.o., Bratislava
- Marelli Kechnec Slovakia s.r.o., Kechnec
- K-Mlab, Ilmsens GmbH, Košice
- Telegrafia a.s., Košice

Visitors to the Department

- | | |
|---|--------------------|
| • Nataliya Nosa-Polypenko, Uzhhorod, NGO CEI, Ukraine | March 29-30, 2023 |
| • Nadiya Boyko, Uzhhorod National University, Ukraine | March 29-30, 2023 |
| • Dmytro Kotov, UPCE, Pardubice, Czech Republic | June 3-Sep.29,2023 |
| • Andrii Ponomarov, UPCE, Pardubice, Czech Republic | June 3-Sep.29,2023 |
| • Patrick Bours, NTNU, Gjøvik, Norway | Oct. 24-27, 2023 |
| • Sebastian Leibold, NTNU, Gjøvik, Norway | Oct. 24-27, 2023 |
| • Bahnu Shrestha, NTNU, Gjøvik, Norway | Oct. 24-27, 2023 |

International Co-operation

- Austrian Research Institute for Artificial Intelligence (OFAI) of the Austrian Society for Cybernetic Studies
- FTW Telecommunications Research Center Vienna, Austria
- Ingenieur Büro Ralf Klukas, Germany
- INESC Lisbon, Portugal
- Instituto Superior Técnico (IST), Lisbon, Portugal
- Statens Räddningsverk, Sweden
- ŠkodaAuto Mladá Boleslav, Czech Republic
- Second University of Naples, Italy
- Ilmenau University of Technology, Germany
- Ilmsens GmbH, Ilmenau, Germany
- Hamburg University of Technology, Germany
- AGH University of Science and Technology Krakow, Poland
- Gdansk University of Technology, Poland
- Bulgarian Academy of Sciences, Bulgaria
- Technische Universiteit Delft, Netherlands
- Universitat Ramon Llull, Barcelona, Spain

Department of Electronics and Multimedia Telecommunications

- Technical University of Ljubljana, Slovenia
- Technical University of Cluj-Napoca, Romania
- University of Firenze, Italy
- University of Gent, Belgium
- University of Maribor, Slovenia
- University of Sannio, Benevento, Italy
- University of Reggio Di Calabria, Italy
- University of Oulu, Finland
- University of Veliko Tarnovo, Bulgaria
- Gjøvik University College, Norway
- Mississippi State University, Starkville, USA
- Fraunhofer Institute for Integrated Circuits IIS (Wireless Distribution Systems / Digital Broadcasting Research Group), Germany
- European Polytechnical University, Pernik, Bulgaria
- Brunel University London, UK
- DigiRobotics, London, UK
- National Taipei University of Technology
- Institute for Information Industry (III), Taipei
- University of Applied Sciences (OAMK), Oulu, Finland
- Norwegian University of Science and Technology (NTNU), Gjøvik, Norway
- Joint Research Center (EC: DG-JRC), Ispra, Italy
- Universitatea politehnica din Bucuresti, Romania
- Soochow University, Taipei, Taiwan
- Crayonic B.V., Eindhoven, Netherlands
- Uzhhorod National University, Ukraine
- Stefan Cel Mare University of Suceava, Romania
- University of Nyiregyhaza, Hungary
- Non-Governmental organization European Initiatives Centre, Ukraine
- Self-Government of Szabolcs-Szatmar-Bereg County, Hungary
- The Rzeszow University of Technology, Poland

Visit of Staff Members to Foreign Institutions

- Budaj, A., University Pardubice, Czech Republic April 18-20, 2023

Department of Electronics and Multimedia Telecommunications

• Bugár,G., Zadar, Croatia	September 10-14, 2023
• Bugár,G., Södertälje, Sweden	October, 3-5, 2023
• Čavojský,M., University Pardubice, Czech Republic	April 18-20, 2023
• Drutarovský,M., Malá Morávka, Czech Republic	September 6-8, 2023
• Galajda,P., Malá Morávka, Czech Republic	September 6-8, 2023
• Galajda,P., Hsinchu, Taiwan	December 1-17, 2023
• Haluška,R., Havířov, TU Ostrava, Czech Republic	June 19-20, 2023
• Haluška,R., Gjøvik, Norway	October 2-7, 2023
• Hládek,D., Sofia, Bulgaria	June 8-6, 2023
• Hládek,D., Malá Morávka, Czech Republic	September 6-8, 2023
• Hládek,D., Warszawa, Poland	September 19-21, 2023
• Hládek,D., Taipei, Taiwan	October 14-22, 2023
• Juhár,J., Malá Morávka, Czech Republic	September 6-8, 2023
• Jurík,P., University Pardubice, Czech Republic	April 18-20, 2023
• Jurík,P., Pordenone, Italy	September 16-21, 2023
• Jurík,P., Hsinchu, Taiwan	December 1-17, 2023
• Jusková,A., Pordenone, Italy	September 16-23, 2023
• Kromka,J., Pordenone, Italy	September 16-23, 2023
• Kupcová,E., Gjøvik, Norway	October 2-7, 2023
• Kupcová,E., Lisbon, Portugal	November 13-16, 2023
• Ovseník,Ľ., Malá Morávka, Czech Republic	September 6-8, 2023
• Papaj,J., Ostrava, TU Ostrava, Czech Republic	May 29, 2023
• Papaj,J., Malá Morávka, Czech Republic	September 6-8, 2023
• Petnuch,A., Hsinchu, Taiwan	December 1-17, 2023
• Pleva,M., Brussel, Belgium	March 6-9, 2023
• Pleva,M., University Pardubice, Czech Republic	April 18-20, 2023
• Pleva,M., Sofia, Bulgaria	June 8-6, 2023
• Pleva,M., Havířov, TU Ostrava, Czech Republic	June 19-20, 2023
• Pleva,M., Malá Morávka, Czech Republic	September 6-8, 2023
• Pleva,M., Gjøvik, Norway	October 2-7, 2023
• Pleva,M., Taipei, Taiwan	October 17-22, 2023
• Pleva,M., Cambridge, UK	December 12-14, 2023
• Popovič,M., Gjøvik, Norway	October 2-7, 2023

Department of Electronics and Multimedia Telecommunications

• Poremba, P., Gjøvik, Norway	October 2-7, 2023
• Sokol, M., University Pardubice, Czech Republic	April 18-20, 2023
• Sokol, M., University Berlin, Germany	May 23-28, 2023
• Sokol, M., Hsinchu, Taiwan	December 1-17, 2023
• Sokolová, Z., Gjøvik, Norway	October 2-7, 2023
• Šaliga, J., University Budapest, Hungary	September 8-9, 2023
• Šaliga, J., Pordenone, Italy	September 18-22, 2023
• Šaliga, J., Jerusalem, Israel	Aug. 28-Sep. 2, 2023

Membership in International Organizations and Societies

Čižmár, A.: Member IEEE Affiliate Computer Society, No. 41237162.

- Čižmár, A.: Member of Audio Engineering Society, New York, I.D. 44154.
- Galajda, P.: Member of Czech and Slovak Radioelectronics Engineering Society.
- Galajda, P.: Member of EURO PRACTICE IC Service.
- Gamec, J.: Reviewer Board Member of Multidisciplinary Digital Publishing Institute Journals.
- Gamcová, M.: Reviewer Board Member of Multidisciplinary Digital Publishing Institute Journals.
- Hládek, D.: Member of "Electronics" journal topics editorial board.
- Juhár, J.: Member of the ISCA (International Speech Communication Association).
- Juhár, J.: Member of AES (Audio Engineering Society), Memb. No. 76122.
- Juhár, J.: Member of IEEE, Memb. No. 90402602.
- Juhár, J.: Member of the editorial board "International Journal of Signal and Imaging Systems Engineering", Issued by Inderscience Publishers, Geneva, Switzerland.
- Juhár, J.: Member of the editorial board "Signals", Issued by MDPI, Basel, Switzerland.
- Levický, D.: Member of Czech and Slovak Radioelectronics Society.
- Pleva, M.: Member of European Network on High Performance and Embedded Architecture and Compilation (HiPEAC).
- Pleva, M.: Member of the "COST Association Review Panel" for RP2 - Information Technologies and Mathematics to Provide Solutions to Society.
- Pleva, M.: Member of the H2020 Monitoring Review Panel and Rapporteur.
- Pleva, M.: Member of Association for Computing Machinery (ACM).
- Staš, J.: Member of the Association for Computational Linguistics (ACL) Special Interest Group on Slavic Natural Language Processing (SIGSLAV).
- Šaliga, J.: Member and chairman of the international board of IMEKO Technical Committee TC-4 "Measurement

Department of Electronics and Multimedia Telecommunications

of Electrical Quantities”.

Membership in Slovak Organizations and Societies

- Čížmár, A.: Member of Technical Standardization Commission No.41 for Telecommunications In Slovakia.
- Doboš, Ľ.: Member of Technical Standardization Commission No.80 for Radiocommunications In Slovakia.
- Drutarovský, M.: Member of the editorial board of the journal “Acta Electrotechnica et Informatica”.
- Juhár, J.: Member of Technical Standardization Commission No.55 for Electroacustics and ultrasound In Slovakia.
- Levický, D.: Member of the editorial board of the journal “Acta Electrotechnica et Informatica”.
- Staš, J.: Member of the Slovak Research Center for Artificial Intelligence – Slovak AI.
- Šaliga, J.: Member of Council for Technical Sciences of Slovak Research and Development Agency.
- Šaliga, J.: Member of the editorial board of the journal “Acta Electrotechnica et Informatica”.

CONTRACTS, INTERNATIONAL SCIENTIFIC PRIJECTS

- Multi3Generation: Multi-task, Multilingual, Multi-modal Language Generation (COST Action IC CA18231)
- A Multilingual Repository of Phraseme Constructions in Central and Eastern European Languages (COST Action IC CA22115)
- Network of IoT Robo Clubs - NitroClubs.eu (Erasmus+ 2020-1-BG01-KA202-079200)
- NewEnergySolutionsinCarpathianArea(ENICross-borderCooperationProgrammeHUSKROUA/1702/6.1/0014)
- Technologies to Support Response Generation for Multilingual Intelligent Agent (Project of the Slovak Research and Development Agency, No. SK-TW-21-0002)
- Early Fake Profile Detection- FakeDetect, (FBR-PDI-019, EEA Norway Funds, predefined bilateral initiative)

THESIS

Thesis Type	Bachelor	Master	Doctoral
Number	38	40	2

OTHER ACTIVITIES

Department of Electronics and Multimedia Telecommunications

Conferences, seminars

- Galajda, P., Sokol, M., Jurík, P.- Certificate for participating in the TSRI (Taiwan Semiconductor Research Institute) Integrated Circuit Design and Implementation Course under the Taiwan-Europe Semiconductor Short-Term Training Program supported by the Ministry of Foreign Affairs of the Republic of China: Cell-based IC Design, Implementation and Verification.
- Student Competitions and Rewards

Student Competitions and Rewards

- The head of Ness in Košice, Tomáš Futáš, personally selected and awarded the Best diploma thesis within the Faculty of Electrical Engineering and Informatics of the Technical University in Košice. Eva Kupcová received the Ness award at graduation for her work on the topic “Implementation of OPAQUE for IoT devices”.
- Microwave and Radio Electronics Week 2023 awarded the Best student Paper Awards to Anton Buday for the paper “Transfer Learning from English to Slovak in Speech Recognition Applications”.

Compositions for Dissertation Examinations

- ANDREJČÍK, S.: Modern methods of data hiding in images (Moderné metódy ukrývania dát v obrazoch). FEI TU Košice, Slovakia, February 2023. (supervisor: Ovseník, L.)
- HARAHAUS, M.: Automatic text correction during natural language processing (Automatické opravy textu pri spracovaní prirodzeného jazyka). FEI TU Košice, Slovakia, February 2023. (supervisor: Pleva, M.)
- JURÍK, P.: Customer circuit design for modern UWB sensor networks (Návrh zákazníckých obvodov pre moderné UWB senzorové siete). FEI TU Košice, Slovakia, February 2023. (supervisor: Galajda, P.)
- KROMKA, J.: Compression sensing and its applications (Kompresné snímanie a jeho aplikácie). FEI TU Košice, Slovakia, February 2023. (supervisor: Šaliga, J.)
- KURKINA, N.: New routing algorithms in cloud MANETs (Nové algoritmy smerovania v cloudových MANET). FEI TU Košice, Slovakia, February 2023. (supervisor: Papaj, J.)
- SOKOLOVÁ, Z.: Detecting hate speech and offensive language in social networks (Detekcia nenávistných prejavov a ofenzívneho jazyka v sociálnych sieťach). FEI TU Košice, Slovakia, February 2023. (supervisor: Juhár, J.)

PUBLICATIONS

Books

Department of Electronics and Multimedia Telecommunications

- KAPALO,P.-GAMCOVÁ,M.-VRANAY,F.: Možnosti využitia solárnej energie v Karpatskom regióne. In: Košice: TU, Slovakia, 1st edition, 2023, 60 pp, ISBN 978-80-553-4370-9.
- PLEVA,M.-LIAO,Y.-BOURS,P.: Human-Computer Interaction for Intelligent Systems Editorial. In: Human Computer Interaction for Intelligent Systems. Basel (Switzerland): MDPI AG, ISBN 978-3-0365-6577-4. <http://dx.doi.org/10.3390/books978-3-0365-6576-7>

Journals

- ČAVOJSKÝ,M.-HASIN,M.-BUGÁR,G.: An Analytical Framework for Data Collection and Analysis in IP
- HARAHUS,M.-ČAVOJSKÝ,M.- BUGÁR,G.-PLEVA,M.: Interactive Network Learning: An Assessment of Eve-Ng Platform in Educational Settings. In: Acta Electrotechnica et Informatica, Vol. 23, no. 3 (2023), pp. 3-9.
- HLÁDEK,D.-STAŠ,J.-JUHÁR,J.-KOCTÚR,T.: Slovak Dataset for Multilingual Question Answering. In: IEEE Access: practical innovations, open solutions, Piscataway (USA): Institute of Electrical and Electronics Engineers Vol. 11 (2023), pp. 32869-32881, ISSN 2169-3536, <http://dx.doi.org/10.1109/access.2023.3262308>. WOS: Q2, SCO: Q1
- HLÁDEK,D.-HARAHUS,M.-STAŠ,J.-PLEVA,M.: Slovak Language Models for Basic Preprocessing Tasks in Python. Jazykovedný časopis, Vol. 74, no. 1, (2023), pp. 323-332, ISSN 0021-5597. SCO:Q2
- JURÍK,P.-SOKOL,M.-GALAJDA,P.-DRUTAROVSKÝ,M.: Analysis and Implementation of Controlled Semiconductor Switch for Ultra-Wideband Radar Sensor Applications. In: Sensors, Basel (Switzerland): Multidisciplinary Digital Publishing Institute, Vol. 23, no. 17 (2023), pp. 1-24, ISSN 1424-3210, <http://dx.doi.org/10.3390/s23177392>. WOS: Q2, SCO: Q1
- KOVÁČ,O.-KROMKA,J.-ŠALIGA,J.-JUSKOVÁ,A.: Multiwavelet-based ECG Compressed Sensing. In: Measurement: Journal of the International Measurement Confederation, Vol. 220 (2023), no. 113393, DOI: Platform in Educational Settings. In: Acta Electrotechnica et Informatica, Vol. 23, no. 3 (2023), pp. 3-9.
- KROMKA,J.-ŠALIGA,J.-KOVÁČ,O.-DE VITO,L.-PICARIELLO,F.-TUDOSA,I.: Radial Artery Pulse Wave Estimation by Compressed Sensing Measurements of Wrist Bio-impedance. In: Measurement: journal of the International Measurement Confederation, London (United Kingdom), Institute of Measurement and Control Vol. 219 (2023), pp. 1-10, ISSN 0263-2241, <http://dx.doi.org/10.1016/j.measurement.2023.113174>. WOS: Q1,SCO: Q1
- LAPČÁK,M.-OVSENÍK,L.: Skúmanie obmedzení prenosu dát v hybridných FSO/RF systémoch. In: QuoVadis Research @ FEI, Košice (Slovakia), Vol. 6 , no. 2 (2023), pp. 48-58, ISSN 2585-9587.
- ONDÁŠ,S.-PLEVA,M.-BAČÍKOVÁ,S.: Transition-relevance Places Machine Learning-based Detection in Dialogue Interactions. In: Elektronika ir Elektrotechnika (Electronics and Electrical Engineering): Research Journal, Kaunas (Lithuania), Kauno Technologijos Universitetas Vol. 29, no. 3 (2023), pp. 48-54, ISSN 1392-1215, <https://doi.org/10.5755/j02.eie.33853>. WOS: Q4, SCO: Q3

Department of Electronics and Multimedia Telecommunications

- STAŠ, J.-HLÁDEK, D.-KOCTÚR, T.: Slovak Question Answering Dataset Based on the Machine Translation of the SQuAD v2.0. Jazykovedný časopis, Vol. 74, No. 1 (2023) pp. 381-390, ISSN 0021-5597. SCO:Q2
- ŠALIGA, J.-SVATOS, J.-SOVILJ, P.: Introductory notes to selected papers from the 2022 IMEKO TC4 symposium. In: Acta Imeko: The IMEKO Online Journal, Budapest (Hungary), International Measurement Confederation Vol. 12, no. 3 (2023), pp. 1-2, ISSN 2221-870X (online). <http://dx.doi.org/10.21014/actaimeko.v12i3.1637> SCO:Q3
- ZDRAVECKÝ, N.-OVSENÍK, Ľ.: Skúmanie obmedzení prenosu dát v plne optických prenosových sieťach. In: QuoVadis Research @ FEI, Košice (Slovakia), Vol. 6 , no. 2 (2023), pp. 131-139, ISSN 2585-9587.

Other publications

Publication Type Conferences

Publication Type	Conferences		Other
	International	National	
Number	24	37	0



Faculty of Electrical Engineering
and Informatics

*Department
of Physics*

Department of Physics

Head of Department: *prof. RNDr. Jana Tóthová, PhD.*
Email: *jana.tothova@tuke.sk*
Web: *<http://web.tuke.sk/feikf/sk/index.html>*
Phone/Fax: *+421 55 602 2484*

DEPARTMENT'S PROFILE

Since the foundation of the Department of Physics (1952), the scientific activities of the department have been predominantly oriented to the study of magnetic properties of materials by radiospectroscopic and static magnetic methods. At present, the research is focused on the study of magnetic properties of ferromagnetic materials and the study of non-metallic materials using nuclear magnetic resonance (NMR) and some other complementary methods. The department consists of three sections:

- Section of Physics of Magnetic Materials,
- Section of Physics of Macromolecular Systems,
- Section of Physics of Non-Metallic Materials.

In 2009 the Solid State NMR Laboratory was established at the department. The laboratory is a part of the Slovak National NMR Centre and its research is focused on the study of non-metallic materials. The role of the laboratory is to meet research and educational requirements in the field of solid state NMR study of materials in Slovakia. The laboratory contributes to the development of solid state NMR applications in Slovakia.

In 2013 the Laboratory for modification and testing of properties of advanced materials was established at the department within the project "Centre of Excellence for Integrated Research & Exploitation of Advanced Materials and Technologies in Automotive Electronics". The laboratory is equipped with apparatus for the study of the thermal and mechanical properties of materials and a desktop electron microscope for the study of the surface structure of materials. The Department of Physics provides compulsory courses in basic physics as well as several optional courses in various fields of physics.



Department of Physics

Since the academic year 2015/2016, the department offers bachelor, engineer and PhD. study programmes Physical Engineering of Advanced Materials. The graduates of this programme:

- acquire knowledge on the structure and physical properties of materials with emphasis on progressive materials,
- acquaint with physical phenomena which are the basis of the methods for investigation and diagnostics of materials, possibilities and procedures of controlled modification of mechanical, thermal, electrical, magnetic and optical properties of various materials,
- acquire basic knowledge of information technologies, and will be skilled in using the computer in modelling and simulation of processes in the microstructure of materials

The graduates can find positions in industry (product testing, controlling production processes), in research and development institutes, and testing, diagnostics and environmental centres. The extent of acquired knowledge creates conditions for good adaptability of graduates in various fields of electrotechnics, electronics and related fields.

STAFF

Professors: **prof. RNDr. Jana Tóthová, PhD.**

prof. RNDr. Vladimír Lisý, DrSc

prof. RNDr. Ján Ziman, CSc.

Associate Professors: **doc. RNDr. Oľga Fričová, PhD.**

doc. RNDr. Mária Kladivová, PhD.

doc. RNDr. Júlia Hlaváčová, CSc

doc. RNDr. Mária Kovaľáková, PhD.

doc. RNDr. Jozef Kravčák, PhD.

doc. Ing. RNDr. Jozef Onufer, PhD.

Assistant Professors: **RNDr. Anton Baran, PhD.**

Mgr. Peter Duranka, PhD.

RNDr. Peter Vrábel, PhD.

RNDr. Natália Šmídová, PhD.

PhD. Students: **Ing. Július Bačkai**

Mgr. Maksym Karpets (till 31st August)

Ing. Marek Kuzmiak (till 31st August)

Mgr. Dmytro Miakota

Ing. Simeon Samuhel (till 31st August)

Ing. Leoš Ondriš

Department of Physics

Ing. Simona Saporová

Mgr. Kristina Zolochovska

Technical Staff: Alena Jakabová

TEACHING

The Department of Physics gives physical courses for students of the following faculties of the Technical University:

- Faculty of Electrical Engineering and Informatics (FEI)
- Faculty of Materials, Metallurgy and Recycling (FMMR)
- Faculty of Civil Engineering (SvF)

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Introduction to Physics (FEI)	1 st	0/2	Kovaľáková, Duranka, Baran, Šmídová, Kravčák, Kladivová
Physics I (FEI) – for foreign students	1 nd	2/2	Kovaľáková
Physics I (FEI)	2 nd	2/2	Baran, Duranka, Šmídová, Onufer, Vrábel, Ziman
Physics 1 (FEI) – external study	2 nd	2/0	Fričová
Physics I (FEI) – for foreign students	2 nd	2/2	Šmídová
Physics (FEI)	2 nd	2/2	Onufer, Duranka, Vrábel,
Physics 1 (FEI)	2 nd	2/2	Ziman, Vrábel, Ondříš, Saporová, Miakota
Seminar in Physics 1.	2 nd	0/2	Šmídová
Physics II (SvF)	2 nd	2/2	Onufer
Physics I (FMMR)	2 nd	2/2	Kladivová, Duranka
Physics I (FMMR) – external study	2 nd	2/0	Baran
Physics II (FEI)	3 rd	3/2	Hlaváčová, Onufer, Vrábel, Duranka, Fričová, Saporová
Physics II (FEI) – external study	3 rd	2/0	Fričová
Physics II (FMMR)	3 rd	2/2	Kladivová
Physics II (FMMR) – external study	3 rd	2/0	Baran
Physical Measurement	3 rd	2/3	Vrábel

Department of Physics

<i>Selected Topics in Physics</i>	3 rd	2/3	<i>Onufer, Ziman</i>
<i>Physics II (FEI)</i>	4 th	3/2	<i>Hlaváčová</i>
<i>Introduction to Quantum Mechanics</i>	4 th	2/3	<i>Kováčková</i>
<i>Structure and Properties of Materials</i>	4 th	3/2	<i>Kravčák</i>
<i>Thermodynamics and Statistical Physics</i>	4 th	3/2	<i>Kladivová</i>
<i>Structure and Properties of Materials – for foreign student</i>	4 th	3/2	<i>Kravčák</i>
<i>Basic Physics of Magnetic Materials – for foreign students</i>	4 th	3/2	<i>Kravčák</i>
<i>Experimental Methods for Materials Study</i>	5 th	3/3	<i>Fričová, Kladivová, Kravčák, Onufer, Tóthová, Ziman</i>
<i>Introduction to Solid State Physics</i>	5 th	2/2	<i>Baran</i>
<i>Basic Physics of Magnetic Materials</i>	5 th	2/2	<i>Kravčák</i>
<i>Bachelor Project</i>	5 th	2/6	<i>Vrábel, Onufer</i>

Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Diploma Project 1</i>	2 nd	2/6	<i>Onufer</i>
<i>Experimental Methods in Materials Sciences II</i>	2 nd	2/4	<i>Onufer</i>
<i>NMR spectroscopy of solids</i>	2 nd	3/2	<i>Fričová</i>
<i>Diploma Project 2</i>	3 rd	2/6	<i>Onufer</i>
<i>Magnetism and Magnetic Materials</i>	3 rd	2/2	<i>Onufer</i>
<i>Solid State Spectroscopic Methods</i>	3 rd	2/2	<i>Šmídová</i>
<i>Superconductive Materials</i>	3 rd	2/2	<i>Vrábel</i>

LABORATORIES

Teaching and Research Laboratories

- Laboratories of basic physics
- Solid state NMR laboratory
- Laboratory for magnetic measurements
- Laboratory of physics of macromolecular systems
- Laboratory of advanced materials
- PC laboratory

Special Measuring Instruments

Department of Physics

- Multinuclear solid state NMR spectrometer Varian 400 MHz
- Experimental apparatus for the study of magnetization characteristics (magnetization curve, susceptibility, magnetoresistance) of ferromagnetic materials
- Desktop electron microscope with disperse rtg spectrometer
- DSC analyser
- Dynamic mechanical analyser
- Sputtering apparatus
- Vibrational viscosimeter SV – 10
- Rotational modular compact rheometer (MCR 502)
- Capillary automated micro viscometer (AMVn)
- DMA 4500 M density meter

RESEARCH PROJECTS

- Effect of external force fields on non-Markovian dynamics of condensed matter, S.G.A. project No. 1/0353/22, Principal investigator: prof. RNDr. V. Lisý, DrSc.
- Influence of supramolecular structure on ultimate properties of blends of biodegradable polymers with thermo-plastic starch, S.G.A. project No.1/0751/21 Principal investigator: doc. RNDr. M. Kovaľáková, PhD.
- Domain wall and magnetization processes in amorphous ferromagnetic microwires, S.G.A. Project No. 1/0250/21, Principal investigator: doc. RNDr. Ing. Jozef Onufer, PhD.
- Development of fully green synthesis protocols for synthesis of gold nanoparticles with surface plasmon resonance absorption in the near-infrared region, S.G.A. project, No.1/0882/21, Principal investigator: doc. RNDr. Ruslan Mariychuk, PhD. (Faculty of Humanities and Natural Sciences, Prešov University in Prešov). Co-operating organisation: Technical University of Košice. Principal investigator: doc. RNDr. Oľga Fričová, PhD.

CO-OPERATION

Co-operation in Slovakia

- Institute of Experimental Physics of the Slovak Academy of Sciences, Košice
- Institute of Physics, Faculty of Science, P.J. Šafárik University in Košice
- Institute of Chemistry, Faculty of Science, P.J. Šafárik University in Košice
- Polymer Institute, Slovak Academy of Sciences, Bratislava
- Faculty of Humanities and Natural Sciences, Prešov University in Prešov

Department of Physics

- Faculty of Electrical Engineering and Information Technology, University of Žilina
- RVMagnetics, a.s., Košice

Visitors to the Department

International Co-operation

- Budapest University of Technology and Economics, Hungary
- Central Physical Research Institute, RMKI KFKI, Budapest, Hungary
- Uzhhorod National University, Ukraine

Membership in Slovak Organizations and Societies

- Fričová, O.: member of SFS
- Kladivová, M.: member of the Slovak Committee of Physics Olympiad, SFS, JSME, and SMAGS
- Kovaľáková, M.: member of SFS (secretary)
- Kravčák, J.: member of SFS and SMAGS
- Lisý, V.: member of SFS
- Onufer, J.: member of SFS and vice-president of SMAGS
- Šmídová, N.: member of SFS
- Tóthová, J.: member of SFS
- Ziman, J.: member of SFS and SMAGS

THESES

PhD. Theses

- KARPETS Maksym: Impact of magnetic and electric field on structure of magnetic fluids Supervisor: RNDr. Milan Timko, CSc.
- KUZMIAK Marek: Superconductivity in strongly disordered systems Supervisor: Mgr. Pavol Szabó, CSc.
- SAMUHEL Simeon: Modification of electrical and magnetic properties of amorphous ferromagnetic microwires Supervisor: doc. Ing. RNDr. Jozef Onufer, PhD.

PUBLICATIONS

Department of Physics

Journal Papers

Other publications

Publication Type	Conference Papers		Conference Abstract		Textbooks
	<i>Foreign</i>	<i>Home</i>	<i>Foreign</i>	<i>Home</i>	
Number	2	19	0	0	1



Faculty of Electrical Engineering
and Informatics

*Department
of Mathematics
and Theoretical
Informatics*

Department of Mathematics and Theoretical Informatics

Head of Department: *RNDr. Michal Staš, PhD.*
Email: *michal.stas@tuke.sk*
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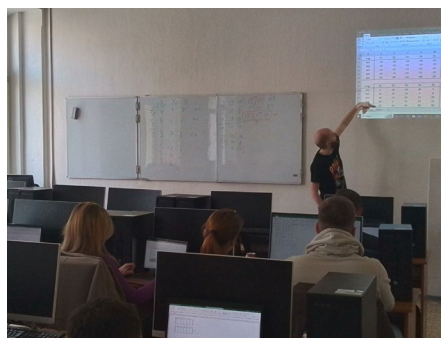


DEPARTMENT'S PROFILE

Department of Mathematics and Theoretical Informatics, before 1981 Department of Mathematical Informatics, was founded in 1969. The activities of the teachers are oriented to the mathematical research and education. The main educational goal is to prepare undergraduate students during the first two years of study in the following courses: Mathematics 1, 2 and 3, Discrete Mathematics, Numerical Methods, Probability and Statistic, Coding theory. In addition to the basic courses, the programs of the courses for graduate study were adjusted in co-operation with special departments. Since 2008 the Department offers its own study programme Computer modelling. This is focused on computer-aided mathematical simulation of diverse problems.

Present research projects of the Department of Mathematics and Theoretical Informatics are oriented on the next problems:

- Asymptotic properties of higher order functional differential equations
- Algebraic structures and graph algorithms in max-plus and max-min algebras
- Topological graph theory – crossing numbers of graphs
- E-learning of mathematical subjects.



Department of Mathematics and Theoretical Informatics

STAFF

Professors: **prof. RNDr. Jozef Džurina, CSc.**

prof. RNDr. Ján Plavka, CSc.

Associate Professors: **doc. RNDr. Blanka Baculíková, PhD.**

doc. RNDr. Marián Klešč, PhD.

doc. RNDr. Helena Myšková, PhD.

Assistant Professors: **RNDr. Štefan Berežný, PhD.**

RNDr. Emília Draženská, PhD.

Mgr. Jana Fortes, PhD.

Ing. Matej Gazda, PhD.

RNDr. Zuzana Gibová, PhD.

RNDr. Anna Grinčová, PhD.

RNDr. Mária Hutníková, PhD.

RNDr. Monika Molnárová, PhD.

RNDr. Michal Staš, PhD.

RNDr. Mária Timková, PhD.

RNDr. Juraj Valiska, PhD.

Technical staff: **Bc. Lenka Ondejková**

The Department consists of two parts:

- Mathematics Section
- Section of Theoretical Informatics

TEACHING

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Repetition of Mathematics</i>	<i>1st</i>	<i>2/0</i>	<i>Hutníková, Valiska</i>
<i>Mathematics I</i>	<i>1^s</i>	<i>2/0</i>	<i>Baculíková</i>
<i>Mathematics I</i>	<i>1^s</i>	<i>0/2</i>	<i>Draženská, Fortes, Gibová, Hutníková, Staš, Timková</i>
<i>Mathematics I</i>	<i>1^s</i>	<i>2/0</i>	<i>Staš</i>

<https://www.fei.tuke.sk>

Department of Mathematics and Theoretical Informatics

Mathematics I- EI	1 ^s	2/2	Molnárová
Basics of Algorithmization and Pro-gramming	1 nd	0/2	Gazda
Mathematics II	2 nd	2/0	Baculíková, Džurina,
Mathematics II	2 nd	0/2	Baculíková, Draženská, Fortes, Gibová, Hutníková, Staš, Timková, Valiska
Mathematics II	2 nd	2/0	Myšková
Mathematics II - EI	2 rd	2/2	Molnárová
Computer modeling	2 rd	2/2	Staš
Mathematics I	3 rd	0/2	Staš
Discrete Mathematics	3 rd	3+1/0	Klešč, Plavka
Discrete Mathematics	3 rd	0/2	Berežný, Draženská, Timková, Valiska
Mathematics III	3 rd	2/0	Dzurina
Mathematics III	3 rd	0/2	Gibová, Grinčová, Hutníková
Mathematics III-EI	3 rd	2/2	Grinčová
Mathematics III	3 th	2/2	Myšková
Software Computing Resources	3 th	2/2	Berežný, Valiska
Theory of Coding	3 th	2/2	Plavka
Mathematics II	4 th	0/3	Grinčová
Mathematics II - EI	4 th	0/2	Molnárová
Applications of Differential Equations	4 th	2/2	Baculíková
Numerical Methods, Probability and Mathematical Statistics - EI	4 th	3/0	Klešč
Numerical Methods, Probability and Mathematical Statistics - EI	4 th	0/2	Draženská, Klešč
Numerical Methods, Probability and Statistics	4 th	3/0	Berežný
Numerical Methods, Probability and Statistics	4 th	0/2	Berežný, Timková, Valiska
Numerical Methods, Probability and Mathematical Statistics	4 th	3/0	Myšková
Numerical Methods, Probability and Mathematical Statistics	4 th	0/2	Draženská, Gibová, Hutníková, Myšková
Theoretical Informatics	4 th	3/1	Plavka
Discrete Mathematics	5 th	0/3	Myšková
Mathematical and Computing Modelling	5 th	2/0	Dzurina

Department of Mathematics and Theoretical Informatics

<i>Mathematical and Computing Modelling</i>	<i>5th</i>	<i>0/2</i>	<i>Baculíková</i>
<i>Programming in Formatting Languages</i>	<i>5th</i>	<i>1/2/1</i>	<i>Berežný</i>
<i>Numerical Methods, Probability and Mathematical Statistics</i>	<i>6th</i>	<i>0/3</i>	<i>Draženská</i>
<i>Financial Mathematics</i>	<i>6th</i>	<i>2/2</i>	<i>Grinčová</i>
<i>Operation Analysis</i>	<i>6th</i>	<i>2/0</i>	<i>Berežný</i>
<i>Operation Analysis</i>	<i>6th</i>	<i>0/2</i>	<i>Valiska</i>

Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Applied Statistics</i>	<i>7th</i>	<i>2/2</i>	<i>Fortes</i>
<i>Differential Equations and Variational Calculus</i>	<i>7th</i>	<i>2/0</i>	<i>Baculíková</i>
<i>Differential Equations and Variational Calculus</i>	<i>7th</i>	<i>0/2</i>	<i>Džurina</i>
<i>Discrete Dynamic Systems</i>	<i>7th</i>	<i>0/2</i>	<i>Molnárová</i>
<i>Applied Mathematics</i>	<i>7th</i>	<i>3/2</i>	<i>Klešč</i>
<i>Cryptography</i>	<i>8th</i>	<i>2/2</i>	<i>Fortes</i>
<i>Linear and Quadratic Programing</i>	<i>8th</i>	<i>2/2</i>	<i>Staš</i>
<i>Modeling of Physical Processes</i>	<i>8th</i>	<i>2/2</i>	<i>Džurina</i>
<i>Graph Algorithms and Discrete Optimization</i>	<i>9th</i>	<i>2/2</i>	<i>Timková</i>
<i>Mathematical Methods for Neural Networks and Time Series</i>	<i>9th</i>	<i>2/2</i>	<i>Staš</i>

LABORATORIES

- LabIT4KT-1: Laboratory of Computer Modelling (prototype unit of the project IT4KT)
- LabIT4KT-2: Laboratory of Numerical Mathematics (prototype unit of the project IT4KT)

RESEARCH PROJECTS

- LabIT4KT-1: Laboratory o
- LabIT4KT-1: Laboratory o UWB sensor systems for people monitoring working in real conditions. VEGA Scientific Grant Agency No. 1/0584/20, duration 2020-2023, co-ordinator: Fortes Jana
- Influence of supramolecular structure on ultimate properties of blends of biodegradable polymers with thermo-

Department of Mathematics and Theoretical Informatics

plastic starch. VEGA Slovak Grant Agency No. 1/0751/21, duration 2021-2024, co-ordinator: Hutníková Mária

- Extension of the autonomous applications of monitoring through multi-band UWB sensors. APVV Slovak Research and Development Agency APVV-22-0400, duration 2023-2026, co-ordinator: Fortes Jana
- Research and development of compression signal acquisition methods for sensor and test applications. VEGA Scientific Grant Agency No. 1/0413/22, duration 2022-2025, co-ordinator: Staš Michal

CO-OPERATION

Co-operation in Slovakia

The members of department work in the main research projects described above and they are involved in research projects at other institutions:

- Faculty of Science UPJŠ, Košice
- Faculty of Mathematics, Physics and Informatics UK, Bratislava
- Special Departments of FEI TU, Košice
- Institute of Experimental Physics of Slovak Academy of Sciences, Košice
- Faculty of Natural Science, Žilina

Visitors to the Department

- Prof. Berinde Vasile, Technical University of Cluj-Napoca, Department of Mathematics and Informatics, Baia Mare, Romania
- Mgr. Witasek Roman, Palacký University Olomouc, Faculty of Science, Olomouc, Czech Republic
- Dr. Kovács Béla, University of Miskolc, Faculty of Mechanical Engineering and Informatics, Institute of Mathematics, Miskolc, Hungary
- Veres Zoltán, Mihály Károly, Bárdos Trisztén, University of Tokaj, Tokaj, Hungary

International Co-operation

- Technical University in Graz, Austria
- Charles University in Prague, Czech Republic
- Czech Technical University in Prague, Czech Republic
- University of Birmingham, United Kingdom
- UHK in Hradec Králové, Czech Republic
- Texas Univeresity, Kingsville, USA
- Veszprem University, Hungary
- Technical university of Cluj Napoca, North University at Baia Mare, Romania

Department of Mathematics and Theoretical Informatics

- JINR Dubna, Russia
- University of Miskolc, Hungaria
- Institute of Physics, Academia Sinica, Taiwan
- Fraunhofer Institute for Integrated Circuits IIS, Ilmenau, Germany

Membership in International Organizations and Societies

- Klešč, M.: American Mathematical Society
- Plavka, J.: International Linear Algebra Society
- Berežný, Š. (coordinator for TUKE): Czechoslovak Association of TeX Users (CSTUG), z.s.

Membership in Slovak Organizations and Societies

- Berežný, Š.: Slovak Mathematical Society
- Džurina, J.: Slovak Mathematical Society
- Grinčová, A.: Slovak Mathematical Society
- Klešč, M.: Slovak Mathematical Society
- Molnárová, M.: Slovak Mathematical Society
- Timková, M.: Slovak Mathematical Society

Contracts, International Scientific Projects

- CEEPUS – partner in CEEPUS III program CIII-HU-0028-16-2223 and CIII-HU-0028-17-2324 – Active Methods in Teaching and Learning Mathematics, Informatics and their Applications, co-ordinator: Berežný Št

THESES

<i>Thesis type</i>	<i>Bachelor</i>	<i>Master</i>	<i>Doctoral</i>
<i>Number</i>	15	8	1

OTHER ACTIVITIES

Study tours:

- Berežný, Š.: Czech Technical University in Prague, Faculty of Electrical Engineering
- Berežný, Š., Valiska, J.: Technical University of Cluj-Napoca, Department of Mathematics and Informatics, Baia Mare

Department of Mathematics and Theoretical Informatics

PUBLICATIONS

Books

Journals

- ANDREJIOVÁ Miriam - GRINČOVÁ Anna - KIMÁKOVÁ Zuzana: Application of multi-criteria decision-making methods for the conveyor belt selection in practice. *Transport & logistics*. Vol. 23, No. 55 (2023), p. 20-31. ISSN 1451-107X.
- ANDREJIOVÁ Miriam - GRINČOVÁ Anna - MARASOVÁ Daniela ml.: Analysis of the development of energy consumption of electricity and fuels in Slovakia. *Acta Montanistica Slovaca*. Vol. 28, No. 2 (2023), p. 384-407. ISSN 1335-1788.
- ANDREJIOVÁ Miriam - GRINČOVÁ Anna - MARASOVÁ Daniela ml.: The use of doe method in the evaluation of conveyor belt impact resistance. *Transport & logistics*. Vol. 23, No. 54 (2023), p. 95-105. ISSN 1451-107X.
- BACULÍKOVÁ Blanka: New monotonicity properties and oscillation of n-order functional differential equations with deviating argument. *Electronic Journal of Qualitative Theory of Differential Equations*. No. 30 (2023), p. 1-10. ISSN 1417-3875.
- BACULÍKOVÁ Blanka: Oscillation of odd order linear differential equations with deviating arguments with dominating delay part. *Mathematica Slovaca*. Vol. 73, No. 4 (2023), p. 949-956. ISSN 0139-9918.
- BEREŽNÝ Štefan - STAŠ Michal: On the crossing numbers of the join products of five graphs on six vertices with discrete. *Carpathian journal of mathematics*. Vol. 39, No. 2 (2023), p. 371-381. ISSN 1584-2851.
- DŽURINA Jozef: Properties of second order differential equations with advanced and delay argument. *Applied Mathematics Letter*. Vol. 141 (2023), p. 1-7. ISSN 0893-9659.
- FORTES Jana - STAŠ Michal: Crossing numbers of join product with discrete graphs: a study on 6-vertex graphs. *Mathematics*. Vol. 11, No. 13 (2023), p. 1-10. ISSN 2227-7390.
- FRIČOVÁ Oľga - HUTNÍKOVÁ Mária: Effects of plasticizer on viscoelastic properties of biodegradable polymer blends of poly (butylene-adipate-co-terephthalate) with thermoplastic. *APCOM 2022 : 27th International conference on applied physics of condensed matter*. p. 1-8. ISBN 978-0-7354-4479-9.
- MARASOVÁ Daniela - ANDREJIOVÁ Miriam - GRINČOVÁ Anna: Experimental study of the influence of the interaction of a conveyor belt support system on belt damage using video analysis. *Applied sciences*. Vol. 13 No. 13 (2023), p. 1-15. ISSN 2076-3417.
- SAPAROVÁ Simona - ONDRIŠ Leoš - KOVALÁKOVÁ Mária - FRIČOVÁ Oľga - PEIDAYESH Hamed - BARAN Anton - HUTNÍKOVÁ Mária - CHODÁK Ivan: Effects of glycerol content on structure and molecular motion in thermoplastic starch-based nanocomposites during long storage. *International Journal of Biological Macromolecules : Structure, Function and Interactions*. Vol. 253 (2023), p. 1-10. ISSN 0141-8130.

Department of Mathematics and Theoretical Informatics

- STAŠ Michal: Calculating crossing numbers of graphs using their redrawings. Symmetry. Vol. 15, No. 1 (2023), p. 1-13. ISSN 2073-8994.
- STAŠ Michal: The crossing numbers of join products of eight graphs of order six with paths and cycles. Carpathian Mathematical Publications. Vol. 15, No. 1 (2023), p. 66-77. ISSN 2075-9827.
- STAŠ Michal - ŠVECOVÁ Mária: Disconnected spanning subgraphs of paths in the join products with cycles. The Art of Discrete and Applied Mathematics. Vol. 6, No. 3 (2023), p. 1-9. ISSN 2590-9770.
- STAŠ Michal - TIMKOVÁ Mária: The crossing numbers of join products of seven graphs of order six with paths and cycles. Carpathian journal of mathematics. Vol. 39, No. 3 (2023), p. 727-743. ISSN 1584-2851.
- STAŠ Michal - TIMKOVÁ Mária: The crossing numbers of join products of four graphs of order five with paths and cycles. Opuscula Mathematica. Vol. 43, No. 6 (2023), p. 865-883. ISSN 1232-9274.
- STAŠ Michal - VALISKA Juraj: On the problems of CF-connected graphs. Electronic Journal of Graph Theory and Applications. Vol. 11, No. 2 (2023), p. 491-500. ISSN 2338-2287.

Other publications

Publication Type	Conferences		Other
Number	Foreign	Home	
	0	0	0



Faculty of Electrical Engineering
and Informatics

*Department
of Theoretical
and Industrial
Electrical
Engineering*

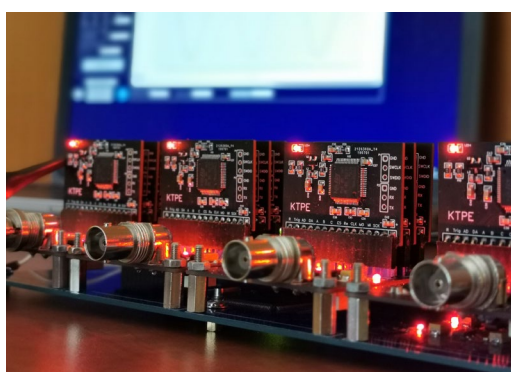
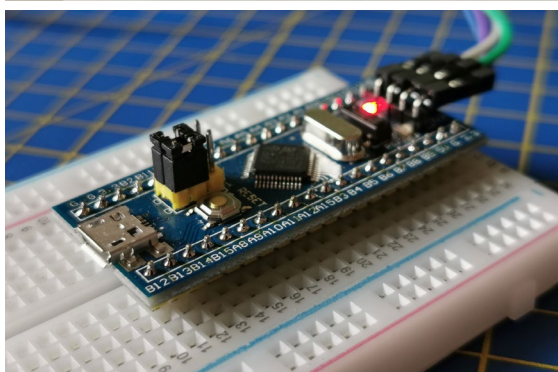
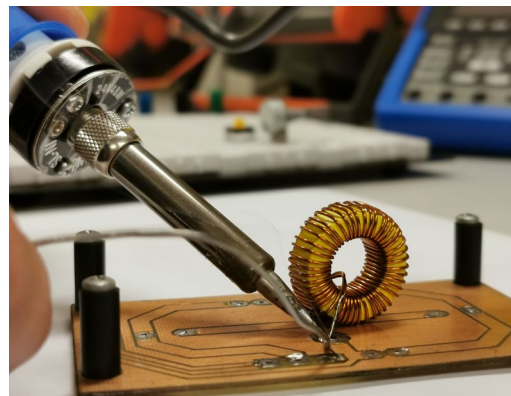
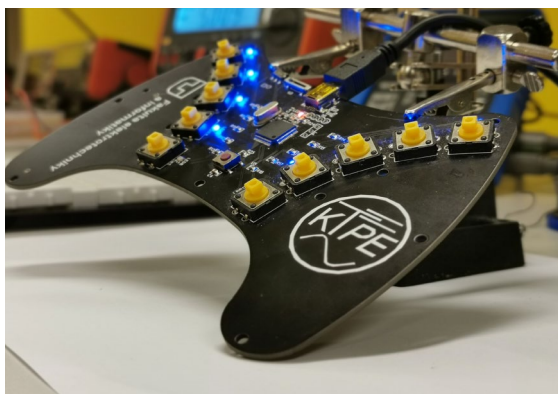
Department of Theoretical and Industrial Electrical Engineering

Head of Department: doc. Ing. Ján Molnár, PhD.
Email: jan.molnar@tuke.sk
Web: <https://ktpe.fei.tuke.sk>
Phone/Fax: +421 55 602 2592



DEPARTMENT'S PROFILE

Department of Theoretical and Industrial Electrical Engineering is a workplace, which guarantees the bachelor, master and doctoral study program Industrial Electrical Engineering. In addition to that, department's employers provide education for FEI TU students on all three-education levels. Professional field of the department is oriented on area of theoretical electrical engineering, where students learn the fundamental laws of electrical engineering and area



of industrial engineering where students learn basic information and skills regarding the construction and service of basic industrial systems and information technologies. Graduates also gain knowledge about the application of modern methods of automated and industrial measurement. The research activity of the department is concentrated in the following areas:

Department of Theoretical and Industrial Electrical Engineering

- Electromagnetic field analysis of the electrotechnical products from the point of view of its electromagnetic compatibility
- Integrated research and exploitation the advanced materials and technologies in the automotive electronics
- Modern virtual, intelligent and automated measuring and control systems.
- Applied microcomputer, microcontrollers and smart information circuits in industrial systems.

STAFF

Professors: **prof. Ing. Dobroslav Kováč, PhD.**

prof. Ing. Irena Kováčová, PhD.

Associate Professors: **doc. Ing. Ján Dudáš, DrSc.**

doc. Ing. Milan Guzan, PhD.

doc. Ing. Miroslav Mojžiš, PhD.

doc. Ing. Ján Molnár, PhD.

doc. RNDr. Darina Špaldonová, PhD.

doc. Ing. Tibor Vince, PhD.

Assistant Professors: **Ing. Matej Bereš, PhD.**

Ing. Jozef Dziak, PhD.

Ing. Anna Hodulíková, PhD.

Ing. Patrik Jacko, PhD.

Ing. Branislav Fecko, PhD.

Technical staff: **Jozef Lenart**

Ing. Mgr. Monika Špernoga

PhD. Students: **Ing. Šimon Gans**

Ing. Simona Kirešová

Ing. Richard Král

TEACHING

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Fundamentals of Electrical Engineering</i>	<i>1st</i>	<i>2/2</i>	<i>Fecko, Hodulíková, Gans, Guzan, Dziak, Král</i>
<i>Electrotechnics</i>	<i>2nd</i>	<i>3/3</i>	<i>Fecko, Hodulíková, Gans, Guzan, Dziak, Jacko</i>

Department of Theoretical and Industrial Electrical Engineering

<i>Electrotechnical Practical Lessons</i>	<i>2nd</i>	<i>2/2</i>	<i>Hodulíková, Fecko</i>
<i>Programming of Industrial Applications I</i>	<i>2nd</i>	<i>2/2</i>	<i>Vince</i>
<i>Windows server I</i>	<i>3rd</i>	<i>2/2</i>	<i>Vince, Jacko</i>
<i>Industrial Electrical Engineering</i>	<i>3rd</i>	<i>2/2</i>	<i>Kováč</i>
<i>CAD systems in Electrotechnics</i>	<i>3rd</i>	<i>2/2</i>	<i>Bereš</i>
<i>Applied analog electronics</i>	<i>3rd</i>	<i>2/2</i>	<i>Kováčová</i>
<i>Metrology</i>	<i>4rd</i>	<i>2/2</i>	<i>Guzan, Kirešová</i>
<i>MS Office in Technical Practice</i>	<i>4nd</i>	<i>2/2</i>	<i>Bereš, Kirešová</i>
<i>Applied digital electronics</i>	<i>4th</i>	<i>2/2</i>	<i>Kováčová</i>
<i>Semestral Project</i>	<i>4th</i>	<i>0/3</i>	<i>Kováč</i>
<i>Sensors and Actuators</i>	<i>4th</i>	<i>2/2</i>	<i>Jacko</i>
<i>Simulation software for electrical circuit analysis</i>	<i>4th</i>	<i>2/2</i>	<i>Fecko</i>
<i>Modelling and Measurement</i>	<i>5th</i>	<i>2/2</i>	<i>Guzan</i>
<i>Marketing and industry management</i>	<i>5th</i>	<i>2/2</i>	<i>Kováčová</i>
<i>Database Systems SQL ORACLE</i>	<i>5th</i>	<i>2/2</i>	<i>Molnár</i>
<i>Bachelor 's Project</i>	<i>5th</i>	<i>0/6</i>	<i>Kováč,</i>
<i>Microprocessor technology</i>	<i>5th</i>	<i>2/2</i>	<i>Bereš</i>
<i>Linux I</i>	<i>6th</i>	<i>2/2</i>	<i>Molnár, Jacko</i>
<i>Programmable Logic Controllers</i>	<i>6th</i>	<i>2/2</i>	<i>Vince</i>
<i>Bachelor 's Project</i>	<i>6th</i>	<i>3/3</i>	<i>Kováč</i>

Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>DSP processors application</i>	<i>7th</i>	<i>2/2</i>	<i>Jacko</i>
<i>Unlinear electromechanic systems</i>	<i>7th</i>	<i>2/2</i>	<i>Dziak, Gans</i>
<i>Automated measurement systems and Internet-controlled systems</i>	<i>7th</i>	<i>2/2</i>	<i>Molnár</i>
<i>Project management</i>	<i>7th</i>	<i>2/2</i>	<i>Dziak</i>
<i>Development of software applications in industrial electrical engineering</i>	<i>7th</i>	<i>2/2</i>	<i>Vince</i>

Department of Theoretical and Industrial Electrical Engineering

<i>Economic analyzes and accounting</i>	<i>8th</i>	<i>2/2</i>	<i>Kováčová</i>
<i>Linux II</i>	<i>8th</i>	<i>2/2</i>	<i>Molnár</i>
<i>Regulatory systems</i>	<i>8th</i>	<i>2/2</i>	<i>Kováč</i>
<i>Control electronics</i>	<i>8th</i>	<i>2/2</i>	<i>Kováčová</i>
<i>Diploma 's Project I</i>	<i>8th</i>	<i>3/3</i>	<i>Kováč</i>
<i>Semestral Project II</i>	<i>8th</i>	<i>0/3</i>	<i>Kováč</i>
<i>Electromechanical production systems</i>	<i>9th</i>	<i>2/2</i>	<i>Fecko</i>
<i>Numerical methods at electronics</i>	<i>9th</i>	<i>2/2</i>	<i>Jacko, Gans</i>
<i>Visualization programs for control systems</i>	<i>9th</i>	<i>2/2</i>	<i>Dziak</i>
<i>Diploma 's Project II</i>	<i>9th</i>	<i>3/3</i>	<i>Kováč</i>

LABORATORIES

- laboratory for industrial control systems
- two laboratories for electrical measurement
- laboratory for basics of electrical engineering
- PC laboratories
- laboratory for Internet remote measuring systems
- microcontroller and microprocessor laboratory

RESEARCH PROJECTS

- Tatra Bank Foundation - Innovative IoT Laboratory of Microprocessor Technology RuCEL.
- VEGA 1 /0036/22 Study of the effect of Wi-Fi radiation on the development of tissues and organs of the chicken embryo.

CO-OPERATION

Co-operation in Slovakia

- Department of Experimental Physics, P.J. Šafárik University, Košice
- Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava
- Institute of Electrical Engineering, Slovak Academy of Science, Bratislava

Department of Theoretical and Industrial Electrical Engineering

- Department of Metal Physics, Institute of Experimental Physics, Slovak Academy of Sciences, Košice
- Department of Low Temperature Physics, Institute of Experimental Physics, Slovak Academy of Sciences, Košice
- Institute of Material Research, Slovak Academy of Sciences, Košice
- Institute of Neurobiology, Slovak Academy of Sciences, Košice
- Volkswagen, Slovakia
- LVD II Slovakia - Unicorn Tornaľa
- Molex Slovakia, a.s.
- SPP, a.s.
- BSH Drives and Pumps, s.r.o., Michalovce
- Antik Telecommunications
- RV magnetics, a.s.
- Faculty of medicine, P.J. Šafárik University, Košice
- Institute of Geotechnics of Slovak Academy of Sciences, Košice
- Department of Morphological Disciplines, University of Veterinary Medicine and Pharmacy in Košice

International Co-operation

- The Czech Academy of Science, Prague, Czech Republic
- Czech Technical University in Prague, Czech Republic
- Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Poland
- Institute of Physics, A.Mickiewicz University, Poznan, Poland
- Politechnika Czestochowska, Poland
- Stefan cel Mare University, Suceava, Romania
- Silesian University of Technology, Gliwice, Poland
- University, Budapest, Hungary
- University of Florence, Italy
- University of Applied Sciences, Harz, Germany
- University, Miskolc, Hungary
- University of West Bohemia, Pilsen, Czech Republic
- Magna Steyr, Graz, Austria
- Kremenchuk Mykhailo Ostrohradskyi National University, Ukraine

Membership in International Organizations and Societies

- D. Kováč: Member of the team of evaluators of The Grant Agency of Czech Republic

Department of Theoretical and Industrial Electrical Engineering

- D. Kováč: Member of Editorial Board of Journal "Acta Technica"

Membership in Slovak Organizations and Societies

- J. Dudáš: Member of the Slovak Vacuum Society
- J. Dudáš: Member of the Slovak Electrotechnical Society
- J. Dudáš: Member of the Slovak Physical Society
- D. Kováč: Member of Editorial Board of Journal "Acta Electrotechnica et Informatica"
- J. Molnár: Member of Scientific council of FEI TU of Košice
- M. Mojžiš: Member of Technical Standardization Committee

THESES

<i>Thesis type</i>	<i>Bachelor</i>	<i>Master</i>	<i>Doctoral</i>
<i>Number</i>	6	11	2

OTHER ACTIVITIES

Trainings and courses:

- Higher education pedagogy course according to IGIP standards (M. Bereš, B. Fecko, P. Jacko)
- ULYSSEUS Université Côte d'Azur - European project management (B. Fecko)
- Professional training in cooperation with IBM (M. Guzan, T. Vince)
- Promiseo - Digital Marketing (P. Jacko)
- SUVKO Coaching Company - Individual development based on their strengths (P. Jacko)
- Confederacion Espanola de Personas con Discapacidad Física y Organica (COCEMFE) (T. Vince)

Excursions

- 19.2.2024 – Magna PT
- 21.3.2024 - Kia Slovakia

Promotional activities:

- 16.4. - 18.4.2024 AlmaMater - Košice
- 25.4.2024: European Girls' Day at Technikom
- 9.5. 2024: Visit of students from SPŠE KE
- 21.5. 2024: Piknik day TUKE 2024

Department of Theoretical and Industrial Electrical Engineering

- 24. – 25. 9. 2024: EXPO SlovakiaTech 2024
- 27.9. 2024 European Researcher's Night
- 15.10.2024: DoD TUKE – open laboratory
- 22.10. – 23.10.2024: Gaudeamus
- 4.12 – 5.12.2024: PRO EDUCO

Conferences:

- 1. XIV. European Magnetic Sensors and Actuators Conference (EMSA 2024) in Kosice from 24th to 27th June of 2024
- 2. IEEE 6th International Conference on Modern Electrical and Energy System (MEES) on September 18-21, 2024, Kremenchuk, Ukraine

Other

- 7.2.2024: SOČ Michalovce - M. Bereš, P. Jacko

PUBLICATIONS

Journals indexed in Thomson Reuters "Current Contents" database

- M. Pavlík, M. Bereš, and Ľ. Beňa, "The Influence of Various Commonly Used Building Materials on the Shielding Effectiveness, Reflection and Absorption of the Electromagnetic Wave," Applied Sciences, vol. 14, no. 6. MDPI AG, p. 2521, Mar. 16, 2024. doi: 10.3390/app14062521.
- P. Jacko, P. Duranka, and R. Varga, "Advantages of Bistable Microwires in Digital Signal Processing," Sensors, vol. 24, no. 8. MDPI AG, p. 2423, Apr. 10, 2024. doi: 10.3390/s24082423.
- S. Kirešová et al., "Particulate Matter in the Eastern Slovakia Region: Measurement, Monitoring, and Evaluation," Atmosphere, vol. 15, no. 7. MDPI AG, p. 802, Jul. 04, 2024. doi: 10.3390/atmos15070802.
- M. Pavlík, M. Bereš, and F. Kurimský, "Analyzing the Impact of Volatile Electricity Prices on Solar Energy Capture Rates in Central Europe: A Comparative Study," Applied Sciences, vol. 14, no. 15. MDPI AG, p. 6396, Jul. 23, 2024. doi: 10.3390/app14156396.
- M. Pavlík, M. Bereš, A. Hyseni, and J. Petráš, "Statistical Analysis of Electricity Prices in Germany Using Benford's Law," Energies, vol. 17, no. 18. MDPI AG, p. 4606, Sep. 13, 2024. doi: 10.3390/en17184606.

Other publications – foreign

- I. O. Tampubolon, P. Jacko, M. Bereš, P. Baláž, and M. Baláž, "Demonstrating the Simplicity and In

Department of Theoretical and Industrial Electrical Engineering

- Situ> Temperature Monitoring of the Mechanochemical Synthesis of Metal Chalcogenides Suitable for Thermoelectrics,” Journal of Visualized Experiments, no. 210. MyJove Corporation, Aug. 30, 2024. doi: 10.3791/67249.
- B. Sobota, M. Guzan, S. Kirešová and Š. Korečko, “Towards Real-World Data Supported XR Training of Trustworthy Human-Robot Interaction in a Risky Environment,” 2024 IEEE 22nd World Symposium on Applied Machine Intelligence and Informatics (SAMI), Stará Lesná, Slovakia, 2024, pp. 000365-000370, doi: 10.1109/SAMI60510.2024.10432918.
 - S. Kirešová, V. Rusyn, M. Guzan, G. Vorobets, B. Sobota, and O. Vorobets, “Utilizing low-cost optical sensor for the measurement of particulate matter and calculating Pearson’s correlation coefficient,” Sixteenth International Conference on Correlation Optics. SPIE, p. 62, Jan. 05, 2024. doi: 10.1117/12.3014098.
 - D. Kovac and V. Melnykov, “New Control Method for Multi-phase Buck DC-DC Converters Used with Photovoltaic Panels,” 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-4, doi: 10.1109/MEES61502.2023.10402389.
 - I. Kovacova and A. Gladyr, “Electric Power Systems’ Electromagnetic Compatibility,” 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-4, doi: 10.1109/MEES61502.2023.10402497.
 - P. Jacko, V. Kovalchuk, P. Mlynár, V. Prus and O. Somka, “Sun-tracking Solar Panel with Battery Charger Based on the MPPT Technology,” 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-6, doi: 10.1109/MEES61502.2023.10402437.
 - Š. Gans, J. Molnár, V. Naida and M. Maliakova, “Analysis of Magnetic Field Simulations of Magnetoelastic Sensors Quasi-Statically using COMSOL Multiphysics and MATLAB Software,” 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-6, doi: 10.1109/MEES61502.2023.10402387.
 - M. Bereš and M. Maliakova, “Six-Phase Galvanically Isolated Control Pulse Generator with Power Transistor Gate Connectivity Capability,” 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-5, doi: 10.1109/MEES61502.2023.10402526.
 - M. Bereš and A. Gladyr, “Welding Inverter Utilizing a 32-bit Microcontroller,” 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-6, doi: 10.1109/MEES61502.2023.10402519.
 - S. Kirešová, M. Guzan, B. Sobota, V. Fedák, R. Bača and D. Bakši, “The Use of Time Series Database in Measurements,” 2023 International Conference on Electrical Drives and Power Electronics (EDPE), The High Tatras, Slovakia, 2023, pp. 1-8, doi: 10.1109/EDPE58625.2023.10274054.
 - S. Kirešová, M. Guzan, B. Sobota, V. Melnykov, R. Yatsiuk and B. Peryvertailo, “Mobile Application for Visu-

Department of Theoretical and Industrial Electrical Engineering

alizing the Measurements," 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-5, doi: 10.1109/MEES61502.2023.10402445. Visualizing the Measurements," 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-5, doi: 10.1109/MEES61502.2023.10402445.

- T. Vince, M. Sroka, B. Fecko, B. Peryvertailo, R. Yatsiuk and I. Anna, "A Universal DSP Module for Simultaneous Multiple RS232 Communication with Synchronous Measurements Reading Capability," 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-5, doi: 10.1109/MEES61502.2023.10402393.
- T. Vince, D. Čižmárik, J. Dziak, D. Mamchur, I. Anna and N. Vitalii, "A Comparative Analysis of Transient Analysis Results for DC-DC Regulator in PSpice, Tina, and LTspice," 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-6, doi: 10.1109/MEES61502.2023.10402513.
- B. Fecko, N. Aliona and E. Burdilna, "Open source solution for CNC milling machine monitoring and comparison with Matlab simulation in real time," 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-4, doi: 10.1109/MEES61502.2023.10402537.
- J. Molnár, Š. Gans, M. Maliakova and B. Peryvertailo, "Design and Implementation of a Power Frequency Converter," 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-6, doi: 10.1109/MEES61502.2023.10402541.
- M. Bereš and V. Prus, "Design of a Device for Determining I-V curve of a Photovoltaic Panel Using SiC Power Transistors," 2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES), Kremenchuk, Ukraine, 2023, pp. 1-5, doi: 10.1109/MEES61502.2023.10402435.
- B. Sobota, M. Guzan, S. Kirešová and Š. Korečko, "Towards Real-World Data Supported XR Training of Trustworthy Human-Robot Interaction in a Risky Environment," 2024 IEEE 22nd World Symposium on Applied Machine Intelligence and Informatics (SAMI), Stará Lesná, Slovakia, 2024, pp. 000365-000370, doi: 10.1109/SAMI60510.2024.10432918.

Patents

- Modifikované paralelné zapojenie impulzových DC/DC eničov / Dobroslav Kováč, Irena Kováčová, Matej Bereš
- Zapojenie na rozširovanie prúdovej a napäťovej zaťažiteľnosti integrovaného obvodu spínaného regulátora jednosmerného napätia / Dobroslav Kováč, Irena Kováčová, Dávid Schweiner

Other publications

Publication Type	Journals		Textbooks	Conferences		Patents	Other
	Foreign	Home	Home	Foreign	Home	Domestic	
Number	5	38	37	17	0	2	0



Faculty of Electrical Engineering
and Informatics

*Department
of Technologies
in Electronics*

Department of Technologies in Electronics

Head of Department: *prof. Ing. Alena Pietriková, CSc.*
Email: *alena.pietrikova@tuke.sk*
Web: *<http://www.tuke.sk/fei-kte/>*
Phone/Fax: *+421 55 602 3195*



DEPARTMENT'S PROFILE

The Department of Technologies in Electronics (Katedra technológií v elektronike – KTE) was founded in 1991. Education at the Department of Technologies in Electronics is realized at three degrees of education and oriented very versatile to fulfill the core of the “Electronics” specialization.

The Department offers three types of full-time courses:

Bachelor's Degree courses “Automotive Electronics” lasts in normal way 3 years and is leading to degree Bc. The graduates get more-or-less practical skills in mastering automotive electronics and has the ability to acquire and interpret facts in the brunch of electrical engineering.

Master's Degree course “Automotive Electronics” lasts in normal way 2 years and is leading to degree Ing. The graduates in “Automotive Electronics” get theoretical and practical skills around automotive electronic with the aspect on progressive materials and technologies and has comprehensive theoretical knowledge and developed analytic - synthetic engineering approach to solve the problems of design, development, research and production of electronic devices for a wide range of applications.



Department of Technologies in Electronics

PhD. course “Industrial Electrical Engineering” lasts in normal way 4 years and is leading to degree PhD. The graduates get erudition in scientific areas and acquire deeper knowledge in specific area of materials and technologies in intelligent electronics.

By its focus, the Department ranks among the unique scientific-research and teaching workplaces in Slovakia with a focus on layered electronics technologies, rigid and flexible printed circuit boards, surface mounting technologies (SMT), multi-chip MCM-C modules including LTCC, polymer technology, development and production of a wide variety of electronic elements and sensors, materials used in electrical engineering and, last but not least, CAD design systems. The laboratories of the Department of Technologies in Electronics have been gradually rebuilt in recent years and are currently equipped with new technological devices that meet the requirements for the practical implementation of project tasks, the implementation of final theses and the transfer of knowledge into practice. Teaching in technological laboratories for integrated research of electrophysical properties of progressive materials used in assembly technologies provides good prerequisites for the implementation of quality teaching. The core of the scope is research activity in the field of material - technological research based on the use of modern experimental methods and computer technologies. The basic research activities of the Department are concentrated on:

- research, development, and application of latest trends in the field of mounting technology in electronic,
- investigation of materials and structures of solder joints in microelectronics as well as in power electronics, analyze of solderability and adhesion mechanism, analyze of surface finishes quality and their influence on defects and fracture resistivity,
- investigation of multilayer electronics structure with embedded components and development of specific packages based on Face-down technology applied in System-in-Package,
- research, development, and application in flexible electronics,
- development of specific polymer pastes based on Ag2O,
- research and development of microsystems and hybrid sensors,
- LTCC multilayer electronics modules including modules with various shape,
- patterning and precise printing technologies in electronic (InkJet-printing, screen-printing),
- quality and reliability of electronic systems,
- image processing.

STAFF

Professors: **prof. Ing. Alena Pietriková, CSc.**

Associate Professors: **doc. Ing. Juraj Ďurišin, PhD.**

doc. Ing. Peter Lukács, PhD.

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Assistant Professors: **Ing. Slavomír Kardoš, PhD.**

Ing. Ondrej Kováč, PhD.

Ing. Ľubomír Livovský, PhD.

Ing. Igor Vehec, PhD.

Ing. Tomáš Lenger, PhD.

Ing. Daniel Dzivý, PhD. (from July 2023)

Other staff: **prof. Ing. Juraj Banský, CSc.**

Dr.h.c. prof. Ing. Miloš Somora, CSc.

Igor Vehec

Secretary: **Mgr. Alena Focková**

Internal Ph.D. Students: **Ing. Peter Provázek**

Ing. Gabriela Hricková

Ing. Daniel Dzivý

External Ph.D. Students: **Ing. Tomáš Kmec**

TEACHING

Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
<i>Fundamentals of Materials Engineering</i>	1 st	2/2	<i>Pietriková</i>
<i>Computer Engineering in Electronics</i>	2 nd	2/2	<i>Lukács</i>
<i>Fundamentals of Automobile Construction</i>	3 rd	2/2	<i>Ďurišin</i>
<i>Materials and Principles of Component Production in Electrical Engineering</i>	3 rd	2/2	<i>Vehec</i>
<i>Fundamentals of Microprocessors</i>	4 rd	2/2	<i>Livovský</i>
<i>Signals and Systems</i>	3 rd	2/2	<i>Kováč</i>
<i>Introduction into the Matlab</i>	4 th	2/2	<i>Kováč</i>
<i>Design and Construction of Electronic Equipment</i>	4 th	2/2	<i>Kardoš</i>
<i>Principles of Operation and Use of Microsystems in Electronics</i>	5 th	2/2	<i>Kardoš</i>
<i>Microprocessor Technology</i>	5 th	2/2	<i>Livovský</i>
<i>Bachelor Project</i>	5 th	0/8	
<i>Methods of Scientific Work</i>	6 th	2/2	<i>Pietriková</i>
<i>Bachelor Work</i>	6 th	0/12	

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Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Production Processes in Electronics	1 st	3/3	Pietriková
ECAD Design Tool	1 st	2/2	Livovský
Microstructural Analysis of the Materials in Electronics*	1 st	3/3	Žurišin
Digital Signal Processing	1 st	2/2	Kováč
Diploma Project 1	2 nd	0/6	
Artificial Intelligence in Electronics	2 nd	2/2	Vehec
Microelectromechanical Systems and Production	3 rd	2/2	Žurišin
Digital Image Processing	3 rd	2/2	Kováč
Flexible Electronics	3 rd	2/2	Lukács
Diploma Project 2	3 rd	0/8	
Sensor Systems	3 rd	2/2	Žurišin
Main Knowledge of Study Field Electronic and their Use	4 th		
Master Thesis	4 th		

or study programme "Physical Engineering of Advanced Materials" Undergraduate and Graduate Study for Foreign

Undergraduate and Graduate Study for Foreign Students (in English Language)

Students (in English Language)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Fundamentals of Material Engineering	Bc.	2/2	Kardoš
Introduction into the Matlab	Bc.	2/2	Kováč
Sensor Systems	Ing.	2/2	Žurišin

4.4 Postgraduate study (PhD.)

Subject	Semester	Lectures/exercises (hours per week)
Electrotechnology and Materials	1 st	0/10
Scientific Activity 1	1 st	0/10
Analyse Methods of Electronic Materials and Structures	2 nd	0/10
Scientific Activity 2	3 rd	0/10
Subject of Specialization	3 rd	0/10
Scientific Activity 3	4 th	0/10
Scientific Activity 4	5 th	0/10

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Scientific Activity 5	6 th	0/10
Dissertation Project	6 th	
Dissertation Thesis	6 th	

PhD. Students at the Branch of Industry Electrical Engineering

Name of PhD Student	Thesis	Beginning from/form	Supervisor
Provázek, P.	Silver layers for flexible electronics	2021/Internal	Pietriková A.
Dzivý, D.	Selected quality aspects of the analysis of PCB surface finishes	2019/Internal	Pietriková A.
Hricková, G.	Formable impurity Ag ₂ S for use in thermoelectric generators	2021/Internal	Žurišin J.
Kmec, T.	Improving the properties of the thermally sprayed Al ₂ O ₃ insulating layer for the heating element by modifying the production process	2020/External	Žurišin J.

LABORATORIES

Teaching and Research Laboratories

- Laboratory of Mounting Technologies and PCB Manufacturing.
- Laboratory for Manufacturing of Multifunction Microsystems and Hybrid Sensors.
- Laboratory of Quality and Reliability.
- Laboratory of CAD Systems and E-learning Education.
- Laboratory of Measurement.

Special Laboratories and Equipment

- Laboratory of Thick-film and LTCC Technology (covers full process from CAD design to printing, firing and assembly including die wire bonding).
- Laboratory of InkJet Printing.
- Self-developed furnace for Vapour Phase Soldering.

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- Laboratory of Quality and Reliability (thermal shock and climatic chamber, pull/shear test, accelerated aging).
- Laboratory of Material Analysis (grinder-polisher, material microscopy).

RESEARCH PROJECTS

Research Projects

- Synergy of new soldering forms and solutions and their impact on the quality in the context of a low-energy and environmental approach in the production of power electronics modules (Synergia nových foriem a riešení spájkovania a ich vplyv na kvalitu v kontexte nízkoenergetického a environmentálneho prístupu pri výrobe výkonových modulov elektroniky). Project APVV 22-0289. Coordinator: prof. Ing. Alena Pietriková, CSc. Duration: 2023 - 2026.
- Synergy of educational process, research, innovation and industry world for automotive electronics study program (Synergia edukačného procesu, výskumu, inovácií a priemyselného sveta v kontexte prestavby študijného programu automobilová elektronika). Project KEGA 011TUKE-4/2023. Coordinator: prof. Ing. Alena Pietriková, CSc. Duration: 2023 - 2025

CO-OPERATION

Co-operation in Slovakia

The Department of Technologies in Electronics has entered into the long-term based co-operation with:

Industrial Partners

- Marelli, Kechnec
- MAGNA, Kechnec
- Semikron Danfoss, Vrbové
- Kia Motors Slovakia s.r.o., Žilina
- Sensor, s.r.o., Košice
- IEE Sensing Slovakia s.r.o., Veľká Ida
- ELCOM, s.r.o., Prešov
- PreDops, s.r.o., Prešov
- Continental Automotive Systems Slovakia s.r.o.
- ELPRO, s.r.o., Košice
- Deutsche Telekom
- BSH Drives and Pumps s.r.o., Michalovce, Slovakia

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- Minebea Slovakia s.r.o.
- *Academic Partners*

All academic partners intensively co-operate on all above fields – research, development, and education, too:

- Department of Electrotechnology, FEI STU Bratislava,
- Department of Electronics and Electrotechnology, EF ŽU in Žilina,
- Institute of Materials Research, Slovak Academy of Science, Košice.

International Co-operation

The Department of Technologies in Electronics has entered into long-term international co-operation with:

- Faculty of Electrical Engineering, Czech Technical University in Prague (FEL ČVUT Prague), Czech Republic.
- Faculty of Electrical Engineering and Communication, Brno University of Technology (FEKT, VUT Brno), Czech Republic.
- Faculty of Electrical Engineering, University of West Bohemia (FEL, ZČU Pilsen), Czech Republic.
- University POLITEHNICA of Bucharest, Romania.
- Budapest University of Technology and Economics (BME).
- Technical University of Cluj-Napoca, Romania
- Politechnika Rzeszow, Poland.
- DESY, Hamburg, Germany.
- Diamond Light Source, Oxfordshire, Great Britain.

Visits of Staff Members to Foreign Institutions

- | | |
|---------------------------------------|---------------------|
| • Pietriková, A., Romania (Timișoara) | 10.05. – 14.05.2023 |
| • Lukács, P., Romania (Timișoara) | 10.05. – 14.05.2023 |
| • Vehec, I., Romania (Timișoara) | 10.05. – 14.05.2023 |
| • Provázek, P., CZ (Brno) | 25.10. – 27.10.2023 |
| • Vehec, I., CZ (Brno) | 25.10. – 27.10.2023 |

Visitors to the Department

- | | |
|------------------------------------|---------------------|
| • prof. Ing. Vladimír Šály, PhD. | 15.06. – 16.06.2023 |
| • FEI, STU v Bratislave | |
| • prof. RNDr. Jozef Kúdelčík, PhD. | 15.06. – 16.06.2023 |
| • Žilinská univerzita | |

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- prof. Ing. Karel Dušek, PhD. 15.06. – 16.06.2023
- FEL, ČVUT Praha

Membership in International Organizations and Societies

- Pietriková, A.: Member of the International Steering Committee for International Spring Seminar on Electronics Technology – ISSE.
- Pietriková, A.: Member of the International Steering Committee for IMAPS Poland Conference.
- Pietriková, A.: Representative for Slovakia of the International Steering Committee for IMAPS CZ&SK.
- Pietriková, A.: Member of Editorial Board of Scientific Bulletin of University of Pitesti – Series: Electronics and Computer Science, (Romania).
- Pietriková, A.: Member of the International Technical Program Committee and Editorial Board for Conference on Diagnostics in Electrical Engineering (Diagnostika (Czech Republic)
- Lukács, P.: Member of the International Steering Committee for International Spring Seminar on Electronics Technology – ISSE.
- Pietriková, A.: Member of IMAPS CZ&SK.
- Livovský, Ľ.: Member of IMAPS CZ&SK.
- Kardoš, S.: Member of IMAPS CZ&SK.
- Kováč, O.: Member of IMAPS CZ&SK.
- Vehec, I.: Member of IMAPS CZ&SK.

Membership in Slovak Organizations and Societies

- Pietriková, A.: Member of Editorial Board “ACTA ELECTROTECHNICA ET INFORMATICA”.
- Pietriková, A.: Member of the Commission for Ph.D. Study in the Branch of Electrical Engineering at FEI TU Košice.
- Pietriková, A.: Member of the Commission for Ph.D. Study in the Branch in the Branch Electrical Engineering at Faculty of Electrical Engineering, University of Žilina.
- Pietriková, A.: Member of Scientific board at FEI TUKE.
- Pietriková, A.: Member of Commission Project VEGA No5.
- Lukács, P.: Member of the Faculty Academic Senate at FEI TUKE.
- Kováč, O.: Chairman of the Regional Round for SOČ in the Field No. 12: Electrical Engineering, Hardware, and Mechatronics.
- Kováč, O.: Chairman of the National Round for SOČ in the Field No. 12: Electrical Engineering, Hardware, and Mechatronics.

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- Kováč, O.: Chairman of the National Round for ENERSOL in the Category of Creativity.
- Kováč, O.: AMAVET (The Association for Youth, Science and Technology) – Member of the Evaluation Committee for the Prešov and Košice Region in the Field: Electricity and Mechanics, Energy and Transport.
- Pietriková, A., Vehec, I., Livovský, L., Lukács, P., Kováč, O., Kardoš, S., Lenger, T.: Members of SES - Slovak Electrotechnical Society.

OTHER ACTIVITIES

Symposia, Workshops, Conferences

- 24.5. – 26.5.2023: Organizing the international conference “Elektrotechnológie 2024: Výskum a veda v oblasti materiálov a elektrotechnológií na univerzitách v Slovenskej republike a Českej republike”, Štrbské pleso, Slovakia.

Events

- 4.10.2023 – Ceremonial opening of the renovated Magna classroom at KTE FEI TUKE in cooperation with MAGNA.

THESES

Bachelor's Theses

- Oleh Kasianenko: Technological and economic aspects of the application of solar power systems (Supervisor: Kardoš, S.)
- Jozef Duda: Image acquisition (Supervisor: Kováč, O.)
- Matúš Kohout: Image quantization and encoding (Supervisor: Kováč, O.)
- Lukáš Timčo: Etching of printed circuit boards (Supervisor: Lenger, T.)
- Tomáš Minčák: Driver alertness monitoring (Supervisor: Ďurišin, J.)
- Martin Bednár: Electronic stability programme of vehicle (Supervisor: Ďurišin, J.)
- Matúš Gič: Vehicle parking sensors (Supervisor: Ďurišin, J.)
- Jaroslav Majcher: Properties and reliability of polymer thick film resistors (Supervisor: Vehec, I.)
- Jozef Compel: Possibilities of fuzzy control using microcontrollers Supervisor: Vehec, I.)
- Jerguš Ševce: Drone stabilization with MEMS IMU based sensing (Supervisor: Kardoš, S.)
- Stanislav Cesnak: Properties and diagnostics of electrochemical cells (Supervisor: Kardoš, S.)
- Dávid Mrázko: Selected aspects of assessment of properties of joints in power electronics (Supervisor:

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Pietriková, A.)

- Andrii Khainas: Shape descriptors in image processing (Supervisor: Gladišová, I.)
- Oleksandr Mykhailyshyn: Channel coding for error detection and correction (Supervisor: Gladišová, I.)
- Damián Goliaš: Flexible hybrid electronics (Supervisor: Lukács, P.)
- Filip Mahdal: Utilization of graphene in the flexible Electronics (Supervisor: Lukács, P.)

Master's Theses

- Matúš Čižmár: Electronic modules for educational measurement workplaces (Supervisor: Kardoš, S.)
- Martin Mati: FSR sensor testing equipment (Supervisor: Livovský, Ľ)
- Tomáš Marczell: Design of Electrical Drive for Small Motorcycle (Supervisor: Ďurovský, F.)
- Jozef Angelovič: Raspberry Pi and RC cars (Supervisor: Papaj, J.)
- Tomáš Rindoš: Detection and Localization of Static Person by UWB Sensor Network based on SVD Decomposition (Supervisor: Drutarovský, M.)
- Peter Ridilla: Detection of Human Respiration by UWB Sensor Network Based on Eigenvalue Method (Supervisor: Drutarovský, M.)
- Martin Jarkovský: Analysis of OhmegaPly resistors' properties (Supervisor: Lenger, T.)
- Lukáš Andraščík: Ball & Plate Laboratory System (Supervisor: Vehec, I.)
- Marek Mišenčík: Programmable equipment with a graphic interface for measurement of electronic components characteristics (Supervisor: Kardoš, S.)
- Samuel Janoščík: Reliability tests of the carbon based conductive joints (Supervisor: Lukács, P.)
- Antónia Jusková: Autonomous parking system (Supervisor: Kováč, O.)
- Richard Sisol: Flexible low profile UWB antenna (Supervisor: Gamec, J.)

PUBLICATIONS

Textbooks

- LUKÁCS, Peter: Flexibilná elektronika, Košice, Technická univerzita v Košiciach, 2023, 93 s, ISBN 978-80-553-4334-1
- LIVOVSÝ, Ľubomír: Mikroprocesorová technika ATmega328P, Košice, Technická univerzita v Košiciach, 2023, 139 s., ISBN 978-80-553-4403-4
- KARDOŠ, Slavomír - DURANKA, Peter: Napájanie elektronických systémov, Košice, Technická univerzita v Košiciach, 2023, 120 s., ISBN 978-80-553-4422-5

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Journals indexed in Thomson Reuters "Current Contents" database (from 2020 to 2022)

Journals

- PIETRIKOVÁ, Alena - DZIVÝ, Daniel - PROVÁZEK, Peter - LIVOVSÝ, Ľubomír - DŽUNDA, Róbert - DUŠEK, Karel - BUŠEK, David: Effect of non-standard snag surface finishes on properties of solder joints. In: Applied surface science advances : an Open Access Journal Devoted to the Physics and Chemistry of Surfaces and Interfaces. - Amsterdam (Holandsko) : Elsevier č. 18 (2023), s. [1-9] [print]. - ISSN 2666-5239
- KROMKA, Jozef - ŠALIGA, Ján - KOVÁČ, Ondrej - DE VITO, Luca - PICARIELLO, Francesco - TUDOSA, Ioan: Radial artery pulse wave estimation by compressed sensing measurements of wrist bio-impedance. In: Measurement : journal of the International Measurement Confederation. - London (Veľká Británia) : Elsevier č. 219 (2023), s. [1-10] [print, online]. - ISSN 0263-2241
- KOVÁČ, Ondrej - KROMKA, Jozef - ŠALIGA, Ján - JUSKOVÁ, Antónia: Multiwavelet-based ECG compressed sensing. In: Measurement : journal of the International Measurement Confederation. - London (Veľká Británia) : Elsevier Roč. 220 (2023), s. [1-14] [print, online]. - ISSN 0263-2241
- DZIVÝ, Daniel - PIETRIKOVÁ, Alena: Vybrané aspekty analýzy kvality povrchových úprav dosiek plošných spojov. In: QuoVadis Research @ FEI. - Košice (Slovensko) : Technická univerzita v Košiciach, 2018 Roč. 6, č. 1 (2023), s. 23-31 [print, online]. - ISSN 2585-9587
- HUSÁR, Stanislav - BUNDZEL, Marek - HLIBOKÝ, Maroš - KARDOŠ, Slavomír - FERENČÍK, Norbert: Advanced Prototype of Manus Diagnostics and Rehabilitation Device. In: Acta Electrotechnica et Informatica. - Košice (Slovensko) : Fakulta elektrotechniky a informatiky Roč. 23, č. 1 (2023), s. 32-40 [print, online]. - ISSN 1335-8243

Other publications

- PROVÁZEK, Peter: Contribution to Analysis of Thick Layers' Adhesion Fabricated by Screen Printing Technology. In: 23rd Scientific Conference of Young Researchers : proceedings from conference. - Košice (Slovensko) : Technická univerzita v Košiciach s. 40-41 . - ISBN 978-80-553-4377-8
- HRICKOVÁ, Gabriela: Flexible Ag₂S Based Thermoelectrics for Use in Thermoelectric Generators. In: 23rd Scientific Conference of Young Researchers : proceedings from conference. - Košice (Slovensko) : Technická univerzita v Košiciach s. 132-133 . - ISBN 978-80-553-4377-8
- LIVOVSÝ, Ľubomír: Elektrické vlastnosti kompozitných materiálov. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 66-69 [CD-ROM]. - ISBN 978-80-553-4387-7
- LUKÁCS, Peter: Súčasné trendy vo flexibilnej elektronike. In: Elektrotechnológie 2023 : zborník vedeckých prác.

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- Košice (Slovensko) : Technická univerzita v Košiciach s. 47-51 [CD-ROM]. - ISBN 978-80-553-4387-7
- VEHEC, Igor - GONTKOVIČ, Kristián: Piezorezistívny jav vo vybraných polymérnych pastách. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 70-73 [CD-ROM]. - ISBN 978-80-553-4387-7
- DZIVÝ, Daniel - PIETRIKOVÁ, Alena: Vplyv typu povrchovej úpravy na hrúbku a štruktúru IMC v medzifázovom rozhraní. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 5-9 . - ISBN 978-80-553-4387-7
- LENGER, Tomáš: Vplyv dvojstupňovej laminácie na mechanické vlastnosti viacvrstvových štruktúr. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 20-24 . - ISBN 978-80-553-4387-7
- HRICKOVÁ, Gabriela - ĎURIŠIN, Juraj: Prímesový Ag₂S pre využitie v termoelektrickom generátore. In: Elektrotechnológie 2023 : Zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 16-19 . - ISBN 978-80-553-4387-7
- HRICKOVÁ, Gabriela - ĎURIŠIN, Juraj: Termoelektrické javy. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 32-35 [CD-ROM]. - ISBN 978-80-553-4387-7
- HRICKOVÁ, Gabriela - ĎURIŠIN, Juraj: Prehľad termoelektrických materiálov / - 2023. In: Elektrotechnológie 2023 : Zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 60-65 . - ISBN 978-80-553-4387-7
- HRICKOVÁ, Gabriela - ĎURIŠIN, Juraj: Vybrané vlastnosti termoelektrického materiálu Ag₂S s prídavkom antimónu. In: Metalurgia Junior 2023. - Košice (Slovensko) : Technická univerzita v Košiciach s. 60-64 [online]. - ISBN 978-80-553-4392-1
- Kardoš, Slavomír: Alkaline electrochemical cells on the market - electrical properties and economic aspect. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 79-86 [CD-ROM]. - ISBN 978-80-553-4387-7
- PROVÁZEK, Peter - PIETRIKOVÁ, Alena - LUKÁCS, Peter: Príprava elektricky vodivej pasty na báze Ag₂O častíc pre vytváranie strieborných vrstiev na flexibilných substrátoch / - 2023. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 41-46 . - ISBN 978-80-553-4387-7
- PROVÁZEK, Peter - PIETRIKOVÁ, Alena - LUKÁCS, Peter: Nedávny vývoj vodivých atramentov a pást na báze striebra pre flexibilnú elektroniku / - 2023. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 87-92 . - ISBN 978-80-553-4387-7
- KMEC, Tomáš: Cold atmospheric plasma treatment of substrate for heating resistive film / - 2023. In: Electrical Engineering and Informatics 14 : Proceedings of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice. - Košice (Slovensko) : Technická univerzita v Košiciach s. 164-169 [CD-ROM]. -

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ISBN 978-80-553-4407-2

- VEHEC, Igor - LENGER, Tomáš - Kardoš, Slavomír - LUKÁCS, Peter - GONTKOVIČ, Kristián: Polymer thick-film piezoresistive sensor integrated into the pcb / - 2023. In: The 46th International Spring Seminar on Electronics Technology. - New York (USA) : Institute of Electrical and Electronics Engineers s. [1-8] . - ISBN 979-8-3503-3485-2 - ISSN 2161-2528
- Kardoš, Slavomír - VEHEC, Igor: Investigation of energy flow in particular parts of the discharge characteristics of li-ion cells / - 2023. In: The 46th International Spring Seminar on Electronics Technology. - New York (USA) : Institute of Electrical and Electronics Engineers s. [1-5] . - ISBN 979-8-3503-3485-2 - ISSN 2161-2528
- JUSKOVÁ, Antónia - KOVÁČ, Ondrej: Monitor okolitého pohľadu / - 2023. In: Elektrotechnológie 2023 : zborník vedeckých prác. - Košice (Slovensko) : Technická univerzita v Košiciach s. 36-40 [CD-ROM]. - ISBN 978-80-553-4387-7
- JUSKOVÁ, Antónia - KOVÁČ, Ondrej: The Design of Vehicle Surround View Monitor / - 2023. In: IMEKO TC-4 International Symposium : proceedings : Academia meets industry. - Budapest (Maďarsko) : International Measurement Confederation s. 135-139 [online]. - ISBN 978-3-033-09885-5
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