TECHNICAL UNIVERSITY OF KOŠICE

FACULTY OF ELECTRICAL ENGINEERING AND INFORMATICS

ANNUAL REPORT 2017

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ANNUAL REPORT 2017

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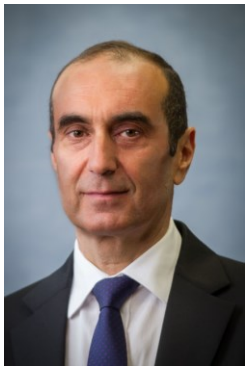
Foreword / Welcome from the Dean of the Faculty

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 9,000. Approximately 8,400 of them are full-time students, out of which there are 5,000 Bachelor students, 3,000 Master students and over 350 PhD students. Almost 800 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. 2000 students and 159 teachers and research associates. We have 118 PhD students in our courses. We offer more than 35 courses for faculty education including Bc. (BSc.), Ing. (MSc.) and PhD in thee main branches: *Informatics*, *Telecommunications*, *Electric Power Engineering and Electrical Engineering*. In this publication can found 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 4 educational and 12 research international projects granted by agencies from EEC countries and also participates on more than 45 research projects granted by Slovak agencies. All this activity brings very interesting and highly valuable results.

There is a small community of 33 foreign students studying at our faculty. 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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Košice and the Technical University

Košice – the 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 kindin 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 9 000 Master's and Bachelor's degree students, about 350 PhD. students and 800 academic staff members.

Faculty of Electrical Engineering and Informatics

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 225 and among them 30 professors, 47 associate professors, 80 assistant professors, 9 research workers, 59 administrative staff and technicians.
- The number of BSc. students is approximately 1691, number of MSc. students is 631 and number of PhD students approximately 118, every year.

Number of the Bc. students in academic year 2017-2018

Bc. level			
1. year	**2. year**	**3. year**	**Sum**
760	569	362	1691

Number of the Ing. students in academic year 2017-2018

MSc. (Ing.) level		
1. year	**2. year**	**Sum**
312	319	631

Overall number of the students in academic year 2017-2018

Bc. level	MSc. (Ing.) level	PhD. level	Total number
1691	631	118	2440

The student numbers in the academic year 2017/18 by study programs area (number of students vs. study program).

Branch of study	Bc.	Ing.	PhD.	Total
Electric Power Engineering	150	58	12	220
Informatics	778	306	29	1113
Multimedia Communication Technologies	13	38	8	59
Intelligent Systems	134	45	16	195
Computer modeling	39	13	1	53
Business Informatics	163	85	10	258
Physical Engineering of Advanced materials	9	5	5	19
Electrotechnics systems	-	23	-	23
Electrical Systems	-	-	7	7
Electronic systems and signal processing	-	-	13	13
Industrial Electrical Engineering	49	21	3	73
Technology in Automotive Electronics	9	15	6	30
Automated Electrical Systems	96	-	-	96
Automotive Electronics	46	-	-	46
Computer Networks	200	-	4	204
Smartelectronics	5	22	-	27
Telecommunications	-	-	1	1
Cybernetics and info control systems	-	-	2	2
Infoeletronics	-	-	1	1
Total	**1691**	**631**	**118**	**2440**

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

Dean:	prof. Ing. Liberios Vokorokos, PhD.	
Vice-deans:	prof. Ing. Alena Pietriková, CSc.	responsible for research and development and doctoral studies
	Ing. Mária Gamcová, PhD.	responsible for the Faculty promotion and International Relationships
	doc. Ing. Ľubomír Beňa, PhD.	responsible for Bachelor and Master's studies
	prof. Ing. Ján Šaliga, PhD.	responsible for International projects coordinating and for publicising activities
	prof. Ing. Roman Cimbala, PhD.	responsible for development and External Relations
Faculty Secretary:	JUDr. Mária Girmanová Homzová	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 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 form 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)
Department of Cybernetics and Artificial Intelligence	KKUI
Department of Computers and Informatics	KPI
Department of Mathematics and Theoretical Informatics	KMTI
Department of Electronics and Multimedia Telecommunications	KEMT
Department of Technologies in Electronics	KTE
Department of Physics	KF
Department of Theoretical and Industrial Electrical Engineering	KTPE
Department of Electrical Engineering and, Mechatronics	KEM
Department of Electric Power Engineering	KEE

CENTRES OF EXCELLENCE

The faculty has two Centres of Excellence:

1. **Centre of Information and Communication Technologies for Knowledge Systems.**
   Head of the centre: prof. Ing. Dušan Kocur, PhD.
   Email: dusan.kocur@tuke.sk
   WEB: http://www.ce-ikt.fei.tuke.sk/
   The Center consists of:
   - Laboratory of Intelligent Interfaces of Communication and Information Systems
   - Labotratory 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.
   Email: alena.pietrikova@tuke.sk
   WEB: http://ce3.fei.tuke.sk/
   The Center consists of:
   - Laboratory of Sensor and Communication Networks of Safe Automobile 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

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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 COURSES

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
- Electric Power Engineering
- Industrial Electrical Engineering
- Multimedia Communication Technologies
- Automated Electrical Systems
- Intelligent systems
- Computer modeling
- Physical Engineering of Advenced Materials
- Business Informatics
- Computer Networks
- Smartelectronics
- Technology in Automotive Electronics
- Automotive Electronics

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
- Multimedia Communication Technologies
- Electrotechnics Systems
- Electric Power Engineering
- Computer modeling
- Technologies in Automotive Electronics
- Industrial Electrical Engineering
- Business Informatics
- Intelligent Systems
- Smartelectronics

PhD. courses

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

- Electric Power Engineering
- Informatics
- Multimedia Communication Technologies
- Intelligent Systems
- Computer Modeling
- Business Informatics
- Physical Engineering of Advanced materials
- Electrical Systems
- Electronic systems and Signal processing
- Industrial Electrical Engineering
- Technologies in Automotive Electronics
- Computer Networks

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 race 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 givenin the Program of Study.

RESEARCH AND DEVELOPMENT

The research at the Faculty's departments is oriented towards the fields, which are contained in both centres of excellence.

Research projects, which were co-ordinate by the Faculty staff members:

Category of projects	Number of projects
COST projects	11
DAAD	1
Slovak – Portugal program	1
CEEPUS	2
Erasmus program	3
Erasmus MUNDUS	1
Subtotal	19
National projects supported by VEGA	18
National projects supported by KEGA	16
National projects supported by APVV	11+3
National projects supported by APVV-CERN	1
Total	**68**

There are national and international projects at the Faculty. The national projects are supported by:

- The Scientific Grant Agency (VEGA) at Ministry of Education of Slovak Republic (grant research),
- The Cultural and Educational Grant Agency (KEGA) at Ministry of Education of Slovak Republic
- Slovak Research and Development Agency (APVV)
- The Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic for the Structural Funds of EU (Agency)

The projects are described in detail in the chapters giving the description of the departments.

The Faculty has intensive co-operation with industry: the most of results of applied research is realized in industrial enterprises. In 2017 there were accomplished 26 projects of such category at the Faculty.

The departments of the Faculty organize scientific conferences held usually in two-year intervals.

INTERNATIONAL CO-OPERATION

International co-operation presents one of the most important activities of the Faculty. The Faculty policy is oriented:

- towards creating conditions for co-operation in science and technology with the centers in Europe and USA,
- to increase the number and quality of the international research and educational projects,

- to support the mobility of the staff members to foreign institutions,
- towards acceptance the university teachers at the faculty for a certain teaching period,
- to increase the number of international students studying at the Faculty.

Except of co-operation with the partners' faculties in framework of Technical University's contracts there are several signed contracts with the company and faculties of the following universities: University of Oradea (Romania), Politechnika Czestochowska (Poland), Technical University of Ilmenau (Germany), The University of West Bohemia in Pilsen (Czech Republic), Faculty of Electrical Engineering, Czech Technical University, Prague (Czech Republic), Budapest University of Technology and Economics (Hungary), Université Jean Monnet de Saint-Etienne (France).

In framework of international co-operation, the Faculty is currently involved in the following projects:

CEEPUS program

- Active Methods in Teaching and Learning Mathematics, CIII-HU-0028-10-1718 (co-ordinator: Štefan Berežný, department: KM)
- International Cooperation in Computer Science, CIII-HU-0019-12-1718 (co-ordinator: Csaba Szabó, department: KPI)

COST projects

- Resilient communication services protecting end-user applications from disaster-based failures (RECODIS) – COST CA15127 (co-ordinator: Ľubomír Doboš, department: KEMT)
- Inclusive Radio Communication Networks for 5G and beyond (IRACON) – COST CA15104 (co-ordinator: Ľubomír Doboš, department: KEMT)
- Wireless Power Transmission for Sustainable Electronics (WiPE) COST IC1301 (co-ordinator: Pavol Galajda, department: KEMT)
- Algorithms, Architectures and Platforms for Enhanced Living environments COST IC 1303 (co-ordinator: Dušan Kocur, department: KEMT)
- Semantic keyword-based search on structured data sources COST IC 1302 (co-ordinator: Peter Butka, department: KKUI)
- Autonomous Control for a Reliable Internet of Services COST IC 1304 (co-ordinator: Peter Bednár, department: KKUI)
- Civil Engineering Applications of Ground Penetrating Radar COST TU 1208 (co-ordinator: Dušan Kocur, department: KEMT)
- Improving Applicability of Nature-Inspired Optimisation by Joining Theory and Practice (ImAppNIO) COST CA15140 (co-ordinator: Juraj Gazda, department: KPI)
- European network for cost containment and improved quality of health care COST CA15222 (co-ordinator: František Babič, department: KKUI)
- Big Data Era in Sky and Earth Observation (BIG-SKY-EARTH) COST TD1403 (co-ordinator: Peter Butka, department: KKUI)
- European network for the Joint Evaluation of Connected Health

Technologies (ENJECT) – COST TD1405 (co-ordinator: František Babič, department: KKUI)

FLAG-ERA

- Rethinking Robotics for the Robot-Companion of the future – RoboCom plus plus (co-ordinator: Peter Sinčák, department: KKUI)

Slovak – Portugal program

- Nová inžinierska disciplína: zelený softvér (co-ordinator: Csaba Szabó, department: KPI)

Erasmus projects

- INNOSOC – Inovative ICT Solutions for the Societal Challenges (contact: Ľubomír Doboš, Mária Gamcová, department: KEMT)
- Setting the trends in IoT education (co-ordinator: František Jakab, department: KPI)
- Focusing Education on Composability, Comprehensibility nad Correctness of Working Software (co-ordinator: Csaba Szabó, department: KPI)

Erasmus MUNDUS

- THELXINOE: Erasmus Euro-Oceanian Smart City Network (contact: Ľubomír Doboš, department: KEMT)

DEPARTMENT OF COMPUTERS AND INFORMATICS

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kpi
Katedra počítačov a informatiky

ANNUAL REPORT 2017

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 CSE.

DCI consists of 5 laboratories:

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

DCI programs enrollment counts approx. 773 students in bachelor and 306 students in master programs. Number of doctoral students studying towards PhD degree is 28.

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,
- modeling and simulation of systems,
- advanced database and information technologies,
- information systems security,
- e-learning systems, intelligent tutoring systems,
- 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.

2 STAFF

Professors:
prof. Ing. Štefan Hudák, DrSc.
prof. Ing. Ján Kollár, CSc.
prof. RNDr. Valerie Novitzká, PhD.
prof. Ing. Liberios Vokorokos, PhD.

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doc. Ing. Juraj Gazda, PhD.
doc. Ing. Ján Genči, PhD.
doc. Ing. Zdeněk Havlice, CSc.
doc. Ing. František Jakab, PhD.
doc. Ing. Jaroslav Porubän, PhD.
doc. Ing. Branislav Sobota, PhD.
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doc. Ing. Martin Tomášek, PhD.

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Ing. Peter Feciľak, PhD.
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Ing. Dominik Lakatoš, PhD.
Ing. Branislav Madoš, PhD.
Ing. Daniel Mihályi, PhD., Ing.-Paed.IGIP
Ing. Miroslav Michalko, PhD.
Ing. Emília Pietriková, PhD.
Ing. William Steingartner, PhD.
Ing. Csaba Szabó, PhD.
Ing. Slavomír Šimoňák,PhD.

Senior Scientists:

Ing. Igor Chudáčik
Ing. Jaroslav Lámer, PhD.

Technical Staff:

Ing. Martina Dragošeková
Jozef Šefčík
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Ing. Aleš Deák
Ing. Ondrej Kainz, PhD.
Ing. Tomáš Kanócz
Ing. Monika Kinyiková
Ing. Jana Špesová
Ing. Roman Vápeník

Ph.D. Students:
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Ing. Zuzana Bilanová
Ing. Zuzana Dankovičová
Ing. Aleš Deák
Ing. Mohamed Ali M. Eldojali
Ing. Lukáš Galko
Ing. Marián Hudák
Ing. Michal Hulič
Ing. Ján Hurtuk
Ing. Ladislav Jacho
Ing. Ján Juhár
Ing. Milan Jančár
Ing. Ondrej Kainz
Ing. Ľubor Leščišin
Ing. Matej Madeja
Ivan Manov
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Ing. Peter Pastornický
Ing. Ján Perháč
Ing. Michal Sičák
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Ing. Martin Sivý
Ing. Milan Spišiak
Ing. Matúš Sulír
Ing. Martin Štancel
Ing. Jana Šťastná
Ing. Matúš Uchnár
Ing. Roman Vápeník
Ing. Michal Vrábeľ

External form:

Ing. Matej Kostroš
Abobaker Hasan A. Mustafa
Ing. Milan Krendželák

3 LABORATORIES

- Laboratory of Inteligent 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

4 TEACHING

4.1. Undergraduate Study (Bc.)

Subject	Semester	Lectures / exercises (hours per week)	Name of Lecturer
Fundamentals of Algorithms and Programming	1st	3/2	Korečko, Pietriková, Sobota
Foundations of Software Engineering	2nd	2/2	Havlice
Principles of Computer Engineering	2nd	2/2	Vokorokos, Madoš
Programming	2nd	2/2	Biňas, Tomášek
Web Technologies	2nd	2/2	Korečko
Computer system architectures	3rd	2/2	Vokorokos, Ádám
Data Structures and Algorithms	3rd	2/2	Šimoňák
Object-Oriented Programming	3rd	2/2	Tomášek
Operating Systems	3rd	3/2	Genči
Database Systems	4th	3/2	Lakatoš
Formal Languages	4th	3/2	Kollár
Computer Networks	4th	2/2	Jakab
Programming in .NET Environment	4th	2/2	Porubän
Component Programming	4th	2/2	Porubän
Bachelor Project	5th	2/6	Porubän
Research Methods	5th	2/2	Drotár, Gazda
Software Projects Management	5th	2/2	Szabó
User Interfaces of Software Systems	5th	2/2	Bačíková
Application Development for Smart Devices	5th	2/2	Biňas
Application of the Network Technologies	5th	2/2	Michalko
Assembler	6th	2/2	Šimoňák
Bachelor Thesis	6th	3/9	Porubän
Development of Computer Games	6th	2/2	Sobota, Biňas
Security in Computer Systems	6th	3/2	Vokorokos, Baláž

4.2. Graduate study (Ing.)

Subject	Semester	Lectures / exercises (hours per week)	Name of Lecturer
Current Trends in Informatics 1	1st	2/2	Porubän
Distributed Systems	1st	2/2	Tomášek
Routing Algorithms in Computer Networks	1st	2/2	Feciľak
Semantics of Programming Languages	1st	3/2	Novitzká, Steingartner
Team Project	1st	2/2	Porubän
Computer Graphics	1st, 3th	3/2	Sobota
Data Processing Technologies and Systems	1st, 3th	2/2	Genči
Digital Systems Design Using VHDL	1st, 3th	2/2	Vokorokos, Chovancová
Domain Specific Languages Development	1st, 3th	2/2	Porubän
Functional Programming	1st, 3th	3/2	Kollár
Modeling and Simulation	1st, 3th	2/2	Šujanský, Korečko
Requirements Engineering	1st, 3th	2/2	Havlice, Szabó
Software Systems Evolution	1st, 3th	2/2	Szabó
Type Theory	1st, 3th	2/2	Novitzká
Cloud Systems	2nd	2/2	Tomášek
Current Trends in Informatics 2	2th	2/2	Porubän
Diploma Project 1	2nd	2/6	Vokorokos
Logics for Informaticians	2nd	2/2	Novitzká
Metaprogramming	2nd	2/2	Chodarev
Modelling and Prototyping of Systems	2nd	2/2	Havlice
Parallel Computer Systems	2nd	3/2	Ádám
Stochastic modelling and data analysis	2nd	2/2	Drotár, Gazda
Switched Networks based Technologies	2nd	2/2	Jakab
Verified Development of Systems	2nd	2/2	Korečko
Virtual Reality Systems	2nd	2/2	Sobota
Diploma Project 2	3rd	2/6	Vokorokos
Parallel Programming	3rd	2/2	Kollár
Security in Information and Communication Systems	3rd	2/2	Vokorokos, Baláž
Solving Problems of Large Scale Infrastructures	3th	2/2	Feciľak
Diploma Thesis	4th	9/9	Vokorokos

4.3. Undergraduate and Graduate Study for Foreign Students (In English Language)

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

5 RESEARCH PROJECTS

List of current research and educational projects:

- **Computer-Aided Decision Support System for Hepatic Encephalopathy**, Slovak Research and Development Agency APVV-16-0211, duration 2017–2020, coordinator:
- **Enhancing cognition and motor rehabilitation using mixed reality**, Slovak Research and Development Agency APVV-16-0202, duration: 2017–2021, coordinator: doc. Ing. Branislav Sobota PhD.
- **Implementation of Modern Methods and Education Forms in the Area of Security of Information and Communication Technologies towards Requirements of Labour Market**, Cultural and Educational Grant Agency, KEGA 003TUKE-4/2017, duration: 2017–2019, coordinator: Ing. Anton Baláž PhD.
- **Focusing Education on Composability, Comprehensibility and Correctness of Working Software**, ERASMUS+ KA203 - Strategic partnership for higher education 2017-1-SK01-KA203-035402, duration: 2017–2019, coordinator:
  Ing. Csaba Szabó PhD.
- **Update of computer networks curricula based on needs of practice**, Cultural and Educational Grant Agency, KEGA 011STU-4/2017, duration: 2017–2019, coordinator: Ing. Miroslav Michalko PhD.
- **ViLMA: Virtual Laboratory for Malware Analysis**, Cultural and Educational Grant Agency, KEGA 079TUKE-4/2017, duration: 2017–2019, coordinator: doc. Ing. Martin Tomášek PhD.
- **Improving Applicability of Nature-Inspired Optimisation by Joining Theory and Practice**, COST CA15140, duration: 2016–2020, coordinator: doc. Ing. Juraj Gazda PhD.
- **Intelligent Dynamic Spectrum Access Management for the Future Cognitive Communication Networks**, Slovak Research and Development Agency APVV-15-0055, duration: 2016–2019, coordinator: doc. Ing. Juraj Gazda, PhD.
- **Towards a Software Engineering Discipline for Green Software**, Slovak Research and Development Agency SK-PT-2015-0037, duration: 2016–2017, coordinator: Ing. Szabó Csaba, PhD.
- **Integrating software processes into the teaching of programming**, Cultural and Educational Grant Agency KEGA No. 047TUKE-4/2016, duration: 2016-2018, coordinator: prof. Ing. Ján Kollár, CSc.
- **Pattern based domain-specific language development**, Faculty of Electrical Engineering and Informatics TUKE FEI-2015-23, duration: 2017, coordinator: Ing. Sergej Chodarev, PhD.
- **Virtual-reality technologies in the process of handicapped persons education**, Cultural and Educational Grant Agency KEGA No. 083TUKE-4/2015, duration: 2015-2017, coordinator: doc. Ing. Branislav Sobota, PhD.
- **Promoting the interconnection of Computer and Software Engineering using the KPIkit**, Cultural and Educational Grant Agency KEGA No. 077TUKE-4/2015, duration: 2015–2017, coordinator: Ing. Norbert Ádám, 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 Feciľak, PhD.

6 CO-OPERATION

6.1. Co-operation in Slovakia

- Faculty of Informatics and Information Technologies, Slovak University of Technology in 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

6.1.1 Visitors to the Department

- doc. Mgr. Daniela Chudá, PhD., Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava, Slovakia
- doc. Ing. Viera Rozinajová, PhD., Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava, Slovakia
- Ing. Katarína Jelemenská, PhD., Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava, Slovakia
- Ing. Ivan Polášek, PhD., Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava, Slovakia
- doc. Ing. Ladislav Hudec, CSc., Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava, Slovakia
- doc. RNDr. Petr Šaloun, PhD., VŠB-Tehnical university of Ostrava, Czech Republic
- doc. RNDr. Ľubomír Dedera, PhD., Military Academy of gen. M. R. Štefanik in Lliptovský Mikuláš, Slovakia
- doc. Ing. Marcel Harakaľ, PhD., Military Academy of gen. M. R. Štefanik in Lliptovský Mikuláš, Slovakia
- PaedDr. Mgr. Vladimír Siládi, PhD., Matej Bel University in Banská Bystrica, Slovakia
- doc. Ing. Jarmila Škrinárová, PhD., Matej Bel University in Banská Bystrica, Slovakia
- Ing. Dana Horváthová, PhD., Matej Bel University in Banská Bystrica, Slovakia
- Akademik prof. Ing. Ivan Plander, DrSc., Alexander Dubček University of Trenčín, Slovakia
- doc. Ing. Penka Martincová, PhD., Faculty of Management Science and Informatics, University of Žilina, Slovakia
- doc. Ing. Emil Kršák, PhD., Faculty of Management Science and

Informatics, University of Žilina, Slovakia
- prof. Ing. Mikuláš Alexík, PhD., Faculty of Management Science and Informatics, University of Žilina, Slovakia
- prof. Ing. Róbert Lórencz, CSc., Czech Technical University in Prague, Czech Republic
- prof. Ing. Jiří Šafařík, CSc., University of West Bohemia, Pilsen, Czech Republic
- Assoc. Prof. Andreas Bollin, Alps Adriatic University of Klagenfurt, Austria
- Dr. Zsolt Kollár, Budapest University of Technology and Economics, Hungary
- Dr. Taras Maksymyuk, Lviv Polytechnic National University, Ukraine
- Ioan Marius Pisak Lukáts, "SAPIENTIA" University of Cluj Napoca, Romania
- Prof. João Saraiva, University of Minho, Braga, Portugal
- Miguel Guimarães, University of Minho, Braga, Portugal
- Wolfgang Schreiner, Johannes Kepler University of Linz, Austria
- Prof. Zoltán Fülöp, University of Szeged, Hungary
- Dr. Veljko Pejovic, University of Ljubljana, Slovenia
- BA Noel Leshica, Canadian Institute of Technology, Tirana, Albania
- Gordana Rakic, University of Novi Sad, Serbia
- Jernej Flisar, University of Maribor, Slovenia
- Clemens Grelck, University of Amsterdam, Netherlands
- Pieter Koopman, Radboud University Nijmegen, Netherlands
- Rinus Plasmeijer, Radboud University Nijmegen, Netherlands
- Elena Somova, Plovdiv University „Paisii Hilendarski“, Bulgaria
- Zoltan Porkolab, Eötvös Loránd University, Budapest, Hungary
- Lehel Csato, Babes-Bolyai University, Cluj-Napoca, Romania

6.2. 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
- University of Szeged, Hungary
- Technical University of Gdansk, Poland
- Warsaw University of Technology, Warsaw, Poland
- Czestochova University of Technology, Poland
- University of Oradea, Romania
- Babes-Bolyai University, Cluj-Napoca, Romania

- University of Maribor, Slovenia
- International Solomon University Kiew, Ukraine
- The National University of T. Schevchenko, Kiew, 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
- University of Coimbra, Portugal

6.2.1. Visits of Staff Members to Foreign Institutions

- Ing. Jana Šťastná, SOFSEM 2017, University of Limerick, Lero-Limerick, Ireland
- Ing. William Steingartner, PhD., Fachhochschule Campus Wien, Austria
- Ing. William Steingartner, PhD., Palacký University, Olomouc, Czech Republic
- Ing. Igor Chudáčik, NetAcad, Ostrava, Czech Republic
- Ing. Peter Feciľak, PhD., NetAcad, Ostrava, Czech Republic
- doc. Ing. František Jakab, PhD., NetAcad, Ostrava, Czech Republic
- Ing. Norbert Ádám, PhD., Óbuda University Budapest, Hungary
- doc. Ing. Peter Drotár, PhD., Dáta a znalosti 2017, University of West Bohemia, Pilsen, Czech Republic
- doc. Ing. Juraj Gazda, PhD., Dáta a znalosti 2017, University of West Bohemia, Pilsen, Czech Republic
- prof. Ing. Ján Kollár, CSc., ICEMES 2017, University of Oradea, Romania
- Ing. Michal Sičák, ICEMES 2017, University of Oradea, Romania
- Ing. Milan Spišiak, ICEMES 2017, University of Oradea, Romania
- doc. Ing. Jaroslav Porubän, PhD., SLATE 2017, Polytechnic Institute of

Porto, Portugal
- Ing. Matúš Sulír, SLATE 2017, Polytechnic Institute of Porto, Portugal
- Ing. Milan Jančár, SLATE 2017, Polytechnic Institute of Porto, Portugal
- Ing. Jaroslav Lámer, PhD., University Politechnica of Bucharest, Romania
- Ing. Ondrej Kainz, PhD., University Politechnica of Bucharest, Romania
- Ing. Ladislav Jacho, ITRO 2017, University of Novi Sad, Zrenjanin, Serbia
- Ing. Peter Pastornický, ITRO 2017, University of Novi Sad, Zrenjanin, Serbia
- doc. Ing. Juraj Gazda, PhD., IEEE AICT 2017, Lviv Polytechnic National University, Ukraine
- Ing. Matúš Sulír, FedCSIS 2017, Czech Technical University in Prague, Czech Republic
- Ing. Jana Šťastná, FedCSIS 2017, Czech Technical University in Prague, Czech Republic
- Ing. Michal Sičák, FedCSIS 2017, Czech Technical University in Prague, Czech Republic
- doc. Ing. Juraj Gazda, PhD., ICITEE 2017, Phuket, King Mongkut´s Institute of Technology Ladkrabang, Thailand
- doc. Ing. Peter Drotár, PhD., ICITEE 2017, Phuket, King Mongkut´s Institute of Technology Ladkrabang, Thailand
- Ing. Štefan Korečko, PhD., CogInfoCom 2017, University of Debrecen, Hungary
- Ing. William Steingartner, PhD., MMFT 2017, Politechnika Czestochowska, Poraj, Poland
- prof. RNDr. Valerie Novitzká, PhD., MMFT 2017, Politechnika Czestochowska, Poraj, Poland
- doc. Ing. Peter Drotár, PhD., University of Maribor, Portoroz, Slovenia
- Ing. Ján Hurtuk, PhD., INES 2017, Larnaca, Cyprus
- Ing. Matúš Sulír, ASE 2017, University of Illinois at Urbana-Champaign, USA
- doc. Ing. Juraj Gazda, PhD., CTTE 2017, Aalborg University Copenhagen, Denmark
- Ing. Csaba Szabó, PhD., University of Minho, Braga, Portugal
- doc. Ing. Ján Genči, PhD., University of Minho, Braga, Portugal
- Ing. Igor Chudáčik, NetAcad, Atens, Greece
- Ing. Peter Feciľak, NetAcad, Atens, Greece
- doc. Ing. Juraj Gazda, PhD., ICCTIM 2017, Metropolitan College, Thessaloniki, Greece
- Ing. Miroslav Biňas, PhD., eLearning 2017, University of Hradec Králové, Czech Republic
- prof. RNDr. Valerie Novitzká, PhD., VŠB-Technical University of Ostrava, Czech Republic
- Ing. Michal Vrábel, University of Turin, Italy
- Ing. Ján Perháč, Plovdiv University "Paisii Hilendarski", Bulgaria

6.3. Membership in International Organizations and Societies

- Bača, J., Genči, J., Havlice, Z., Hudák, Š., Kollár, J., Korečko, Š., Novitzká, V., Porubän, J., Sobota, B., Šujanský, M., Tomášek, M.: Members of the CSSS - Czech and Slovak Society for Simulation
- Genči, J., Paralič, M.: 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

6.4. Membership in Slovak Organizations and Societies

- Bača, J., Biňas, M., Genči, J., Havlice, Z., Hudák, Š., Chodarev, S., Kollár, J., Korečko, Š., Mihályi, D., Novitzká, V., Paralič, M., Porubän, J., Steingartner W., Sobota, B., Szabó, Cs., Šimoňák, S., Šujanský, M., Tomášek, M., Vokorokos, L.: Members of the SSAKI - „Slovak Society for Applied Cybernetics and Informatics"
- Genči, J., Havlice, Z., Kollár, J., Novitzká, V., Paralič, M., 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
- Kollár, J.: Member of the review group of the Journal of Electrical Engineering
- Kollár, J.: Member of the review group of the Computers and Informatics journal
- Kollár, J.: Member of the program committee of the international conference ICETA – International Conference on Emerging Telecommunications Technologies and Applications, Košice, Slovak Republic
- Kollár, J.: Member of Common Scientific Commission for Defense of PhD dissertation in the field „Programm and Information System“
- 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".
- 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

6.5. Contracts, International Scientific Projects

- Cooperation with companies:
  - Košice IT Valley z.p.o.
  - AllProjects, s.r.o., Prešov
  - Astound Commerce s.r.o.
  - AT&T Global Network Services Slovakia
  - bart.sk s.r.o.
  - Cisco (www.cnl.sk)
  - ELCOM, s.r.o., Prešov
  - ESET, spol. s r.o.
  - Fpt Slovakia, s.r.o.
  - GEODETICCA, s.r.o.
  - GlobalLogic Slovakia s.r.o.
  - Hotovo, s.r.o.
  - IBM Slovensko, spol. s r.o.

- IPsoft Slovakia s.r.o.
- localhost, s.r.o.
- matsuko, s.r.o.
- NESS KE s.r.o.
- PWC Avis, s.r.o.
- Red Hat Czech, s.r.o.
- Senacor Technologies AG
- Siemens Healthcare s.r.o.
- Software AG Development Center Slovakia, s.r.o.
- T-Systems Slovakia s.r.o.
- Východoslovenská distibučná, a.s.
- Wirecard Technologies GmbH

- Cooperation with the Stredná priemyselná škola dopravná, Košice

7 THESES

Thesis type	Bachelor	Master	Doctoral
Number	134	117	2

8 OTHER ACTIVITIES

8.1. Symposia, Workshops, Conferences, Seminars

- Informatics'2017 – IEEE 14th International Conference on Informatics 2017, November 14–16, in Poprad, Slovakia
- ICETA 2017 – IEEE 15th International Conference on Emerging eLearning Technologies and Applications, October 26–27, Starý Smokovec, The High Tatras, Slovakia (DCI co-operation)

8.2. Activities in cooperation with commercial partners

- Live IT Projects 2017, January 25, Košice – presentation of student projects developed in cooperation with IT companies
- Arduino Day 2017, April 5, Košice – part of the worldwide birthday celebration of Arduino technology
- Beat_IT! 2.0, April 13, Košice – presentation and comparison of different technologies by experienced developers
- Extrapolácie 2017, September 25 – November 31, Banská Bystrica, Bratislava, Košice, Žilina – exhibition devoted to history and future of IT in Slovakia
- T-Systems Hackathon 2017, November 25–26, Košice – weekend hackathon with the theme "Hack your life"
- Beat_IT! 3.0, December 7, Košice – presentation and comparison of different technologies by experienced developers

9 PUBLICATIONS

9.1. Books

[1] SOBOTA, Branislav: Počítačová grafika - podklady k prednáškam - 1. vyd. - Košice : TU - 2017. - 344 s.. - ISBN 978-80-553-3077-8.
[2] KOREČKO, Štefan: Webové technológie podklady k prednáškam - 1. vyd - Košice : TU - 2017. - 344 s.. - ISBN 978-80-553-307X-X.

9.2. Journals

[1] GAZDA, Juraj - KOVÁČ, Viliam - TÓTH, Peter - DROTÁR, Peter - GAZDA, Vladimír: Tax optimization in an agent-based model of real-time spectrum secondary market - 2017. In: Telecommunication Systems. Vol. 64, no. 3 (2017), p. 543-558. - ISSN 1018-4864
[2] HORVÁTH, Denis - GAZDA, Juraj - BRUTOVSKÝ, Branislav: A new bio-inspired, population-level approach to the socioeconomic evolution of dynamic spectrum access services - 2017. In: International Journal of Modern Physics C. Vol. 28, no. 5 (2017), p. 1-21. - ISSN 0129-1831
[3] ABDELLAOUI, Ghouti - ABE, Shinsuke - ACHELI, Abdelhakim - ADAMS, Jenni H. - AHMAD, Salleh - GENČI, Ján - VRÁBEL, Michal: Meteor studies in the framework of the JEM-EUSO program - 2017. In: Planetary and Space Science. Vol. 143 (2017), p. 245-255. - ISSN 0032-0633 Spôsob prístupu: https://doi.org/10.1016/j.pss.2016.12.001.
[4] ABDELLAOUI, Ghouti - ABE, Shinsuke - ACHELI, Abdelhakim - ADAMS, Jenni H. - AHMAD, Salleh - GENČI, Ján - VRÁBEL, Michal: Cosmic ray oriented performance studies for the JEM-EUSO first level trigger - 2017. In: Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment. Vol. 866 (2017), p. 150-163. - ISSN 0168-9002 Spôsob prístupu: https://doi.org/10.1016/j.nima.2017.05.043.
[5] GAZDA, Juraj - BUGÁR, Gabriel - VOLOŠIN, Marcel - DROTÁR, Peter - HORVÁTH, Denis - GAZDA, Vladimír: Dynamic spectrum leasing and retail pricing using an experimental economy- 2017. In: Computer Networks. Vol. 121 (2017), p. 173-184. - ISSN 1389-1286 Spôsob prístupu: http://www.sciencedirect.com/science/article/pii/S1389128617301718.
[6] NOSÁĽ, Milan - PORUBÄN, Jaroslav - SULÍR, Matúš: Customizing host IDE for non-programming users of pure embedded DSLs: A case study - 2017. In: Computer Languages, Systems and Structures. Vol. 49 (2017), p. 101-118. - ISSN 1477-8424 Spôsob prístupu: http://www.sciencedirect.com/science/article/pii/S1477842416301269.
[7] VOKOROKOS, Liberios - IVCHENKO, Alexander - MARCHEVSKÝ, Stanislav - PALAHINA, Elena - PALAHIN, Volodymyr: Parameters estimation of correlated non-Gaussian processes by the method of polynomial maximisation - 2017. In: IET Signal Processing. Vol. 11, no. 3 (2017), p. 313-319. - ISSN 1751-9675
[8] CHOVANCOVÁ, Eva - ÁDÁM, Norbert - BALÁŽ, Anton - PIETRIKOVÁ, Emília - FECIĽAK, Peter - ŠIMOŇÁK, Slavomír - CHOVANEC, Martin: Securing distributed computer systems using an advanced sophisticated hybrid honeypot technology - 2017. In: Computing and Informatics. Roč. 36, č. 1 (2017), s. 113-139. - ISSN 1335-9150
[9] DROTÁR, Peter - ŠIMOŇÁK, Slavomír - PIETRIKOVÁ, Emília - CHOVANEC, Martin - CHOVANCOVÁ, Eva - ÁDÁM, Norbert - SZABÓ,

Csaba - BALÁŽ, Anton - BIŇAS, Miroslav: Comparison of filter techniques for two-step feature selection - 2017. In: Computing and Informatics. Roč. 36, č. 3 (2017), s. 597-617. - ISSN 1335-9150

[10] MUDARRI, Tawfik - LACIAK, Marek - RÁŠKAYOVÁ, Diana: Possibilities of indirectly measured variables in the extraction and processing of raw materials - 2017. In: Interdisciplinarity in theory and practice: www.itpb.eu. No. 12 (2017), p. 72-77. - ISBN 2344-2409

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9.3. Other publications

Publication Type	Confereces		Other
	Foreign	Home	
Number	20	41	27

DEPARTMENT OF CYBERNETICS AND ARTIFICIAL INTELLIGENCE

Head of Department
prof. Ing. Peter Sinčák, CSc.
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ANNUAL REPORT 2017

The Department of Cybernetics and Artificial Intelligence (DCAI) is responsible for education in two study programs: Intelligent Systems, and Business Information Systems at all three levels of university education (bachelor, master and PhD).

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, 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 27 internal PhD. students. There are 3 research centers within the department: Center of Intelligent Technology (http://www.cloudai.sk/), Center of Applied Cybernetics (http://kkui.fei.tuke.sk/info/cak) and Center of Business Information Systems (http://kkui.fei.tuke.sk/chi/). The Department is involved in a number of research and educational projects (see below).

2 STAFF

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

Associate Professors:
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. Kristína Machová, CSc.
doc. Dr. Ing. Ján Vaščák

Assistant Professors:
Ing. František Babič, PhD.
Ing. Peter Bednár, PhD.
Ing. Anna Biceková, PhD.
Ing. Vladimír Gašpar, PhD.
Ing. Slávka Jadlovská, PhD.
Ing. Gergely Magyar, PhD.
Ing. Peter Papcun, PhD.
Ing. Martin Sarnovský, PhD.

Technical Staff:
Tatiana Baňasová
Ing. Renáta Giannusis

Ph.D. Students (internal):

1st.
Ing. Juliana Ivančáková
Ing. Miroslav Jaščur
Ing. Lukáš Koska
Ing. Ján Magyar
Ing. Katarína Oravcová
Ing. Ľudmila Pusztová
Ing. Jaroslav Socháň
Ing. Pavol Šatala

2nd.
Ing. Norbert Ferenčík
Ing. Erik Kajáti
Ing. Patrik Sabol
Ing. Zuzana Pella

3rd.	Ing. Martin Čertický
	Ing. Jozef Mocnej
	Ing. Miroslav Smatana
	Ing. Peter Takáč
	Ing. Michal Vadovský
	Ing. Dominik Vošček
	Ing. Michal Varga
4th.	Ing. Ján Čabala
	Ing. Jakub Hvizdoš
	Ing. Martin Mikula
	Ing. Martin Miškuf
	Ing. Miroslava Muchová
	Ing. Ladislav Nyulászi
	Ing. Matej Oravec
	Ing. Michal Puheim

3 RESEARCH TEAMS

- Data science- primarily focused on methods and models for analysis of different types of data and models and methods for the processing and analysis of large volumesof data and continuous flows of data in real-time. (http://kkui.fei.tuke.sk/chi/?path=english)
- Fault-tolerant and Robust Control- primarily focused oninnovative 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 onmethods 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/laben/)
- Intelligent Cybernetic Systems- primarily focused on machine learning algorithms, collective intelligence, and optimalization, 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/index.php/en/events/)

4 TEACHING

4.1 Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Basics of Intelligent Systems	2nd	2/2	Sinčák
Introduction to Business Informatics	2nd	1/2	Paralič
Industry 4.0.	2nd	2/2	Zolotová Papcun
Basics of Automatic Control	3rd	2/2	Jadlovská A., Jadlovský
Open Informatics for Intelligent Systems	3rd	2/2	Zolotová
Simulation Systems	3rd	2/2	Jadlovská A., Jadlovská S.
Project Management	3rd	2/2	Babič
MIcrocontrollers	3rd	2/2	Jadlovský
Information Systems Analysis and Design	3rd	1/2	Babič, Sarnovský M.
Simulation systems in Business Information Systems	4th	1/2	Butka
Knowledge-Based Systems	4th	2/2	Machová
Control and Visualization Systems	4th,5th	2/2	Zolotová Papcun
Intelligent Decision Making Systems	4rd,5th	2/2	Mach
Control System Components	3rd,4rd	2/2	Vaščák
Web Technologies	4th,6th	2/2	Bednár
Control of Technological Processes	4th	2/2	Jadlovský
Scheduling and Logistics	4th	2/2	Paralič Butka
Optimal Control of Hybrid Systems	5th	2/2	Jadlovská A.
Intelligent Robotics	5th	2/2	Bundzel
Business Analytics	5th	2/2	Butka
Neural Networks	5th	2/2	Sinčák
Models and control of industrial processes (MRPP)	5th	2/2	Filasová, Jadlovská S.
Computer Systems in Control	5th	2/2	Jadlovský
Optimisation in Economic Processes	5th	2/2	Filasová
Business Informatics in practice	6th	2/2	Babič
Service Robotics	6th	2/2	Mach
IT Management	5th	2/2	Sarnovský M.
Selected topics in cybernetics II	6th	2/2	Sarnovský J.

4.2 Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Discret Control of Dynamic Systems	1st	2/2	Filasová
Computer Vision	1st	2/2	Bundzel
Humanoid Technologies	1st,3rd	2/2	Magyar
Computer Systems in Control	1st	2/2	Jadlovský
Architectures of Industrial Information Systems	1st	2/2	Zolotová
Subject	**Semester**	**Lectures/exercises** (hours per week)	**Name of lecturer**
Engineering Econometrics	2nd	2/2	Krokavec
Knowledge Discovery	1st	2/2	Paralič
Machine Learning	1st	2/2	Machová
Heuristic Optimization Processes	1st	2/2	Mach
Control and Artificial Intelligence	2nd	2/2	Jadlovská
Technologies for Big Data Processing	2nd	2/2	Bednár, Sarnovský M.
Evolutionary Algorithms	2nd	2/2	Mach
Distributed Control Systems	2nd	2/2	Jadlovský
Decision making and complexity	2nd	2/2	Gašpar
Hybrid Computational Intelligence	2nd	2/2	Vaščák
Control and Visualisation Systems	2nd	2/2	Zolotová Papcun
Knowledge Management	3rd	2/2	Paralič
Design and testing of software systems	3rd	1/2	Gašpar
Management Information Systems	3rd	2/2	Jadlovský
Diagnostics and Robust Control	3rd	2/2	Filasová
Advanced methods of computer vision	3rd	2/2	Bundzel
Cognitive Robotics	3rd	2/2	Bundzel
Semantic and Social Web	3rd	2/2	Machová
Languages for Intelligent Systems	3rd	2/2	Mach
Applications of Cloud Technologies	3rd	2/2	Magyar
New Trends in Business Information Systems	4th	2/2	Paralič

5 RESEARCH AND EDUCATIONAL PROJECTS

- ***Semantic keyword-based search on structured data sources (KEYSTONE),*** COST Action IC1302, European Cooperation in Science and Technology, duration: 2014 – 2017, members from our department: Peter Butka (Management Committee member for Slovakia), Peter Bednár, Martin Sarnovský, Ján Paralič
- ***Big Data Era in Sky and Earth Observation),*** COST Action TD1403, European Cooperation in Science and Technology, duration: 2014 – 2018, members from our department: Peter Butka (Management Committee member for Slovakia)
- ***European Network for cost containment and improved quality of health care***, COST Action CA15222, European Cooperation in Science and

Technology, duration: 2016 – 2020, members from our department: František Babič (Management Committee member for Slovakia)

- ***Indoor living space improvement: Smart Habitat for the Elderly***, COST Action CA16226, European Cooperation in Science and Technology, duration: 2017 – 2021, members from our department: František Babič (Management Committee member for Slovakia)
- ***European Network for the Joint Evaluation of Connected Health Technologies***, COST Action TD1405, European Cooperation in Science and Technology, duration: 2014 – 2018, members from our department: František Babič (Management Committee member for Slovakia)
- ***Autonomous Control for a Reliable Internet of Services***, COST Action IC1304, European Cooperation in Science and Technology, duration: 2013 – 2017, members from our department: Peter Bednár (Management Committee member for Slovakia)
- ***ALICE Experiment at the LHC at CERN – study of strongly interacting matter under extreme conditions,***International project of basic research, duration: 2016 – 2020, members from our department: Ján Jadlovský (Team Leader for TUKE), Slávka Jadlovská (Deputy Team Leader), Anna Jadlovská, Jakub Čerkala, Michal Kopčík, Matej Oravec, Ján Čabala, Michal Varga, Dominik Vošček, Lukáš Koska, Jaroslav Socháň (http://alice-cern.fei.tuke.sk/)
- ***Cloud Based Human Robot Interaction,*** Slovak Research and Development Agency project No. APVV-15-0731, duration: 2016 – 2020, *project leader:* Peter Sinčák
- ***Knowledge-based approaches for intelligent analysis of big data***, Slovak Research and Development Agency project No. APVV-16-0213, duration: 2017 – 2019, in cooperation with Slovak University of Technology in Bratislava, Faculty of Informatics and information Technologies. Members from our department: Ján Paralič (project leader), Peter Bednár, Peter Butka, Kristína Machová, František Babič, Martin Sarnovský, Vladimír Gašpar, Miroslava Muchová, Michal Vadovský, Miroslav Smatana, Zuzana Pella
- ***Control reconfiguration with active fault diagnosis,*** Scientific Grant Agency project No. 1/0608/17, duration: 2017 – 2019, members: Dušan Krokavec (project leader), Filasová Anna
- ***Methods and models for analysis of data streams***, Scientific Grant Agency project No. 1/0493/16, duration: 2016 – 2019, members: Ján Paralič (project leader), Martin Sarnovský, Peter Bednár, František Babič, Peter Butka, Kristína Machová, Vladimír Gašpar, Anna Biceková, Michal Vadovský, Miroslav Smatana, Miroslava Muchová, Martin Mikula, Zuzana Pella, Katarína Oravcová, Pavol Šatala, Ľudmila Pusztová, Juliana Ivančáková
- ***Intelligent Cyber-Physical Systems in Heterogenous Environment with IoE and Cloud Services Support,*** Scientific Grant Agency project No. 1/0663/17, 2017-2020, members: Iveta Zolotová (project leader), Marek Bundzel, Peter Papcun, Ján Sarnovský, Erik Kajáti, Norbert Ferenčík, Jozef Mocnej, Tomáš Lojka, Martin Miškuf

- ***CyberLabTrainSystem – demonstrational and training of informationcontrol systems – innovation.*** Cultural and Education Grant Agency Project No. 001TUKE-4/2015, duration 2015 – 2017, members: Iveta Zolotová (project leader), Marek Bundzel, Peter Papcun, Ján Sarnovský, Anna Jadlovská, Ján Jadlovský, Slávka Jadlovská, Tomáš Lojka, Martin Miškuf, Jozef Mocnej, Michal Kopčík, Dominik Vošček, Matej Oravec, Ján Čabala, Erik Kajáti, Norbert Ferenčík
- ***Introduction of Education in Big Data Analytics.*** Cultural and Education Grant Agency Project No. 025TUKE-4/2015, duration 2015 – 2017, members: Ján Paralič (project leader), Martin Sarnovský, Peter Bednár, František Babič, Peter Butka, Kristína Machová, Marián Mach, Michal Vadovský, Miroslav Smatana, Miroslava Muchová, Martin Mikula, Zuzana Pella
- ***Introduction of practical education of mobile technologies through the development of applications for smart devices.*** Cultural and Education Grant Agency Project No. 005TUKE-4/2017, duration 2017 – 2019, members: František Babič (project leader), Vladimír Gašpar, Martin Sarnovský, Peter Bednár, Michal Vadovský, Miroslav Smatana, Martin Mikula, Miroslava Muchová.
- ***Digitalization, virtualization and testing of a small turbojet engine and its elements using stands for modern applied lecturing,*** Cultural and Education Grant Agency Project No. 014TUKE-4/2015, duration 2015 – 2017, members: Peter Butka (previously Ladislav Madarász) - project leader, Rudolf Andoga (project vice leader), Tobiáš Lazar, Ladislav Főző, Vladimír Gašpar, Jozef Judičák, Michal Puheim, Ladislav Nyulászi, and Róbert Bréda
- ***University Science Park TECHNICOM for Innovation Applications Supported by Knowledge Technology***, ITMS: 26220220182, supported by the Research & Development Operational Programme funded by the ERDF. Three pilot projects are performed at our department:
    - PP4: IT tools and services for analysis of various types of processes, Ján Paralič -pilot project leader, members: František Babič, Gabriel Tutoky, Martin Sarnovský, Peter Bednár, Peter Butka, Alexandra Lukáčová, Vladimír Gašpar, Cecília Havrilová, Michal Puheim, Miroslava Muchová, Martin Mikula
    - PP5 – Cloud and dynamic services for distributed. intelligent and mobile networks: lead by Frantisek Jakab from DCI, from DCAI have been participating: Iveta Zolotová, Peter Michalik, Tomáš Lojka, Martin Miškuf, Erik Kajáti, Jozef Mocnej
    - PP6: Use of artificial intelligence in intelligent systems, Peter Sinčák-pilot project leader
    - PP7: Center for Nondestructive Diagnostics of Technological Processes Using Standard Software for Control and Communication, Ján Jadlovský- pilot project leader, members: Ján Sarnovský, Anna Jadlovská, Iveta Zolotová, Slávka Jadlovská, Peter Papcun, Jakub Čerkala, Michal Kopčík, Matej Oravec, Ján Čabala

- **IT Academy – educationfor the 21st century**, ITMS: 312011F057, duration: 2017-2021. Innovation of the university subjects for preparation of students for employment in the IT sectorin the areas of:
    - Intelligent cyber-physical systems and IoE, members: Iveta Zolotová, Marek Bundzel, Ján Vaščák, Peter Papcun
    - Data science, members: Ján Paralič, Peter Butka, František Babič, Peter Bednár, Martin Sarnovský
- ***Software development for portable IoT devices***, Tatrabanka Foundation, Education quality 2017. Project leader: Vladimír Gašpar, members: František Babič, Pavol Šatala, študenti HI.
- ***Pervasive computing in medical diagnostics,*** FEI research grant, 2017, Project leader: Vladimír Gašpar, members: Juliana Ivančáková, Katarína Oravcová, Ľudmila Pusztová, Pavol Šatala.
- ***Microsoft Azure Research Award***: IoT Cloud Control – Smart Living and Smart Manufacturing, project leader: Jozef Mocnej, members: Iveta Zolotová, Peter Papcun, Tomáš Lojka, Martin Miškuf
- ***Microsoft Azure Research Award***: Smart Manufacturing, 2017-2018, project leader: Peter Papcun, members: Iveta Zolotová, Marek Bundzel, Jozef Mocnej, Erik Kajáti, Norbert Ferenčík, Tomáš Lojka, Martin Miškuf
- ***REPAIR – REhabilitation PlAtform ImpRovement***, Foundation of Tatrabanka – E-talent, project leader: Marek Bundzel, members: Norbert Ferenčík, Iveta Zolotová, Peter Papcun, Erik Kajáti and students
- ***Quo vadis Smart Industry/Industry 4.0?,*** Foundation of Tatrabanka – Quality of Education, project leader: Iveta Zolotová, members: Peter Papcun, Marek Bundzel, Tomáš Lojka, Martin Miškuf, Jozef Mocnej, Erik Kajáti, Norbert Ferenčík
- ***Research laboratory for nonlinear underactuated systems,*** faculty research grant, project leader: Slávka Jadlovská, members: Dominik Vošček, Lukáš Koska, Matej Oravec, Ján Čabala
- ***CHECkuP – Cognitive HEalthCare Platform,*** faculty research grant, 2017, project leader: Martin Miškuf, members: Tomáš Lojka, Jozef Mocnej and students
- ***Robot - Human Coexistence in the Education of the Internet of Things,*** Foundation of Tatra banka – Quality of Education, No. 2015vs075. Project leader: Ján Vaščák, members: Rudolf Jakša, Jakub Hvizdoš, Michal Puheim, Jakub Szász, Adam Březina.
- ***Artificial Intelligence for Cloud based Intelligent Robotics,*** Scientific Grant Agency ***research grant 1/0773/16, 2016-2019, project leader:*** Peter Sinčák

6 CO-OPERATION

6.1 Co-operation in Slovakia

- Department of Automatic Control Systems Bratislava, Slovak University of Technology, Bratislava
- Institute of Intelligent Systems, Faculty of Informatics, Slovak University of Technology, Bratislava
- Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava
- Institute of Computer Science, Slovak Academy of Sciences in Bratislava
- Department of Biophysics IEP Slovak Academy of Science
- Institute of Computer Science, University of P.J. Šafárik, Košice
- 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
- Department of Control and Information Systems, Faculty of Electrical Engineering, University of Zilina
- IT Valley Košice
- US Steel Košice
- Microsoft Slovakia
- IBM Slovakia
- Control Systems Slovakia
- Betamont Slovakia

6.2 International Co-operation

- Department of Software Engineering and Interactive Systems, Vienna University of Technology, Austria
- Dept. for Technical & Operational Information Systems (Data & Knowledge Engineering Group), Otto-von-Guericke-University Magdeburg, Germany
- University of Regensburg, Germany
- University of Dortmund, Germany
- Waseda University, Tokyo, Japan
- Technical University of Czestochowa
- Tokyo Institute of Technology, Japan
- Kuyshu 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, Compiegne, 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
- University of Hradec Králové, Czech Republic
- Dept. of Computer Science and Engineering, Faculty of Applied Sciences, University of West Bohemia, Plzeň
- Faculty of Mechanical Engineering, Department of Automation, Institute of Information, University of Miskolc, Hungary
- Óbuda University, Budapest, Hungary
- 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

6.3 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.: ACM – Association for Computing Machinery, IEEE
- Sabol, T.: Information Society Technologies Program Committee (IST PC), 5th Framework Program, Brussels
- Sarnovský, J.: INESInternational Network of Engineers and Scientists for Global Responsibility
- Sarnovský, J.: Principia Cybernetica Web PRNCYB-L
- Sarnovský, J.: SWIISSuplementary 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

6.4 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
- 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
- Sabol, T.: Board of the Open Society Fund, Bratislava

6.5 International Networks and Exchange Programs

- Erasmus+ programme Inter-institutional agreement 2014-2021 between TU of Košice and TECHNOLOGIKO EKPAIDEFTIKO IDRYMA-PIREA, T.E.I. Pirea, Greece, contact person: Iveta Zolotová
- Erasmus+ programme agreement between TU of Košice and University of Wellington New Zealand, contact person: Iveta Zolotová
- 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
- SAIA – National Scholarship Program – University of Berkeley USA – Norbert Ferenčík; Chukyo University in Nagoya, Japan – Patrik Sabol
- Huawei, China – Seeds for Future 2017, awarded students: Ladislav Pomšár, Simona Korkobcová

6.6 Visitors to the Department

- D. Fiala–University of West Bohemia, Czech Republic
- L. Kovacs – University of Miskolc, Hungary
- J. Koziorek – Faculty of Electrical Engineering and Computer Science, VŠB – Technical University of Ostrava, Czech Republic

6.7 Visits of Staff Members to Foreign Institutions

- F. Babič, Slovenia, 21.-23.02.2017
- J. Paralič, M. Vadovský, Z. Vantová, Czech Republic, 21.-24.02.2017
- P. Butka, Serbia, 19.-22.02.2017
- P. Butka, Hungary, 23.-25.02.2017
- J. Jadlovský, S. Jadlovská, D. Vošček, Switzerland, 20.-26.03.2017
- P. Sinčák, Hungary, 02.-04.03.2017
- P. Sinčák, Italy, 04.-11.03.2017
- M. Mikula, J. Mocnej, New Zealand, 01.01.-28.07.2017
- M. Mikula, Hungary, 15.-25.04.2017
- P. Butka, Great Britain, 05.-08.04.2017
- K. Machová, Hungary, 03.04.2017
- M. Miškuf, T. Lojka, E. Kájati, L. Pomšár, Czech Republic, 06.-09.04.2017
- P. Sinčák, Czech Republic, 01.-02.05.2017
- P. Sinčák, Hungary, 02.-05.05.2017
- D. Krokavec, Algeria, 06.-10.05.2017
- D. Krokavec, Czech Republic, 19-23.05.2017
- M. Oravec, J. Čabala, D. Vošček, Switzerland, 29.05-08.06.2017
- J. Jadlovský, S. Jadlovská, Switzerland, 31.05-08.06.2017
- D. Krokavec, Romania, 28.05-01.06.2017
- F. Babič, Spain, 03-05.07.2017
- K. Machová, Czech Republic, 30.05-01.06.2017
- F. Babič, Poland, 28.-30.06.2017
- J. Vaščák, Czech Republic, 19.06.2017
- P. Sinčák, Italy, 21.-23.06.2017
- S. Jadlovská, D. Vošček, Denmark, 20.-21.06.2017

- M. Miškuf, Great Britain, 23.06.-07.07.2017
- P. Butka, Czech Republic, 27.06.-02.07.2017
- P. Takáč, G. Magyar, Italy, 17.-23.07.2017
- F. Babič, Czech Republic, 03.-06.09.2017
- F. Babič, Greece, 18.-21.09.2017
- P. Sinčák, G. Magyar, Japan, China, 30.08.-25.09.2017
- P. Sabol, Japan, Canada, 19.09.-22.12.2017
- M. Miškuf, Great Britain, 04.-17.08.2017
- D. Krokavec, A. Filasová, Greece, 23.-28.08.2017
- J. Jadlovská, S. Jadlovská, A. Jadlovská, Switzerland, 30.08.-05.09.2017
- I. Zolotová, P. Papcun, Greece, 21.-28.08.2017
- M. Vadovský, Great Britain, 10.-13.09.2017
- D. Krokavec, Poland, 09.-14.09.2017
- P. Butka, Poland, 11.-13.09.2017
- M. Sarnovský, P. Butka, M. Muchová, Poland, 18.-19.09.2017
- J. Paralič, P. Butka, F. Babič, M. Mikula, M. Muchová, M. Smatana, M. Vadovský, Czech Republic, 04.-06.10.2017
- F. Babič, V. Gašpar, Hungary, 27.-29.09.2017
- P. Papcun, E. Kájati, Hungary, 20.-21.09.2017
- N. Ferenčík, USA, 01.10.-02.04.2017
- P. Butka, Bulgaria, 11.-15.10.2017
- P. Sinčák, M. Bundzel, Czech Republic, 04.-06.10.2017
- M. Smatana, Cypress, 19.-23.10.2017
- M. Miškuf, E. Kájati, Great Britain, 26.10.-06.11.2017
- P. Bednár, Netherlands, 08.-10.11.2017
- P. Sinčák, G. Magyar, Hungary, 08.-11.11.2017
- P. Sinčák, Hungary, 12.-13.11.2017
- J. Jadlovský, S. Jadlovská, L. Koska, J. Socháň, D. Vošček, Switzerland, 14.-24.11.2017
- D. Krokavec, Romania, 16.-19.11.2017
- P. Bednár, Belgium, 05.12.2017
- P. Sinčák, Czech Republic, 07.-09.12.2017

7 THESES

Thesis type	Bachelor	Master	Doctoral
Number	72	52	3

8 OTHER ACTIVITIES

- SAMI 2017 (IEEE 15th International Symposium on Applied Machine Intelligence and Informatics) was held on January 26-28, 2017 in Herl'any, Slovakia: http://conf.uni-obuda.hu/sami2017/
- WIKT 2017 - 12th Workshop on Intelligent and Knowledge oriented Technologies 2017 was held on November 30 - December 1, 2017 in Košice, Slovakia: http://web.tuke.sk/fei-cit/wikt2017/

9 PUBLICATIONS

9.1. Books

[1] KROKAVEC, Dušan - FILASOVÁ, Anna: Generalized ratio control of discrete-time systems. - ISBN 9789535130154. In: Dynamical Systems: Analytical and Computational Techniques. - Rijeka: InTech, 2017, - ISBN 9789535130154 P. 77-99. - ISSN 978-953-51-3015-4

[2] KROKAVEC, Dušan - FILASOVÁ, Anna - LIŠČINSKÝ, Pavol: Enhanced principles in design of adaptive fault observers. In: Fault Diagnosis and Detection. - Rijeka: InTech, 2017 P. 53-86. - ISBN 978-953-51-3203-5

[3] KROKAVEC, Dušan - FILASOVÁ, Anna: Stabilizing fuzzy control via output feedback. In: Modern Fuzzy Control Systems and Its Applications. - Croatia: InTech, 2017 P. 4-25. - ISBN 978-953-51-3390-2

[4] BUNDZEL, Marek: Počítačové videnie v praxi s využitím Emgu CV / - 1. vyd - Košice: TU - 2017. - 134 s. - ISBN 978-80-55-3171-3.

[5] BEDNÁR, Peter - SARNOVSKÝ, Martin: Technológie spracovania veľkých dát Návody na cvičenia/ - 1. vyd - Košice: Technická univerzita - 2017. - 91 s. - ISBN 978-80-553-2832-4.

9.1 Journals

[1] MLS, Karel - CIMLER, Richard - VAŠČÁK, Ján - PUHEIM, Michal: Interactive evolutionary optimization of fuzzy cognitive maps, 2017. In: Neurocomputing. Vol. 232 (2017), p. 58-68. - ISSN 0925-2312

[2] ANDOGA, Rudolf - FŐZŐ, Ladislav: Near magnetic field of a small turbojet engine, 2017. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 1117-1119. - ISSN 0587-4246

[3] ADAM, J. - ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - ČERKALA, Jakub - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - PAPCUN, Peter: Charged-particle multiplicities in proton-proton collisions at root s=0.9 to 8 TeV, 2017. In: European Physical Journal C. Vol. 77, no. 1 (2017), p. 1-39. - ISSN 1434-6044

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[5] ADAM, J. - ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, G. - AGNELLO, M. - ČABALA, Ján - ČERKALA, Jakub - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik: Determination of the event collision time with the ALICE detector at the LHC, 2017. In: European Physical Journal Plus. Vol. 132, no. 2 (2017), p. 1-17. - ISSN 2190-5444

[6] ADAM, J. - ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - ČABALA, Ján - ČERKALA, Jakub - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej: JPsi suppression at forward rapidity in Pb-Pb collisions at root s(NN)=5.02 TeV, 2017. In: Physics Letters B. Vol. 766 (2017), p. 212-224. - ISSN 0370-2693

[7] ADAM, J. - ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej: Measurement of azimuthal correlations of D mesons with charged particles in pp collisions at root s=7 TeV and p-Pb

collisions at root S(NN)=5.02 TeV, 2017. In: European Physical Journal C. Vol. 77, no. 4 (2017), p. 1-24. - ISSN 1434-6044

[8] ADAM, J. - ADAMOVA, D. - AGGARWAL, A. - AGLIERI RINELLA, M.M. - AGNELLO, M. - ČABALA, Ján - ČERKALA, Jakub - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VAĽA, Martin - VOŠČEK, Dominik: Flow Dominance and Factorization of Transverse Momentum Correlations in Pb-Pb Collisions at the LHC, 2017. In: Physical Review Letters. Vol. 118, no. 16 (2017), p. 162302-1-162302-12. - ISSN 0031-9007

[9] ADAM, J. - ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - ČERALA, Jakub - JADLOVSKÁ, Slávka - KOPČÍK, Michal - PAPCUN, Peter: phi-Meson production at forward rapidity in p-Pb collisions at root s(NN)=5.02 TeV and in pp collisions at root s=2.76 TeV, 2017. In: Physics Letters B. Vol. 768 (2017), p. 203-217. - ISSN 0370-2693

[10] ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - AGRAWAL, N. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VAĽA, Martin - VOŠČEK, Dominik: Azimuthally Differential Pion Femtoscopy in Pb-Pb Collisions at root s(NN)=2.76 TeV, 2017. In: Physical Rview Letters. Vol. 118, no. 22 (2017), p. 222301-1-222301-12. - ISSN 0031-9007

[11] ADAM, J. - ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - ČABALA, Ján - ČERKALA, Jakub - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: K*(892)(0) and phi(1020)meson production at high transverse momentum in pp and Pb-Pb collisions at root sNN=2.76 TeV, 2017. In: Physical Review C. Vol. 95, no. 6 (2017), p. 064606-1-064606-18. - ISSN 2469-9985

[12] ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - AGRAWAL, N. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Production of Sigma(1385)(+-) and Xi(1530)(0) in p-Pb collisions at root s(NN)=5.02 TeV, 2017. In: European Physical Journal C. Vol. 77, no. 6 (2017), p. 389-406. - ISSN 1434-6044

[13] ACHARYA, S. - ADAMOVA, D. - AGGARWAL, M.M. - AGLIERI RINELLA, A. - AGNELLO, M. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Energy dependence of forward-rapidity Jpsi and psi (2S) production in pp collisions at the LHC, 2017. In: European Physical Journal C. Vol. 77, no. 6 (2017), p. 1-26. - ISSN 1434-6044

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[16] ACHARYA, S. - ADAMOVA, D. - ADOLFSSON, J. - AGGARWAL, MM. - RINELLA, A. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján -

KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Linear and non-linear flow mode in Pb-Pb collisions at root sNN=2.76 TeV, 2017. In: Physics Letters B. Vol. 773 (2017), p. 68-80. - ISSN 0370-2693

[17] ADAM, J. - ADAMOVA, D. - AGGARWAL, M.M. - RINELLA, GA - AGNELLO, M. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Centrality dependence of the pseudorapidity density distribution for charged particles in Pb-Pb collisions at root s(NN)=5.02 TeV, 2017. In: Physics Letters B. Vol. 772 (2017), p. 567-577. - ISSN 0370-2693

[18] ADAM, J. - ADAMOVA, D. - AGGARWAL, MM. - RINELLA, GA - AGNELLO, M. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Evolution of the longitudinal and azimuthal structure of the near-side jet peak in Pb-Pb collisions at root s(NN)=2.76 TeV, 2017. In: Physical Review C. Vol. 96, no. 3 (2017), p. 1-18. - ISSN 2469-9985

[19] ADAM, J. - ADAMOVA, D. - AGGARWAL, MM. - RINELLA, GA - AGNELLO, M. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik: Anomalous Evolution of the Near-Side Jet Peak Shape in Pb-Pb Collisions at root S-NN=2.76 TeV, 2017. In: Physical Review Letters. Vol. 119, no. 10 (2017), p. 1-13. - ISSN 0031-9007

[20] ACHARYA, S. - ADAMOVA, D. - ADOLFSSON, J. - AGGARWAL, MM. - RINELLA, GA - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Searches for transverse momentum dependent flow vector fluctuations in Pb-Pb and p-Pb collisions at the LHC, 2017. In: Journal of High Energy Physics. Vol. 2017, no. 9 (2017), p. 1-32. - ISSN 1029-8479

[21] ADAM, J. - ADAMOVA, D. - AGGARWAL, MM. - RINELLA, G. Aglieri - AGNELLO, M. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Insight into particle production mechanisms via angular correlations of identified particles in pp collisions at root s=7 TeV, 2017. In: European Physical Journal C. Vol. 77, no. 8 (2017), p. 1-17. - ISSN 1434-6052

[22] ACHARYA, S. - ADAMOVA, D. - AGGARWAL, MM. - RINELLA, G.Aglieri - AGNELLO, M. - ČABALA, Ján - JADLOVSKÁ, Slávka - JADLOVSKÝ, Ján - KOPČÍK, Michal - ORAVEC, Matej - VOŠČEK, Dominik - VAĽA, Martin: Measurement of D-meson production at mid-rapidity in pp collisions at root s=7 TeV, 2017. In: European Physical Journal C. Vol. 77, no. 8 (2017), p. 1-21. - ISSN 1434-6052

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Production of pi(0) and eta mesons up to high transverse momentum in pp collisions at 2.76 TeV, 2017. In: European Physical Journal C. Vol. 77, no. 5 (2017), p. 1-25. - ISSN 1434-6044

[26] VADOVSKÝ, Michal - PARALIČ, Ján: Data collection methods for the diagnosis of parkinson's disease, 2017. In: International Journal on Biomedicine and Healthcare. Vol. 5, no. 1 (2017), p. 28-32. - ISSN 1805-8698

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[28] PAPCUN, Peter - KAJÁTI, Erik - ZOLOTOVÁ, Iveta: IoT and cloud technology in residential and business premises as ubiquitous computing, 2017. In: International Journal of Internet of Things and Web Services. Vol. 2 (2017), p. 96-105. - ISSN 2367-9115

[29] KROKAVEC, Dušan - FILASOVÁ, Anna: Interposed control design conditions for linear discrete-time systems, 2017. In: International Journal of Mathematics and Computers in Simulation. Vol. 11 (2017), p. 45 - 50. - ISSN 1998-0159

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[37] ORAVEC, Matej - JADLOVSKÁ, Anna: Sensors fault diagnosis algorithm design of a hydraulic system, 2017. In: Acta Electrotechnica et Informatica. Roč. 17, č. 2 (2017), s. 30-37. - ISSN 1335-8243

[38] ČABALA, Ján - JADLOVSKÝ, Ján: Solving optimal assembly line configuration task by multi-objective decision making methods, 2017. In: Acta Electrotechnica et Informatica. Roč. 17, č. 2 (2017), s. 53-60. - ISSN 1335-8243

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[41] KOPČÍK, Michal - JADLOVSKÝ, Ján: Embedded Control System for Mobile Robots with Differential Drive, 2017. In: Acta Electrotechnica et Informatica. Roč. 17, č. 3 (2017), s. 42-47. - ISSN 1335-8243
[42] JADLOVSKÝ, Ján - JADLOVSKÁ, Anna - JADLOVSKÁ, Slávka - ČERKALA, Jakub - KOPČÍK, Michal - ČABALA, Ján - ORAVEC, Matej - VARGA, Michal - VOŠČEK, Dominik: Modelovanie, diagnostika a optimalizácia výrobných liniek, 2017. In: Strojárstvo. Roč. 21, č. 11 (2017), s. 104-106. - ISSN 1335-2938
[43] JADLOVSKÁ, Anna - JADLOVSKÝ, Ján - JADLOVSKÁ, Slávka - ČERKALA, Jakub - KOPČÍK, Michal - ČABALA, Ján - ORAVEC, Matej - VARGA, Michal - VOŠČEK, Dominik - TKÁČIK, Milan - BŘEZINA, Adam: Návrh metodiky pre modelovanie, riadenie, simuláciu a nedeštruktívnu diagnostiku mobilných robotov, 2017. In: Strojárstvo / Strojírenství. (2017), s. 1-10. - ISSN 1335-2938.
[44] FŐZŐ, Ladislav - ANDOGA, Rudolf - BENEDA, Károly - KOLESÁR, Ján: Effect of operating point selection on non-linear experimental identification of iSTC-21v and TKT-1 small turbojet engines, 2017. In: Periodica Polytechnica Transportation Engineering. Vol. 45, no. 3 (2017), p. 141-147. - ISSN 0303-7800
[45] ČERKALA, Jakub - JADLOVSKÁ, Anna: Application of neural models as controllers in mobile robot velocity control loop, 2017. In: Journal of Electrical Engineering. Roč. 68, č. 1 (2017), s. 39-46. - ISSN 1335-3632

9.2 Other publications

Publication Type	Confereces		Other
	Foreign	Home	
Number	18	39	21

DEPARTMENT OF ELECTRICAL ENGINEERING AND MECHATRONICS

ANNUAL REPORT 2017

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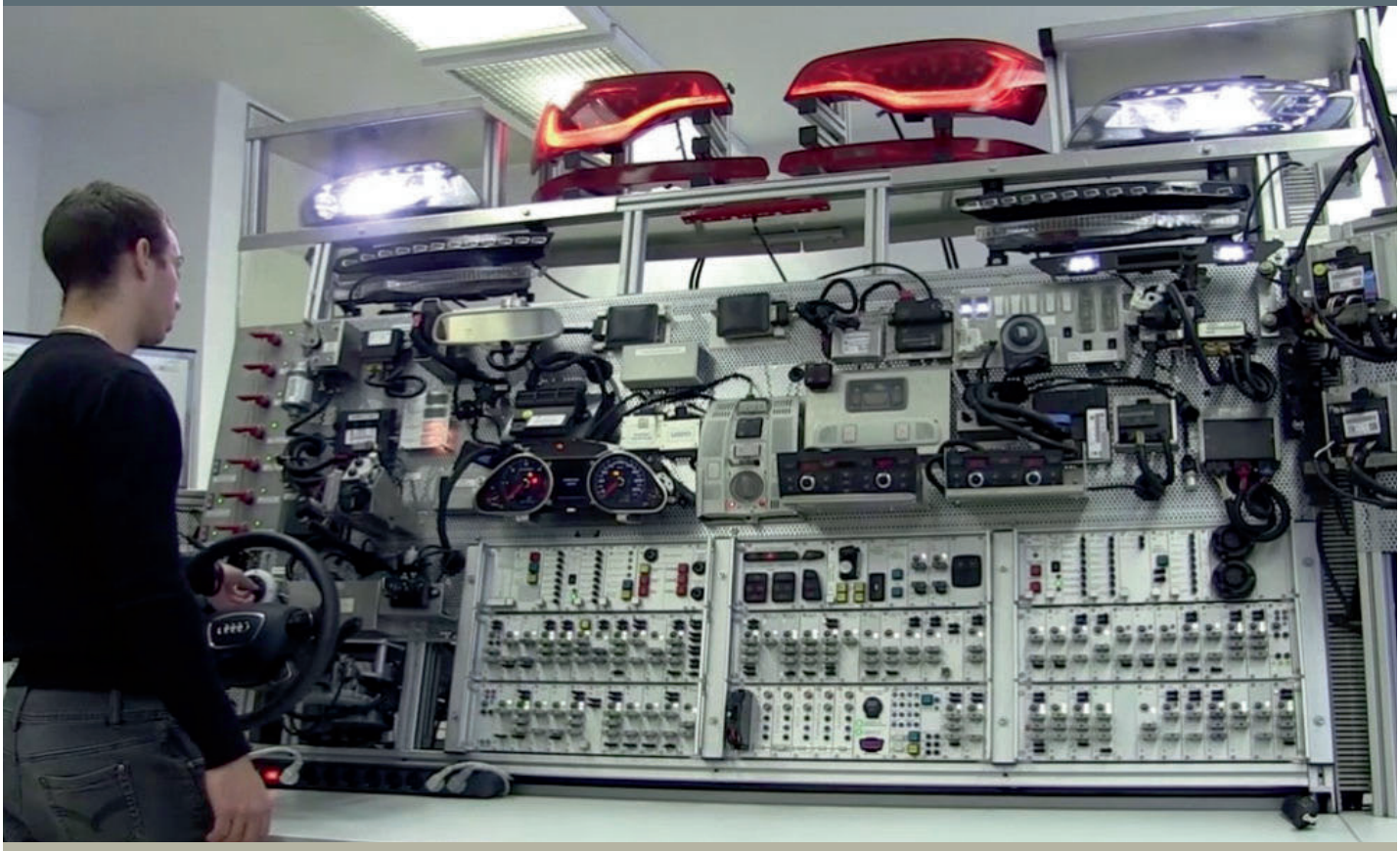

The Department was established at foundation of the Faculty of Electrical Engineering in 1969 as the Department of Electrical Drives but originally it was derived from the Department of Electrical Egineering established at foundation of the Technical University of Kosice (1953). Through the years the name of the department was changed in order to express closier 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 systems 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, industrial and automotive mechatronic systems up to drives of robots.
The Department offers all types of university courses: bachelor, master and Ph.D. courses.

2 STAFF

Professors:	prof. Ing. Jaroslav Dudrik, PhD. prof. Ing. Pavol Fedor, PhD. prof. Ing. Daniela Perduková, PhD. prof. Ing. Pavel Záskalický, PhD.
Associate Professors:	doc. Ing. František Ďurovský, PhD. doc. Ing. Viliam Fedák, PhD. doc. Ing. Želmíra Ferková, PhD. doc. Ing. Michal Girman, PhD. doc. Ing. Jaroslava Žilková, PhD.
Assistant Professors:	Ing. Ján Bačík, PhD. Ing. Peter Bober, PhD. Ing. Peter Girovský, PhD. Ing. Ján Kaňuch, PhD. Ing. Karol Kyslan, PhD. Ing. Milan Lacko, PhD. Ing. Marek Pástor, PhD.
Senior Scientists:	Ing. Peter Hajsák Ing. Viktor Šlapák, PhD.
Technical Staff:	Ing. Gabriela Brečková Zuzana Olexová doc. Ing.Michal Kostelný, CSc. prof. Ing. Jaroslav Timko, CSc.
Full time Ph.D. Students:	Ing. Milan Biroš Ing. Martin Lešo Ing. Ľuboš Suchý Ing. Peter Talian Ing. Róbert Üveges Ing. Róbert Žatkovič

3 LABORATORIES

- Laboratory of Electrical Engineering
- Power Electronics Laboratory
- Laboratory for CAD (COSMOS, ProEngineer, MATLAB, PSpice, and applied SW, ABBRobotStudio)
- Laboratory of Industrial Automation
- Laboratory of Electrical Machines
- Laboratory of Electrical Drives
- Laboratory of Controlled Electrical Drives and Mechatronics
- Laboratory of Automotive Mechatronics
- Laboratory of Pneumatic and Hydraulic Systems
- Virtual Laboratory of Technological Processes Control by Programmable Logic. www.virtual.laboratory.kempi.fei.tuke.sk
- Virtual Laboratory of Mechatronic Systems Control: http://andromeda.fei.tuke.sk

4 TEACHING

4.1. Undergraduate Study (Bc.)

a) Bc. study programme in Automated Electrical Systems

Subject	Semester	Lectures/exercises (hours per week)	Lecturer
Fundamentals of Electrical Engineering	1st	2/2	Kaňuch
Computer Applications	3th	2/2	Perduková
Electrical Machines	3rd	2/2	Záskalický
Electrotechnics in Vehicles	3th	2/2	Ďurovský
Industrial Electronics	3th	2/2	Záskalický
Electrical Drives	4th	2/2	Žilková
Microprocessor Technique	3rd	2/2	Lacko
CAD Programs in Electrical Engineering	4th	2/2	Fedák
Power Electronics	4th	3/3	Dudrik
Sensors and Measurement of Nonelectrical Variables	4th	2/2	Girovský
Industrial Control Systems	4th	2/2	Fedor
Bachelor Thesis I.	5th	0/8	Supervisor
Simulation of Production Systems	5th	2/2	Bober
Controlled Electrical Drives	5th	2/2	Ďurovský
ManMachine Interface	5th	2/2	Peduková
Bachelor Project	5th	0/8	Supervisor
Bachelor Thesis II.	6th	0/8	Supervisor
Modeling of Electromechanical Systems	6th	2/2	Fedák
Projecting of Electrical Systems	6th	2/2	Ferková
Pneumatic and Hydraulics Drives	6th	2/2	Bober

4.2. Graduate Study (Ing.)

a) Ing. study programme in Electrical Systems

Subject	Semester	Lectures/exercises (hours per week)	Lecturer
Power Semiconductor Systems	7th	2/2	Dudrik
Non-linear Electro-Mechanical Systems	7th	2/2	Fedor

Servosystems	7th	2/2	Ďurovský
Dynamic Phenomena of Electrical Machines	7th	2/2	Záskalický
Electrical Machines for Automation	7th	2/2	Ferková
Technology of Production in Electronics	7th	2/2	Slosarčík
Vehicle Mechatronics	8th	2/2	Ďurovský
Construction and Design of Converters	8th	2/2	Dudrik
Control of Assembly Lines with Programming Controllers	8th	2/2	Fedor
Statistical Process Control	8th	2/2	Bober
Diploma Project	8th	0/4	Supervisor
Robotics	8th	2/2	Žilková
Diploma Project II	9th	0/6	Supervisor
Mechatronic Production Systems	9th	2/2	Ďurovský
Intelligent Control in EI Systems	9th	2/2	Žilková
Three-Dimensional Modelling and Simulation	9th	2/2	Ferková
Signal Processors	9th	2/3	Lacko
Technology of Production in Electrotechnics	9th	2/2	Girman
Diploma Thesis	10th	0/18	Supervisor

4.3. Undergraduate and Graduate Study for Foreign Students (in English)

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

4.4. Ph.D Postgraduate Course on Electrical Systems

Subject	Semester	Lectures/exercises (hours per week)	Lecturer
Power Electronics	1st	2/0	Dudrik
Ph.D. Project I	1st	0/2	Supervisor
Foreign Language I	1st	2/0	Dept. of Foreign Languages
Servosystems	2nd	2/0	Fedor
Ph.D. Project II	2nd	0/2	Supervisor
Foreign Language II	2nd	2/0	Dept. of Foreign Languages
Ph.D. Project III	3rd	0/4	Supervisor
Subject of Specialization	3rd	2/0	According to the subject
Scientific Activity	3rd	0/8	Supervisor
Ph.D. Project IV	4th	0/2	Supervisor
Scientific Activity	4th	0/8	Supervisor
Ph.D. Project IV	5th	0/2	Supervisor
Scientific Activity	5th	0/8	Supervisor
Ph.D. Thesis	5th	0/9	Supervisor

5 RESEARCH PROJECTS

- *Research of New Principles and Methods for Design of Electrotechnical Systems.* Project VEGA 1/0464/15 Scientific Grant Agency of the Ministry of Education, science, research and sport of the Slovak Republic and the Slovak Academy of Sciences. Principal investigator: DUDRIK, J. (2015-2018).
- *Electrical Drive with Highfrequency 2-phase Induction Motor.* Project VEGA 2/0192/15. Scientific Grant Agency of the Ministry of Education, science, research and sport of the Slovak Republic and the Slovak Academy of

Sciences. Principal investigator: ZASKALICKÝ, P. (2015-2018)

- *Modular power converter for compact actuators with high precision gears*. Project supported by the Slovak Research and Development Agency under the contract No. APVV-15-0750. Principal investigator: ĎUROVSKÝ, F. (2016-2020).
- *Modular Development System for Control of Power Plant Units based on DCS.* Project supported by the Slovak Research and Development Agency under the contract No. APVV-16-0206. Principal investigator: FEDOR, P. (2017-2020).
- *Smart Drive with Five-Phase Asynchronous Motor.* Project supported by the Slovak Research and Development Agency under the contract No. APVV-16-0270. Principal investigator: : ZASKALICKÝ, P. (2017-2021).
- *Inteligent Mobile Robot*. Grant FEI-2015-20: Principal investigator: BAČÍK, J. (2017).

6 CO-OPERATION

6.1. 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, BWG Prešov, Křižík Prešov, Schneider Electric Slovakia, Spell Procont Prešov, Spinea Prešov, Vonsch Brezno, Kybernetika Košice, TEKO Košice, ENERGO CONTROL Košice, ZŤS VVU Košice, ŽP Podbrezová, Bukóza Hencovce, Genesis Prešov, Embraco Slovakia Spišská Nová Ves, Kopex Košice, Slovak Union for Quality, Innovation and Design Q-IMPULZ, Košice, SEZ Krompachy, DATAKON Košice, SLOVRES Košice, STATON Turany, CAG Český Brod (ČR).

6.2. 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
- Széchenyi István University, Győr, Hungary
- Delft University of Technology, The Netherlands
- Czech Academy of Science, Prague.
- Silesian Polytechnic Institute of Gliwice
- University of Oradea, Romania
- University of Maribor, Slovenia
- University of Zagreb, Croatia
- University of Novi Sad, Serbia

6.2.1. Visits of Staff Members to Foreign Institutions

- BAČÍK, J., BIROŠ, M.: B&R Corporate, 4th European Industrial Ethernet Award 2016/2017, Award ceremony, Eggelsberg, (AT), 20th October 2017
- BAČÍK, J., BIROŠ, M., TALIAN, P.: Ampér 2017, 25th Inernational Trade of Electrotechnics, Electronics, Automation, Communication Lightining and

Security Technologies, Brno, (CZ), 21-24 March 2017
- BOBER, P., ŠLAPÁK, V.: Hilscher (DE), 24-28 September 2017
- FEDÁK V.: (1) Garchinger Technologie- und Gründerzentrum GmbH and (2) ITQ GmbH – in framework of the project coordinator meeting - the project NUCLEI, No CE318, Muenchen, Germany, 27-28 June 2017.
- FEDÁK V.: GOLDEN AMPER 2017 – a competition for the most beneficial showpieces of the 25th Int.Trade Fair of Electrotechnics, Electronics, Automation, Comunication…, Brno, – evaluation committee member, 20-23 March, 2017.
- FEDÁK, V., KYSLAN, K., ZÁSKALICKÝ, P.: Joint International Conference OPTIM-ACEMP 2017, Brasov, Romania, 25-27 May 2017.
- FEDÁK, V., FERKOVÁ, Ž., KYSLAN, K., SUCHÝ L., ŠLAPÁK, V., ÜVEGES, R., ŽATKOVIČ, R.: 19th International Conference on Electrical Drives and Power Electronics, Dubrovnik 2017, Dubrovnik (HR), 4-6 October 2017.
- FERKOVÁ, Ž.: VUT Brno (CZ), January 2017.
- FERKOVÁ, Ž.: Technical Universtity of Liberec (CZ), April 2017.
- FERKOVÁ, Ž.:University of West Behemia, Plzeň (CZ), 2017
- Ferková,Ž: Sympozium SME, Lublin (PL), June 2017
- FERKOVÁ, Ž.: TechSoft Engineering Praha (CZ), December 2017
- FERKOVÁ, Ž.: ČVUT Praha, General meeting of Czechoslovakia section IEEE (CZ), December 2016.
- KAŇUCH, J.: KOMEL 2017, Katowice (PL), May 2017
- KAŇUCH, J.: VŠB-TU Ostrava (CZ), September 2017
- KYSLAN, K: University of Novi Sad, Serbia, 7.October – 8.November 2017 (1 month), ERASMUS Academic Staff Mobility

6.3. Membership in International Organizations, Societies and Committees

- FEDÁK, V; KYSLAN, K: Chairmen of EDPE 2017 conferences, Dubrovnik, Croatia
- FEDÁK, V.: Vicechairman of the PEMC Council (Power Electronics and Motion Control) with the headquarters in Budapest.
- FEDAK, V.: Vicechairman of the 19th International Conference on Electrical Drives and Power Electronics, Dubrovnik 2017, Dubrovnik, 4-6 October 2017.
- FEDÁK, V.: Vicechairman of the PEMC Council (Power Electronics and Motion Control) with the headquarters in Budapest.
- DUDRIK, J; FERKOVÁ, Ž, KYSLAN: IEEE members.
- PERDUKOVÁ, D.: member of Programme Committee: 12th International Conference on Soft Computing Models in Industrial and Environmental Applications – SOCO 2017, Leon, Spain, 6-8 September, 2017.
- PERDUKOVÁ, D.: member of International Scientific Committee: the 9th International Scientific Symposium on Electrical Power Engineering, Stará Lesná, Slovakia, 12-14 September, 2017

6.4. Membership in Slovak Professional Bodies

- FEDÁK, V.; KAŇUCH, J.; TIMKO, J.; ZÁSKALICKÝ, P.; FEDOR, P.; FERKOVÁ, Ž.; GIROVSKÝ, P.; HAJSÁK, 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 SR.

- PERDUKOVÁ, D.: member of Accreditation Commission working group for research in Electrical and Power Engineering.
- PERDUKOVÁ, D.: Council of the Secondary Technical School for EE, Košice (delegate of the FEI TU Košice).
- KOVÁČOVÁ, I., (chairman), DUDRIK, J., GIRMAN, M., PERDUKOVÁ, D., ZÁSKALICKÝ, P.: members of board for the PhD. Study in Electrical Systems at FEI TU Košice.

6.5. National Educational Projects

- *New Technologies in Education of Mechatronics.* Grant of Tatra Banka Foundation, Principal investigator: KYSLAN, K. (2017)

6.6. Editorial Boards

- BOBER, P. Editorial board of journal "Quality, Innovation, Prosperity" (Kvalita, Inovácia, Prosperita), ISSN 1335-1745 (print), ISSN 1338-984X (online).
- 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.
- DUDRIK, J.: International Editorial Board of Power Electronics and Drives, Wroclaw, Poland, ISSN: 2451-0262, eISSN: 2543-4292.
- FEDÁK, V.: Editorial board of the Journal "Przeglad Elektrotechniczny" (Polish Academy of Sciences, Warsszaw), 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", Wroclaw, Poland, ISSN 2543-4292
- PERDUKOVÁ, D.: Editorial board of Elektroenergetika journal, ISSN 1337-6756.
- PERDUKOVÁ, D.; FEDÁK, V.; DUDRIK, J.; ĎUROVSKÝ, F.; FEDOR, P.; GIROVSKÝ, P.; LACKO, M.; KYSLAN, K.; PÁSTOR, M.: Editorial board of Elektrotechnické listy, ISSN 2453-8981
- ZÁSKALICKÝ, P.: Editorial board of Acta Technica CSAV. Journal of Czech Academy of Sience, Praque. Czech Republic. ISSN 0001-7043.
- ZÁSKALICKÝ, P.: Editorial board of KOMEL, Branzowy osrodek badavczo-rozwojovy Maszyn elektrycznych, Katowice, Poland. ISSN 0239-3646.

7. THESESDefened Ph.D. Theses in 2017

- MAGURA, D.: *Dynamic Control of Strip Tensions in in a Contrinuous Strip-Processing Line.* Supervisor: Fedák, V.

Thesis type	Bachelor	Master	Doctoral
Number	20	17	1

8 OTHER ACTIVITIES

8.1. Symposia, Workshops, Conferences

8.2. Projects for Industry

- *Calculation of magnetic field of ARC cathode*. For STATON , s.r.o. Turany. Co-ordinator: Ferková, Ž.
- *Electromagnetic design of rotors for 3-phase reluctance motors.* For CAG Electric Machinery, Český Brod. Co-ordinator: Ferková, Ž.
- *Electromagnetic design of rotor geometry for 3-phase synchronous reluctance motors.* For CAG Electric Machinery, Český Brod. Co-ordinator: Ferková, Ž.
- *Training on Sinamics S120 power converters*. For Siemens Slovakia. Co-ordinator: Lacko, M.
- *Robot analysys.* For Spinea Technologies, Prešov. Co-Ordinator: Kyslan, K.
- *Interface for reading the status of the Body control unit via an OBD connector. Test stand for Thorep control units.* For ROŠERO-P, s.r.o. Spišská Nová Ves. Co-ordinator: Bober, P.

8.3. Student Competitions and Rewards

- BAČÍK Ján, BIROŠ,M.: The European Industrial Ethernet Powerlink Award 2017, 2nd place, Eggelsberg (Austria), 20 October 2017
- BAČÍK Ján, BIROŠ, M., TALIAN,P.: ProEduco Awards 2017: (29 November 2017) 11th International Trade Fair on Education, Košice
- ŽATKOVIČ Róbert: SCYR 2017 (16 May 2017) – Award of SES branch company for the EEE section "3nd year PhD students".
- ŽATKOVIČ Róbert: TUKE Research Days Award, 1st place, 6 November 2017, Košice

8.4. Compositions for Dissertation Examinations

- SUCHÝ, Ľ.: *Optimization of Switch Reluctance Motor Drive and Possibilities of Torque Ripple reduction*. Supervisor: Ferková, Ž.
- ÜVEGES, R.: *Control of Robotic Platform in an Unknown Environment*. Supervisor: Ďurovský, F.

9 PUBLICATIONS

9.1. Books

[1] FEDOR Pavol., PERDUKOVÁ Daniela.: *Use of fuzzy logic for design and control of nonlinear MIMO systems*. The book: Modern Fuzzy control systems and Its Applications. IN TECH, 2017, p. 377-397. ISBN 978-953-51-3390-2. DOI: 10.5772/65834

9.2. Textbooks

[1] FEDOR, Pavol - PERDUKOVÁ, Daniela: **Riadiace systémy s programovateľnými automatmi.** 1.vyd. Košice: TU. 2017. 215 s. ISBN 978-80-553-2812-6.

[2] KAĽAVSKÝ, Michal - FERKOVÁ, Želmíra - GIRMAN, Michal: **Riadenie pohybu mobilných zariadení.** 1. vyd. Košice : TU . 123 s. ISBN 978-80-553-1461-7.

[3] ZÁSKALICKÝ, Pavel - KAŇUCH, Ján: **Zbierka riešených príkladov z elektrických strojov.** 1. Transformátory. 1.vyd. Košice: Technická univerzita.

2017. 47 s. [CD-ROM]. ISBN 978-80-553-3187-4.

9.3. Scientific Journals

Journals indexed in Thomson Reuters "Current Contents" database

[1] DUDRIK, Jaroslav - PÁSTOR, Marek - LACKO, Milan - ŽATKOVIČ, Róbert: **High-Frequency Soft-Switching PWM DC-DC Converter with Active Output Rectifier Operating as a Current Source for Arc Welding Applications.** In: Electric Power Components and Systems. Vol. 45, no. 6 (2017), p. 681-691. - ISSN 1532-5008. Spôsob prístupu: *http://www.tandfonline.com/doi/full/10.1080/15325008.2017.1291770*.

[2] BALARA, Dušan - TIMKO, Jaroslav - ŽILKOVÁ, Jaroslava - LEŠO, Martin: **Neural networks application for mechanical parameters identification of asynchronous motor.** In: Neural Network World. Vol. 27, no. 3 (2017), p. 259-270. - ISSN 1210-0552.

[3] BAČÍK, Ján ml. - ĎUROVSKÝ, František - FEDOR, Pavol - PERDUKOVÁ, Daniela: **Autonomous flying with quadrocopter using fuzzy control and ArUco markers.** In: Intelligent Service Robotics. Vol. 10, no. 3 (2017), p. 185-194. - ISSN 1861-2776.

[4] PERDUKOVÁ, Daniela - FEDOR, Pavol - BAČÍK, Ján ml. - HERČKO, Jozef - ROFÁR, Ján: **Multi-motor drive optimal control using a fuzzy model based approach.** In: Journal on Ambient Intelligence and Smart Environments. Vol. 9, no. 3 (2017), p. 329-344. - ISSN 1876-1364.

[5] OZSOY, Emre - SANJEEVIKUMAR, Padmanaban - MIHET-POPA, Lucian - FEDÁK, Viliam - AHMAD, Fiaz - AKHTAR, Rasool - SABANOVIC, Asif: **Control strategy for a grid-connected inverter under unbalanced network conditions—a disturbance observer-based decoupled current approach.** In: Energies. Vol. 10, no. 7 (2017), p. 1 až 17. - ISSN 1996-1073: Spôsob prístupu: *https://apps.webofknowledge.com/full_record.do?product=CCC&search_mode=GeneralSearch&qid=1&SID=V1EeVMCoG6LFayxizkK&page=1&doc=1*.

[6] ZÁSKALICKÝ, Pavel: **Mathematical model of a five-phase voltage-source PWM-controlled inverter**. In: Electrical Engineering. Vol. 99, no. 4 (2017), p. 1179-1184. - ISSN 0948-7921.

[7] KYSLAN, Karol - RODIČ, Miran - SUCHÝ, Ľuboš - FERKOVÁ, Želmíra - ĎUROVSKÝ, František: **Industrial controller-based dynamometer with dynamic emulation of mechanical loads.** In: Electrical Engineering. Vol. 99, no. 4 (2017), p. 1245-1254. - ISSN 0948-7921 Spôsob prístupu: *https://link.springer.com/article/10.1007/s00202-017-0626-z*.

Foreign Journals

[1] BOBER, P: **On-line optimalizácia komutačných uhlov prúdu vo fázach BLDC motora**. In: Elektro. Roč. 27, č. 11 (2017), s. 11-13. ISSN 1210-0889

[2] KAŇUCH, Ján: **Direct drive of electric wheelchair with double disk BLDC motor.** In: Maszyny elektryczne - Zeszyty problemove. Vol. 114, no. 2 (2017), p. 77-83. ISSN 0239-3646.

[3] ZÁSKALICKÝ, Pavel: **Electromagnetic torque calculation of idnudction motor working under one phase failure.** In: Maszyny Elektryczne - Zeszyty Problemowe. Vol. 113, no. 1 (2017), p. 161-165. ISSN 0239-3646.

[4] DOBRUCKÝ, Branislav - ZÁSKALICKÝ, Pavel - PAVLÁSEK, Pavel: **Control of hybrid and electrical vehicle with five-phase AC motor.** In: Autobusy: Technika, Eksploatacja, Systémy Transportowe. No. 6 (2017), p. 1191-1195.

ISSN 1509-5878.

[5] ZÁSKALICKÝ, Pavel: **Torque ripple calculation of two-phase IM supplied by three-leg VSI inverter** / Pavel Záskalický. In: Maszyny elektryczne: Zeszyty problemowe. Vol. 115, no. 3 (2017), p. 13-17. - ISSN 0239-3646

Foreign Journals indexed in Web of Science or Scopus databases

[1] BIROŠ, Milan - KYSLAN, Karol - ĎUROVSKÝ, František: **Optimization of hybrid vehicle drivetrain with genetic algorithm using matlab and advisor.** In: Journal Of Engineering Science and Technology Review. Vol. 10, no. 3 (2017), p. 35-40. - ISSN 1791-2377.

[2] BOROVSKÝ, Tomáš - KYSLAN, Karol - ĎUROVSKÝ, František: **Material tracking with dynamic torque adaptation for tension control in wire rod mill.** In: Advances in Electrical and Electronic Engineering. Vol. 15, no. 2 (2017), p. 176-183. - ISSN 1336-1376. Spôsob prístupu: *http://advances.utc.sk/index.php/AEEE/article/viewFile/2139/1227*.

[3] KAŇUCH, Ján - GIROVSKÝ, Peter: **Motor for direct drive of electric wheelchair.** In: International Journal of Engineering Research in Africa. Vol. 31 (2017), p. 94-103. - ISSN 1663-3571.

[4] FERKOVÁ, Želmíra - KINDL, Vladimír: **Influence of skewed squirrel cage rotor with intermediate ring on magnetic field of air gap in induction machine.** In: Elektronika ir Elektrotechnika. Vol. 23, no. 1 (2017), p. 26-30. - ISSN 1392-1215. Spôsob prístupu: *http://eejournal.ktu.lt/index.php/elt/article/view/17580*.

National Journals indexed in Web of Science or Scopus databases

National Journals

[1] BAČÍK, Ján ml.: **Grafické rozhranie pre ovládanie helikoptéry T-Rex 600.** In: Elektrotechnické listy. Roč. 2, č. 1 (2017), s. 1-3. ISSN 2453-8981. Spôsob prístupu: *http://elektrotechnickelisty.eu/casopis/rocnik_II/clanky/EL_01_2017.pdf*.

[2] KAŇUCH, Ján: **Vplyv vyšších harmonických na prúd cez nulový pracovný vodič.** In: Elektrotechnické listy. Roč. 2, č. 1 (2017), s. 1-6. ISSN 2453-8981. Spôsob prístupu: *http://www.elektrotechnickelisty.eu/casopis/rocnik_II/clanky/EL_03_2017.pdf*.

[3] GIROVSKÝ, Peter - SIVÝ, Radovan: **Master-Slave riadenie robotických ramien.** In: Elektrotechnické listy. Roč. 2, č. 1 (2017), s. 1-4. ISSN 2453-8981. Spôsob prístupu: *http://www.elektrotechnickelisty.eu/casopis/rocnik_II/clanky/EL_02_2017.pdf*.

[4] DUDRIK, Jaroslav: **ZVZCS PWM DC-DC menič s rekuperačnou odľahčovacou sieťou.** In: Elektrotechnické listy. Roč. 2, č. 1 (2017), s. 1-5. ISSN 2453-8981: Spôsob prístupu: *http://www.elektrotechnickelisty.eu/casopis/rocnik_II/clanky/EL_04_2017.pdf*.

[5] LACKO, Milan - BIROŠ, Milan: **Inteligentné riadenie vonkajších žalúzii v rodinnom dome pomocou mikrokontrolérov.** Elektrotechnické listy. Roč. 2, č. 1 (2017), s. 1-4. ISSN 2453-8981. Spôsob prístupu: *http://elektrotechnickelisty.eu/casopis/rocnik_II/cislo_1_2017.html*.

[6] PÁSTOR, Marek - KISEL, Milan - BIROŠ, Milan: **Nabíjačka olovených akumulátorov s UC3906.** In: Elektrotechnické listy. Roč. 2, č. 2 (2017), s. 1-3. ISSN 2453-8981. Spôsob prístupu: *http://www.elektrotechnickelisty.eu/casopis/rocnik_II/clanky/EL_12_2017.pdf*.

[7] ŽILKOVÁ, Jaroslava - LEŠO, Martin: **Bezsenzorové vektorové riadenie AM.**

In: Elektrotechnické Listy. Roč. 2, č. 1 (2017), s. 1-4. ISSN 2453-8981.
[8] LEŠO, Martin - ŽILKOVÁ, Jaroslava: **Porovnanie PI a fuzzy PI riadenia pre znižovací meniča napätia s mäkkým spínaním.** In: Elektrotechnické Listy. Roč. 2, č. 2 (2017), s. 1-4. ISSN 2453-8981. Spôsob prístupu: *http://elektrotechnickelisty.eu/casopis/rocnik_II/clanky/EL_11_2017.pdf*.
[9] FERKOVÁ, Želmíra - SUCHÝ, Ľuboš: **Porovnanie trojfázových spínaných reluktančných motorov.** In: Strojárstvo. Roč. 21, č. 6 (2017), s. 86-87. ISSN 1335-2938.
[10] ÜVEGES, Róbert - ĎUROVSKÝ, František: **Šmykom riadené robotické vozidlo s ROS rozhraním**. In: Elektrotechnické Listy. Roč. 2, č. 2 (2017), s. 1-3. ISSN 2453-8981.
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[16] PERDUKOVÁ, Daniela - FEDOR, Pavol: **Fuzzy prístup pre popis dynamických systémov.** In: Elektrotechnické listy. Roč. 2, č. 3 (2017), s. 1-5. ISSN 2453-8981. Spôsob prístupu: *http://www.elektrotechnickelisty.eu/casopis/rocnik_II/clanky/EL_14_2017.pdf*.
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Patents and Utility Models

[1] DUDRIK, Jaroslav: Circuit for reduction of switching losses and overvoltages of secondary switches in indirect DC converters with width modulation. Published utility model application SK 46-2015 A3. Banská Bystrica : ÚPV SR - 2017. - 6 s. Spôsob prístupu: *https://wbr.indprop.gov.sk/WebRegistre/Patent/Detail/46-2015*.

9.4. Other publications (papers in conference proceedings, etc.)

Publication Type	Confereces		Other
	Foreign	Home	
Number	10	18	0

DEPARTMENT OF ELECTRIC POWER ENGINEERING

Head of Department
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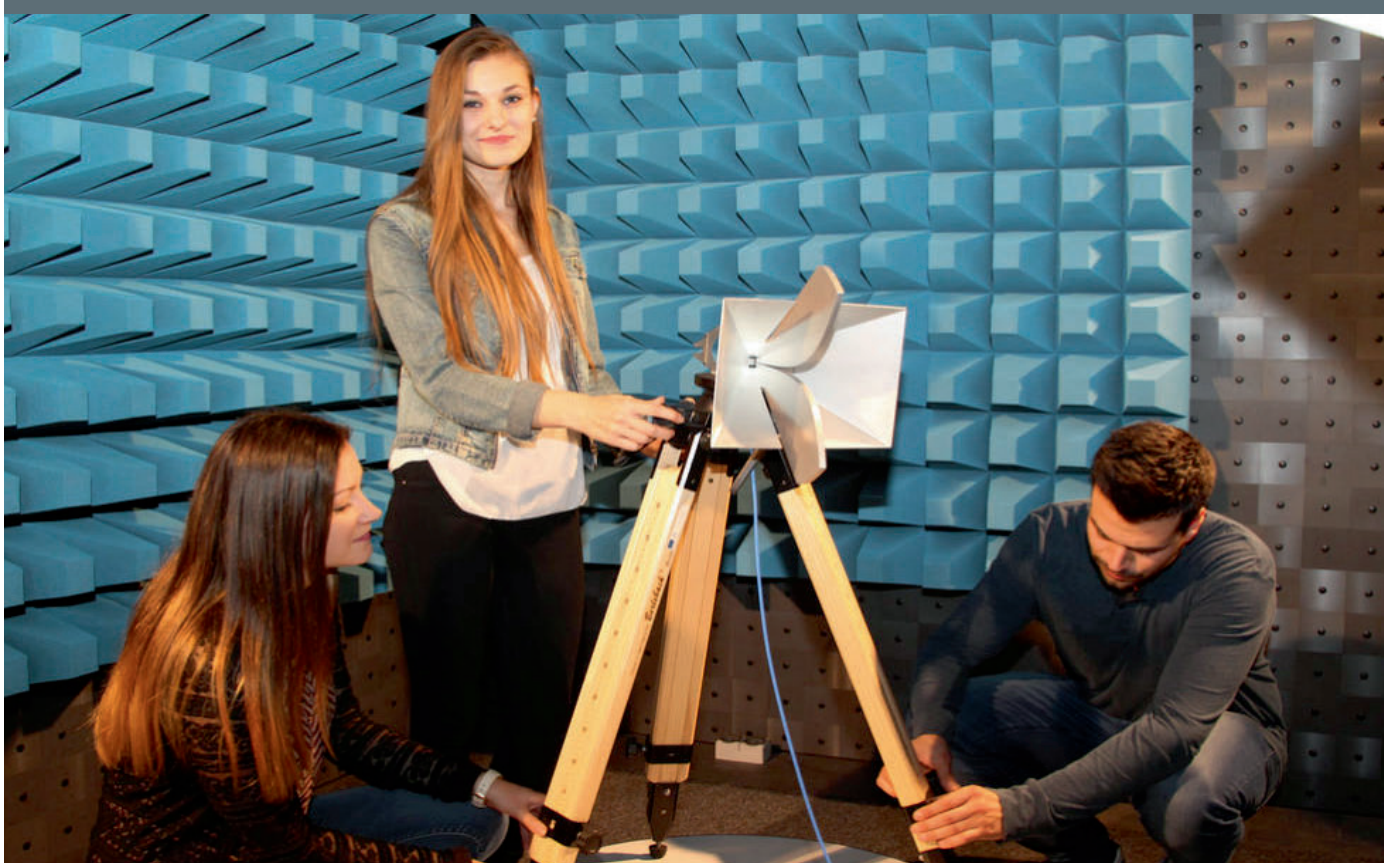
ANNUAL REPORT 2017



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 on the 1st October 2003

These structural changes influenced the department activities and staff changes. The Department of Electric Power Engineering currently has 3 professors, 3 associate professors, 9 assistant professors and 16 internal PhD. students.

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 also 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 ensured 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.

2 STAFF

Professors:	prof. Ing. Roman Cimbala, PhD. Dr.h.c. prof. Ing. Michal Kolcun, PhD. prof. Ing. Iraida Kolcunová, PhD.
Associate Professors:	doc. Ing. Ľubomír Beňa, PhD. doc. Ing. Alexander Mészáros, PhD. doc. Ing. Juraj Kurimský, PhD. doc. Dr. Ing. Bystrík Dolník (since 1.03.2017) doc. Ing. Jaroslav Džmura, PhD. (since 1.07.2017)
Assistant Professors:	Ing. Zsolt Čonka, PhD. Dr. Ing. Bystrík Dolník (until 28.2.2017) Ing. Jaroslav Džmura, PhD. (until 30.06.2017)

Ing. Stanislav Ilenin, PhD.
Ing. Martin Kanálik, PhD.
Ing. Dušan Medveď, PhD.
Ing. Marek Pavlík PhD.
Ing. Jaroslav Petráš, PhD.
Ing. Ján Zbojovský, PhD. (since 01.01.2017)

Technical Staff: doc. Ing. Pavel Novák, CSc. (until 30.06.2017)
Dagmar Kramolišová
doc. Ing. Ladislav Varga, PhD.
Ing. Jana Varnavčinová

Ph.D. Students: Ing. Miroslav Mikita (until 30.06.2017)
Ing. Samuel Bucko (until 30.06.2017)
Ing. Michal Kosterec
Ing. Martin Vojtek
Ing. Lukáš Kruželák
Ing. Michal Špes
Ing. Michal Ivančák
Ing. Anastázia Margitová (since 01.09.2017)
Ing. Jakub Urbanský (since 01.09.2017)

3 LABORATORIES

- Three PC Laboratories
- Laboratory of Electrical Relays
- Laboratory of Environmental Protection
- Laboratory of Electrical Power Network
- Laboratory of Unconventional Power Source
- Laboratory of Lighting Engineering
- Laboratory of High Voltage Engineering
- Laboratory of Diagnostics and Prophylactics
- Laboratory of Electrostatics
- Laboratory of Partial Discharges
- Laboratory of Intelligent Systems
- Electric Power Systems Control Laboratory, Joint Laboratory of Department of Electric Power Engineering TU FEI Košice and ABB ELEKTRO, Ltd., Bratislava
- Laboratory of Electro-magnetic Compatibility
- Laboratory of Photovoltaics
- Laboratory of Dielectric Spectroscopy
- Laboratory LAV6 – Measurements site of OZE

4 TEACHING

4.1 Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (Hours per week)	Name of Lecturer
Fundamentals of Electrical Engineering	1st	2/2	Cimbala
Introduction to programming and networks	1st	0/2	Petráš
Introduction to Engineering	1st	0/2	Kolcun
Fundamentals of environmental engineering	2nd	2/2	Mészáros
Programming	2nd	0/2	Petráš
Power transmission	3rd	2/2	Kanálik
Light - technology	3rd	2/2	Beňa
Designing in electric power engineering	3rd	2/2	Ilenin
Electric Power Plants	4th	2/2	Kolcun
Faults in Electric Power System	4th	2/2	Beňa
Database systems - SQL Oracle	4th	2/2	Petráš
Measurement in electric power engineering	4th	2/2	Kurimský
Conversion of Electrical Energy	4th	2/2	Medveď
Bachelor Project	5th	0/8	(Supervisors)
Electrical installation and substation	5th	2/3	Petráš
High Voltage Engineering	5th	2/3	Kolcunová
Software engineering environment	5th	2/2	Cimbala
Operation of electric power plants	5th	2/2	Džmura
Bachelor Thesis	6th	0/12	(Supervisors)
Electrical relaying in electric power system	6th	2/3	Čonka
Unconventional energy sources	6th	2/2	Pavlík
Prophylactics of power engineering equipment	6th	2/2	Kolcunová
Professional experience in an enterprise	6th	0/4	Džmura
Safety at work on electric devices	6th	2/2	Balogh

4.2 Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (Hours per week)	Name of lecturer
Automatization of Electric Power Plant Service	7th	2/2	Cimbala
Quality and reliability of electric power delivery	7th	2/2	Beňa Kanálik
Optimisation of Electric Power System Operation	7th	2/3	Kolcun
Simulation in Electric Power System	7th	2/3	Medveď
Overvoltages in Electric Networks	7th	2/2	Dolník
Thesis project 1	8th	0/4	(Supervisors)

Subject	Semester	Lectures/exercises (Hours per week)	Name of lecturer
Electric power system operation control	8th	2/3	Kolcun
Transient stability of power system	8th	2/2	Džmura
Electrical power network	8th	2/2	Varga
Design of the illuminating systems	8th	1/3	Beňa
Thesis project 2	9th	0/8	(Supervisors)
Diagnostic in electric power engineering	9th	2/2	Kolcunová
Protection Systems of Electric Power System	9th	2/2	Kurimský
Automated electrical installation systems	9th	2/2	Džmura
Electromagnetic compatibility	9th	3/1	Dolník
Master Thesis	10th	0/18	(Supervisors)
Management of Electric Power Enterprises	10th	2/0	Cimbala

4.3 Postgraduate Study (PhD.)

Subject	Semester	Lectures/exercises (Hours per week)	Name of Lecturer
Theoretic electric power engineering (4)	1st	0/10	Cimbala Kolcun Kolcunová Meszáros Beňa Kurimský
Scientific Activity 1 (4)	1st	0/8	(Supervisors)
Electricity supply system analysis (4)	2nd	0/10	Cimbala Kolcun Kolcunová Mészáros Beňa Kurimský
Subject of specialised area (4)	3rd	0/10	Cimbala Kolcun Kolcunová Mészáros Beňa Kurimský
Scientific Activity 2 (4)	3rd	0/10	(Supervisors)
Scientific Activity 3 (4)	5th	0/10	(Supervisors)
Scientific Activity 4 (4)	6th	0/10	(Supervisors)
Scientific Activity 5 (4)	7th	0/10	(Supervisors)

5 RESEARCH PROJECTS

- **Development of a system for continuous monitoring of pollution**

impact on the high-voltage insulation. Slovak Research and Development Agency (APVV) No. APVV-15-0438, duration: **2016 - 2020**, co-ordinator: Kurimský, J.

- **Interaction of magnetic fluids with electromagnetic field.** Scientific grant agency project (S.G.A.) No. **2/0141/16,** duration: **2016-2019,** co-ordinator: Kurimský, J.
- **Analysis of Influences of Degrading Factors on Electro - Physical Structure Changes of Progressive Electrical Engineering Insulation Materials.** Scientific grant agency project (S.G.A.) No. **1/0311/15,** duration: **2015-2017,** co-ordinator: Cimbala, R.
- **Research of the penetrating of high frequency electromagnetic waves through ecological building materials.** Scientific grant agency project (S.G.A.) No. **1/0312/15,** duration: **2015-2017,** co-ordinator: Kolcunová, I.
- **Proposal of the possibility of implementation of Wide Area Monitoring (WAM) systems into protection system of the electric power system.** Faculty of Electrical Engineering Technical University of Košice (FEI TUKE.) No. **FEI-2015-28,** duration: **2017,** co-ordinator: Čonka, Z.

6 CO-OPERATION

6.1 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 TEKO, Košice
- Slovak Electric Transmission System, Inc. (SEPS, a.s.), Bratislava
- VSE – Eastern Slovakia Power Engineering, 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.,
- SAG ELV Slovensko, Inc.,
- Landis +Gyr, Ltd.,

6.2 International Co-operation

- Moscow Power Engineering Institute, Russia
- Sankt - Petersburg Power Education Institute of Power Engineering, State Department of Russian Federation, Russia

- Eurasian National University, Astana, Kazakhstan
- Graz University of Technology, Austria
- Czestochowa University of Technology, Poland
- Technical University of Riga, Latvia
- Technical University of Tallinn, Estonia
- COMTEST Ltd. Netherlands
- 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 Switzerland Ltd, Switzerland

6.2.1. Visits of Staff Members to Foreign Institutions

- Kolcun, M.: VŠB-Technical University of Ostrava, Czech Republic, 18.-20.1.2017
- Džmura, J.: VŠB-Technical University of Ostrava, Czech Republic, 18.-20.1.2017
- Pavlík, M.: VŠB-Technical University of Ostrava, Czech Republic, 18.-20.1.2017
- Medveď, D.: VŠB-Technical University of Ostrava, Czech Republic, 18.-20.1.2017
- Kruželák, L.: Brno University of Technology, Czech Republic, 6.2.-30.6.2017
- Špeš, M.: Czech Technical University in Prague, Czech Republic, 12.2.-30.6.2017
- Džmura, J.: VŠB-Technical University of Ostrava, Czech Republic, 3.-6.4.2017
- Petráš, J.: VŠB-Technical University of Ostrava, Czech Republic, 3.-6.4.2017
- Petráš, J.: Conference Electrostatic 2017, Frankfurt am Main, Germany, 9.-16.4.2017
- Kolcunová, I.: Conference Electrostatic 2017, Frankfurt am Main, Germany, 9.-16.4.2017
- Cimbala, R.: Conference Electrostatic 2017, Frankfurt am Main, Germany, 9.-16.4.2017
- Dolník, B.: Conference PM´17, Poznaň, Poland, 26.-30.6.2017
- Kosterec, M.: Conference PM´17, Poznaň, Poland, 26.-30.6.2017
- Pavlík, M.: Czech Technical University in Prague, Czech Republic, 8.-12.5.2017
- Medveď, D.: Czech Technical University in Prague, Czech Republic, 8.-12.5.2017
- Kanálik, M.: Czech Technical University in Prague, Czech Republic, 8.-12.5.2017

- Čonka, Z.: Czech Technical University in Prague, Czech Republic, 8.-12.5.2017
- Kolcun, M.: Conference EPE 2017, VŠB-Technical University of Ostrava, Czech Republic, 17.-19.5.2017
- Kosterec, M.: Conference EPE 2017, VŠB-Technical University of Ostrava, Czech Republic, 17.-19.5.2017
- Vojtek, M.: Conference EPE 2017, VŠB-Technical University of Ostrava, Czech Republic, 17.-19.5.2017
- Čonka, Z.: Conference EPE 2017, VŠB-Technical University of Ostrava, Czech Republic, 17.-19.5.2017
- Zbojovský, J.: Conference EPE 2017, VŠB-Technical University of Ostrava, Czech Republic, 17.-19.5.2017
- Dolník, B.: Conference EPE 2017, VŠB-Technical University of Ostrava, Czech Republic, 17.-19.5.2017
- Petráš, J.: Conference EPE 2017, VŠB-Technical University of Ostrava, Czech Republic, 17.-19.5.2017
- Kosterec, M.: Czech Technical University in Prague, Czech Republic, 22.-24.5.2017
- Cimbala, R.: University of West Bohemia, Czech Republic, 15.-18.5.2017
- Kolcun, M.: Brno University of Technology, Czech Republic, 19.- 20.11.2017
- Čonka, Z.: ÓBUDA University Budapest, Hungary, 22.-24.11.2017
- Zbojovský, J.: ÓBUDA University Budapest, Hungary, 22.-24.11.2017

6.3 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, 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

6.4 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 JSES – Starnutie elektroizolačných systémov, Košice
- Cimbala, R.: Member of Editorial Board EEN – Elektroenergetika, TU Košice, FEI
- Dolník, B.: Member of Editorial Board JSES – Starnutie elektroizolačných systémov, Košice
- Kolcun, M.: Member of Editorial Board Journal of EE
- Kolcun, M.: Member of Editorial board journal Acta Electrotechnica et Informatica
- Kolcun, M.: Member of Examinational Commission According to Law: No. 70/1998 Statute of Slovakia
- Kolcun, M.: Member of Scientific Council, TU FEI Košice
- Kolcun, K.: Chairman of Editorial Board JSES – Starnutie elektroizolačných systémov, Košice
- 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 Electro-insulation Materials, TK No. 53
- Kolcunová, I.: Member of WG for Electrical Machine Diagnostics, US Steel Košice
- Kolcunová, I.: Member of Editorial Board JSES – Starnutie elektroizolačných systémov, 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
- Cimbala, R.: Member of Slovak Electrotechnical Society, TU FEI Košice
- Džmura, J.: Chairman of Slovak Electrotechnical Society, TU FEI Košice
- Kanálik, M.: 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
- Mészáros, A.: 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

7 THESES

7.1 Bachelor's Theses

1. Bartko, P.: Measurements of breakdown strength in liquid dielectrics, (Kurimský, J.)
2. Bednár, M.: Design of electrical installation using Eplan software, (Ilenin, S.)
3. Bindas, P.: Modernisation of public lighting, (Beňa, Ľ.)
4. Capcara, P.: Accumulation of electricity, (Kolcun, M.)
5. Čurlej, M.: Photobiological effects of the optic radiation, (Beňa, Ľ.)
6. Darvaši, J.: Partial discharge signal evavaluation by transform methods, (Petráš, J.)
7. Gdovin, D.: Evaluation of the impact of electromagnetic fields around the electrical equipments in residential buildings, (Medveď, D.)
8. Hájnik, S.: Analysis of fault states in electrical networks, (Beňa, Ľ.)
9. Hric, M.: Protective conductors and earthing systems for electrical installations in buildings, (Balogh, J.)
10. Hrabčák, O.: Processing of measured data from the KNX/EIB system, (Džmura, J.)
11. Húlan, L.: Complex proposal of electrical installation in a residential building, (Džmura, J.)
12. Kohan, V.: Utilization of HVDC systems in electric power system, (Čonka, Z.)
13. Korčák, Š.: Calculation of voltages and currents during ground faults in medium voltage systems, (Kanálik, M.)
14. Kovalčik, D.: Visualisation in KNX/EIB standard systems, (Petráš, J.)
15. Kravec, S.: Use of software Easy Soft for electrical applications, (Ilenin, S.)
16. Kurpáš, D.: Proposal of protective devices for small hydropower plant, (Čonka, Z.)
17. Molčan, P.: Independent supply from photovoltaic power plant, (Pavlík, M.)
18. Soták, M.: Protection against lightning impact by active lightning conductor according to STN 341398, (Ilenin, S.)
19. Žolna, P.: Proposal of hybrid system for a family house, (Čonka, Z.)
20. Žvanda, P.: Shield application against the impact of electromagnetic fields, (Medveď, D.)

7.2 Master's Theses

1. Bali Bálint, J.: Measurement of electomagnetic field, (Ilenin, S.)
2. Daňko, M.: Analysis of the interaction of living organisms and electromagnetic fields, (Mészáros, A.)
3. Drab, G.: Design of photovoltaic system, (Pavlík, M.)
4. Farač, D.: Switching LED lamps used in public lighting mounted with electronic ballasts with high starting current, (Dolník, B.)
5. Fedor, R.: Visualisation in KNX/EIB standard systems, (Petráš, J.)
6. Hudák, M.: Cooperation of renewable energy sources, (Kolcun, M.)
7. Imrich, A.: Design and testing of SPD for LED lamps, (Dolník, B.)
8. Ištočko, J.: Design of the hybrid system for the energy supplying of public lighting, (Beňa, Ľ.)
9. Jánosdeák, M.: Control of smart electrical installation KNX/EIB, (Džmura, J.)

10. Ivančák, M.: Selectivity analysis for electrical balance of power plant, (Čonka, Z.)
11. Klešč, M.: Modeling of electrical off-grid in the Simscape Power Systems, (Medveď, D.)
12. Kondás, A.: Impact of operation of surge arresters on the electrical parameters, (Dolník, B.)
13. Körmöndi, P.: Measurement of partial discharges in solid dielectrics, (Petráš, J.)
14. Márton, F.: Comparison of substation earthing system calculation method by two different software tools, (Ungvarský, Ľ.)
15. Margitová, A.: Modeling of transient behavior of synchronous machines, (Kanálik, M.)
16. Mikitka, M.: Building illumination using LED luminaires with the possibility of changing the color of light, (Pavlík, M.)
17. Petrik, P.: Lighting design of the hockey stadium, (Beňa, Ľ.)
18. Poprocký, J.: Saturation of current transformer's core and its rating for ABB differential protection relays, (Ungvarský, Ľ.)
19. Tančák, J.: Influence of DC voltage on oil-paper insulating system, (Kolcunová, I.)
20. Výrostko, P.: Accelerated aging tests of polypropylene film, (Kurimský, J.)
21. Urbanský, J.: The possibilities of electric vehicles connection to smart house, (Kolcun, M.)

7.3 Doctoral Theses

1. Bucko, S. Modern Liquid Insulation Systems in Electric Power Engineering. TU Košice, 2017, pp. 109 (Cimbala, R.) (In Slovak)
2. Kurimský, P.: Research of the Electromagnetic Waves Propagation in Environment. TU Košice, 2017, pp. 100 (Mészáros, A.) (In Slovak)
3. Lovasová, R.: Research of the costs in the field of power engineering, TU Košice, 2017, pp. 113 (Kolcunová, I.) (In Slovak)
4. Mikita, M.: Research of cooperation of renewable energy sources in distribution system. TU Košice, 2017, pp. 109 (Kolcun, M.) (In Slovak)

8 OTHER ACTIVITIES

8.1 Conferences, Seminars

- Symposium: Elektroenergetika 2017, 12.-14.9.2017, Stará Lesná- High Tatras, Slovak Republic
- Scientific and technical colloquium for APVV-15-0438 project Vplyv environmentálenho znečistenia na vysokonapäťovú izoláciu, 25.-27.10.2017, Stará Lesná- High Tatras, Slovak Republic
- Specialized Seminar: Current problems of electric power engineering in SR, 9.-10.11.2017, Poráč, Slovak Republic.

8.2 Projects for Industry Companies

- Beňa, Ľ.: Štúdia Uskutočniteľnosti modernizácie a dlhodobej udržateľnosti verejného osvetlenia v meste Moldava nad Bodvou, mesto Moldava nad Bodvou, 2017, Slovak Republic
- Kolcun, M.: Technical – economical study. VSD, a.s., 2017, Slovak Republic

- Kurimský, J.: Meranie kapacity a stratového činiteľa AdBlue (R) pri 1kHz, 100 kHz a 1 MHz, VUCHT, a.s., 2017, Slovak Republic
- Cimbala, R.: Technická pomoc pre zabezpečenie testov ES25MW na ES2, ES3 na KS01. eustream, a.s., 2017, Slovak Republic
- Kolcun, M.: Zmluva o šírení reklamy, ZSE, a.s., 2017, Slovak Republic
- Kolcun, M.: Development expert course Technology for non-engineers IV 2017. VSE, a.s. Košice, 2017, Slovak Republic
- Kurimský, J.: Nezávislé hodnotenie výsledkov medzilaboratórnych porovnávajúcich skúšok, VSD, a .s., 2017 Slovak Republic
- Kolcun, M.: príprava hybridných systémov na testovanie, VSD, a .s., 2017, Slovak Republic
- Kolcun, M.: Sieťová štúdia – možnosti optimalizácie tokov jalových výkonov v rámci PS SR, SEPS, a.s., 2017, Slovak Republic
- Beňa, Ľ.: školenie pre technikov svetelných systémov, O.S.V.O. comp, a.s. 2017, Slovak Republic
- Cimbala, R.: Calibration / porovnanie skúšačov izolácie. U.S. Steel Košice, Ltd. 2017, Slovak Republic

8.3 Compositions for Dissertation Examinations

- Kruželák, L.: Electro-physical Process Analysis in High Voltage Insulation Materials. (Cimbala, R.)
- Špes, M.: Ampacity of overhead transmission lines. (Beňa, Ľ.)

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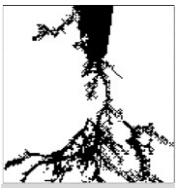

EXPERT'S ACTIVITY FOR PRACTICE

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,
  - 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.

DEPARTMENT OF ELECTRONICS AND MULTIMEDIA COMMUNICATIONS

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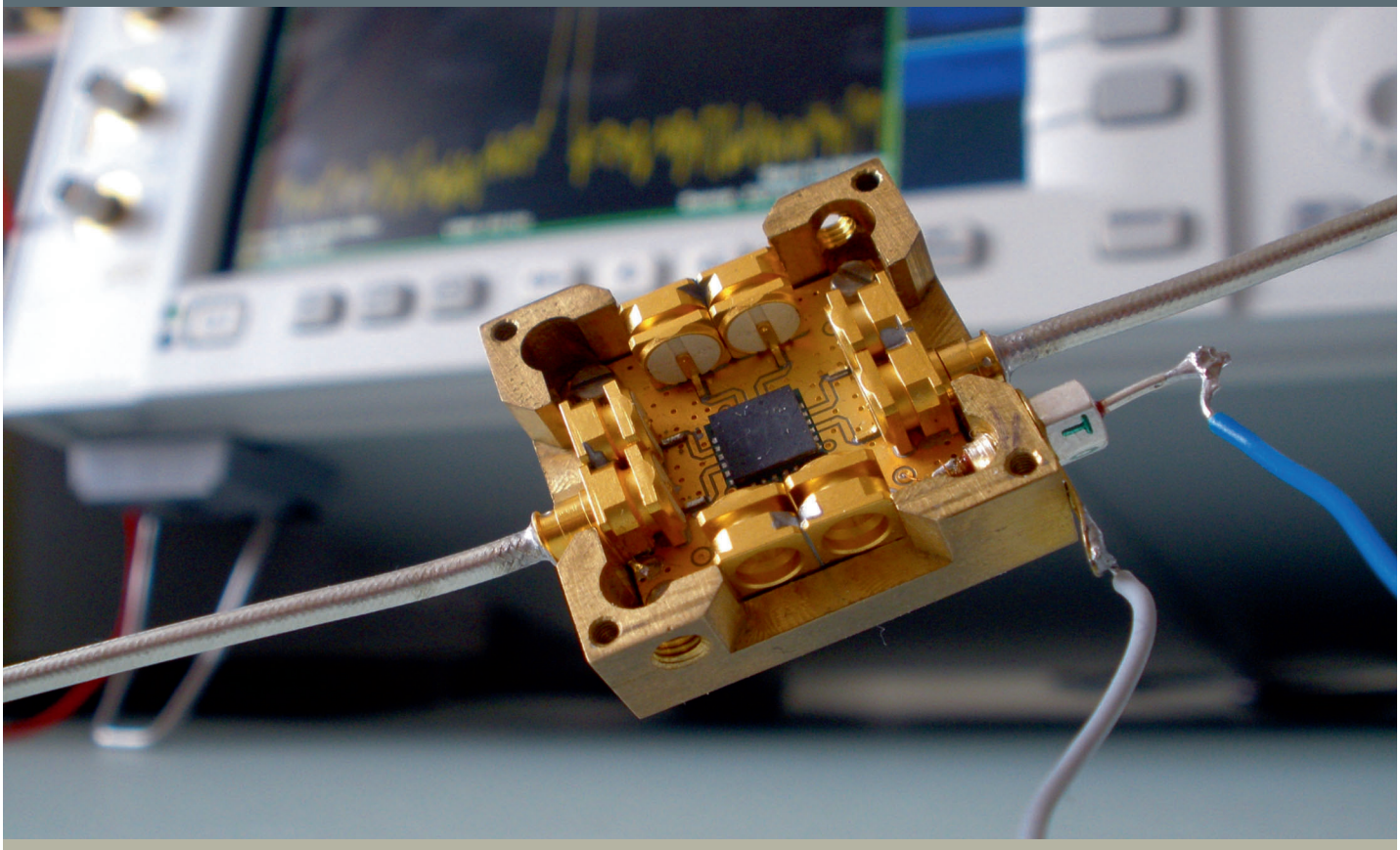
ANNUAL REPORT 2017



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

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

- Computer Networks,
- Smart Electronics,
- Multimedia Communication Technologies.

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,
- Smart Electronics,
- Multimedia Communication Technologies.

Doctoral Study course lasts in normal way 4 years and is leading to degree PhD. The graduates get erudition in scientific areas

- Computer Networks,
- Electronic Systems and Signal Processing,
- Multimedia Communication Technologies.

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.

2 STAFF

Professors:	Dr.h.c. prof. Ing. Anton Čižmár, CSc.	
	prof. Ing. Pavol Galajda, CSc.	
	prof. Ing. Jozef Juhár, CSc.	
	prof. Ing. Dušan Kocur, CSc.	
	prof. Ing. Dušan Levický, CSc.	
	prof. Ing. Stanislav Marchevský, CSc.	
	prof. Ing. Ján Mihalík, CSc.	
	prof. Ing. Linus Michaeli, DrSc.	
	prof. Ing. Ján Šaliga, CSc.	
	Dr.h.c. prof. RNDr. Ing. JánTurán, DrSc.	
Associate Professors:	doc. Ing. Ľubomír Doboš, CSc.	
	doc. Ing. Miloš Drutarovský, CSc.	
	doc. Ing. Ján Gamec, CSc.	
	doc. Ing. Ľuboš Ovseník, PhD.	
	doc. Ing. Ján Papaj, PhD.	
Assistant Professors:	Ing. Gabriel Bugár, PhD.	Ing.Ľudmila Maceková,PhD.
	Ing. Mária Gamcová, PhD.	Ing. Stanislav Ondáš, PhD.
	Ing. Iveta Gladišová, CSc.	Ing. Ján Staš, PhD.
	Ing. Daniel Hládek, PhD	
Research Assistant:	Ing. Martin Lojka, PhD.	Mgr. Mária Švecová, PhD.
	Ing. Matúš Pleva, PhD.	Ing. Peter Viszlay PhD.
Support staff:	Zuzana Bugárová	Viera Šumáková

Ph.D. students:

Internal form:
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Ing. Dávid Čonka
Ing. Pavol Dolinský
Ing. Jozef Greššák
Ing. Vladimír Hajduk
Ing. Renát Haluška
Ing. Dávid Hrabčák
Ing. Tomáš Huszaník
Ing. Tomáš Ivaniga
Ing. Tomáš Koctúr
Ing. Marianna Koctúrová
Ing. Michal Márton
Ing. Martin Matis
Ing. Dominik Nezník
Ing. Jakub Oravec
Ing. Martin Pečovský
Ing. Miroslav Repko
Ing. Stanislav Slovák
Ing. Miroslav Sokol
Ing. Dávid Solus
Ing. Peter Šuľaj

External form:
Ing. Martin Kmec
Ing. Marek Laban
Ing. Roman Palitefka
Ing. František Rakoci
Ing. Peter Strnisko

3 EQUIPMENT

3.1. Teaching and Research Laboratories

- Laboratory of Multimedia Communications
- Laboratory of Digital Signal Processing and Satellite Communications
- Laboratory of Digital Image Processing and Videocommunication
- Laboratory of Optoelectronic Communications
- Laboratory of Electronic Circuits & Measurement

3.2. Special Laboratories and Equipments

- Laboratory of measurement
- Laboratory of Sensor and Wireless Communication Technologies (SeWiTechLab)
- Laboratory of communication technologies and advanced digital signal processing
- Laboratory of optoelectronics
- Laboratory of multimedia and network security
- Laboratory of speech technologies in telecommunications

4 TEACHING

4.1. Undergraduate Study (Bc.) – Automotive Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of electronics	2nd	2/3	Gamec
Analogue circuits	3rd	3/2	Kocur
Digital electronics	3rd	3/2	Galajda
Signals and systems	3rd	3/2	Mihalík, Gladišová

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Measurements in electronics and telecommunications	4th	2/3	Šaliga
Electronic design tools	4th	3/2	Galajda
Active and passive safety systems of cars	5th	3/2	Gamec
Automotive electronics	5th	3/2	Gamec
Microwave circuits and systems	6th	3/3	Gamec
Programming of embedded systems	6th	2/3	Drutarovský

4.2. Undergraduate Study (Bc.) – Smart Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of electronics	2nd	2/3	Gamec
Analogue circuits	3rd	3/2	Kocur
Basics of telecommunications technology	3rd	3/2	Levický
Digital electronics	3rd	3/2	Galajda
Signals and systems	3rd	3/2	Mihalík, Gladišová
Measurements in electronics and telecommunications	4th	2/3	Šaliga
Microwave circuits and systems	4th	3/3	Gamec
Electronic design tools	4th	3/2	Galajda
Networks technology 1	4th	3/2	Levický
Communication acoustics	4th	3/2	Juhár
Bachelor thesis	5th	0/6	Juhár
Graphical programming	5th	3/2	Šaliga
Microprocessor technology	5th	3/2	Drutarovský
Networks architecture	5th	3/2	Čižmár
Automotive electronics	5th	3/2	Gamec
Electromagnetic waves and antennas	5th	3/2	Ovseník
Interactive electronic and communication systems	5th	2/3	Juhár, Ondáš
Videocommunications	5th	3/2	Mihalík
Multimedia database systems	5th	2/3	Juhár, Ondáš
Networks technology 2	5th	2/2	Levický
Programming of embedded systems	6th	2/3	Drutarovský
Active and passive safety systems of cars	6th	3/2	Gamec
Optoelectronic systems	6th	3/2	Turán
Satellite technology and services	6th	3/2	Marchevský

4.3. Undergraduate Study (Bc.) – Multimedia Communication Technologies

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of electronics	2nd	2/3	Gamec
Analogue circuits	3rd	3/2	Kocur

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of telecommunications technology	3rd	3/2	Levický
Digital electronics	3rd	3/2	Galajda
Signals and systems	3rd	3/2	Mihalík, Gladišová
Measurements in electronics and telecommunications	4th	2/3	Šaliga
Multimedia technologies	4th	3/2	Staš
Networks technology 1	4th	3/2	Levický
Communication acoustics	4th	3/2	Juhár
Microwave circuits and systems	4th	3/3	Gamec
Bachelor thesis	5th	0/6	Juhár
Communication technology 1	5th	3/2	Marchevský
Networks architecture	5th	3/2	Čižmár
Electromagnetic waves and antennas	5th	3/2	Ovseník
Graphical programming	5th	3/2	Šaliga
Interactive electronic and communication systems	5th	2/3	Juhár
Multimedia database systems	5th	2/3	Juhár
Mobile technologies and services	5th	3/2	Doboš
Videocommunications	5th	3/2	Mihalík
Networks technology 2	5th	2/2	Levický
Communication technology 2	6th	3/2	Maceková
Programming of embedded systems	6th	2/3	Drutarovský
Optoelectronic systems	6th	3/2	Turán
Satellite technology and services	6th	3/2	Marchevský

4.4. Undergraduate Study (Bc.) – Computer Networks

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of algorithms and programming	1st	3/2	Novitzká, Hládek
Programming	2nd	2/2	Tomášek, Hládek
Principles of computer engineering	2nd	2/2	Vokorokos
Basic of software engineering	2nd	2/2	Havlice, Ondáš
Computer system architectures	3rd	2/2	Vokorokos, Drutarovský
Object oriented programming	3rd	2/2	Juhár, Hládek, Ondáš
Operating systems	3rd	3/2	Genči, Pleva
Basics of electronics and logic circuits	3rd	2/2	Galajda
Introduction to digital communications	3rd	2/2	Doboš

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Computer networks	4th	2/2	Čižmár, Bugár
Database systems	4th	3/2	Juhár, Ondáš
Programming in a DotNET	4th	2/2	Havlice
Transmission media	4th	2/2	Ovseník
Multimedia signals in communication networks	4th	2/2	Staš
Component programming	4th	2/2	Porubän
Bachelor thesis	5th	0/8	Čižmár
Application of computer networks	5th	2/2	Čižmár, Papaj
Data structures and algorithms	5th	2/2	Kollár, Hládek
Mobile technology and services	5th	2/2	Doboš
Programming audio applications	5th	2/2	Juhár
Satellite technology and services	5th	2/2	Marchevský
Bachelor thesis	6th	0/12	Čižmár
Security of computer systems	6th	3/2	Vokorokos, Drutarovský
Programming of embedded systems	6th	2/2	Drutarovský
Speech interactive communication systems	6th	2/2	Juhár, Ondáš

4.5. Graduate Study (Ing.) – Smart Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Circuit theory	1th	3/2	Galajda
Digital signal processing	1th	3/2	Mihalík, Gladišová
Optoelectronics	1th	3/2	Turán
Signal and communication interfaces	1th	3/2	Šaliga
Applied cryptography	1th	3/2	Drutarovský
Signal processors	1th	3/2	Drutarovský
Smart antennas	1th	3/2	Ovseník
Digital image processing and coding	2nd	3/2	Mihalík
Diploma project 1	2nd	0/6	Juhár
Processing and transmission of speech and audio signals	2nd	3/2	Juhár
Smart measuring systems	2nd	3/2	Šaliga
Design of integrated circuits for smart applications	2nd	3/2	Galajda
Optical communication systems	2nd	3/2	Turán
High frequency and microwave technology	2nd	3/2	Gamec
Telecommunication systems theory	2nd	3/2	Čižmár
Diploma project 2	3rd	0/6	Juhár
Digital television systems	3rd	3/2	Marchevský
Photonics	3rd	3/2	Turán

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Advanced speech applications for communication technology	3rd	3/2	Juhár
Advanced communication systems	3rd	3/2	Kocur
Medical electronics	3rd	3/2	Michaeli
Smart security systems	3rd	3/2	Marchevský
UWB sensor networks	3rd	2/2	Kocur

4.6. Graduate Study (Ing.) – Multimedia Communication Technologies

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Applied cryptography	1th	3/2	Drutarovský
Digital signal processing	1th	3/2	Mihalík, Gladišová
Optoelectronics	1th	3/2	Turán
Signal and communication interfaces	1th	3/2	Šaliga
Signal processors	1th	3/2	Drutarovský
Smart antennas	1th	3/2	Ovseník
Localization in wireless and mobile systems	1th	3/2	Doboš
Diploma project 1	2nd	0/6	Juhár
Processing and transmission of speech and audio signals	2nd	3/2	Juhár
Optical communication systems	2nd	3/2	Turán
Telecommunication systems theory	2nd	3/2	Čižmár
Design of integrated circuits for smart applications	2nd	3/2	Galajda
Digital image processing and coding	2nd	3/2	Mihalík
High frequency and microwave technology	2nd	3/2	Gamec
Smart measuring systems	2nd	3/2	Šaliga
Diploma project 2	3rd	0/6	Juhár
Mobile communications	3rd	3/2	Doboš
Multimedia technologies	3rd	3/2	Staš
Advanced speech applications for communication technology	3rd	3/2	Juhár
Advanced communication systems	3rd	3/2	Kocur
Digital television systems	3rd	3/2	Marchevský
Photonics	3rd	3/2	Turán
UWB sensor networks	3rd	2/2	Kocur
Satellite technology and services	6th	3/2	Marchevský

4.7. Graduate Study (Ing.) – Advanced Materials and Technologies in Automotive Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Digital signal processing	1th	3/2	Mihalík, Gladišová

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
High frequency and microwave technology	2nd	3/2	Gamec
Design of integrated circuits for smart applications	2nd	3/2	Galajda
Smart measuring systems	2nd	3/2	Šaliga
Advanced communication systems	3rd	3/2	Kocur
Smart security systems	3rd	3/2	Marchevský
UWB sensor networks	3rd	2/2	Kocur

4.8. Graduate Study (PhD.) – Electronic Systems and Signal Processing

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Electronic circuits and signals and systems theory	1th	0/5	Kocur
Foreign language 1	1th	0/2	
Research activities 1	1th	0/5	Turán
Foreign language 2	2nd	0/2	
Complex electronic systems and advanced signal processing methods	2nd	0/5	Kocur
Specialization subject	3rd	0/5	Turán
Research activities 2	3rd	0/5	Turán
Research activities 3	5th	0/5	Turán
Research activities 4	6th	0/5	Turán
Research activities 5	7th	0/5	Turán

4.9. Graduate Study (PhD.) – Multimedia Communication Technologies

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Multimedia and communication systems theory	1th	0/5	Juhár
Foreign language 1	1th	0/2	
Research activities 1	1th	0/5	Levický
Foreign language 2	2nd	0/2	
Modern multimedia communication technologies	2nd	0/5	Juhár
Specialization subject	3rd	0/5	Levický
Research activities 2	3rd	0/5	Levický
Research activities 3	5th	0/5	Levický
Research activities 4	6th	0/5	Levický
Research activities 5	7th	0/5	Levický

5 RESEARCH PROJECTS

- Civil Engineering Applications of Ground Penetrating Radar (COST Action TU1208)
- Wireless Power Transmission for Sustainable Electronics (COST Action IC1301)
- Algorithms, Architectures and Platforms for Enhanced Living Environments

(AAPELE), (COST Action IC1303)

- Wearable Robots for Augmentation, Assistance or Substitution of Human Motor Functions (COST Action IC CA16116)
- Innovative ICT Solutions for the Societal Challenges (2015-1-HR01-KA203-013124 ERASMUS+)
- Compressing Sensing in Ultra-Wideband (UWB) Sensors for passive radar localization (DAAD - Deutscher Akademischer Austauschdienst project no. APVV-0696-12)
- Laboratory of Medical Electronics and Sensor Systems with Remote Access (Ministry of Education of Slovak Republic KEGA Project, No. 015TUKE-4/2016)
- Transfer of Substantial Results of Research in Speech Technology into Education (Ministry of Education of Slovak Republic KEGA Project, No. 055TUKE-4/2016)
- New Trends in the Optical Data Transmission (Ministry of Education of Slovak Republic KEGA Project, No. 023TUKE-4/2017)
- Laboratory for Support of the Advanced Tools for the Design and Realization of new Smart Electronic Systems (Ministry of Education of Slovak Republic KEGA Project, No. 062TUKE-4/2017)
- New Generation of Interface for Service Robots Teleoperatoric Control (Project of the Slovak Research and Development Agency, No. APVV-14-0894)
- Automatic Subtitling of Audiovisual Content for Hearing Impaired (Project of the Slovak Research and Development Agency, No. APVV-15-0517)
- Real-Time Operating UWB Sensor Network for Human Beings Detection, Localization and Tracking (Project of Agency for Science and Research, No. APVV-15-0692)
- Cloud Based Human Robot Interaction (Project of the Slovak Research and Development Agency, No. APVV-15-0731)
- Selected Security Topics in Advanced Telecommunications (Scientific Grant Agency Project VEGA, No. 1/0075/15)
- Personalized Acoustic and Language Modeling (Project of the Ministry of Education, Science, Research and Sport of the SR, No. VEGA 1/0511/17)
- Multiple Person Localization Based on Detection of Their Vital Signs Using Short-Range UWB Sensors (Project of the Ministry of Education, Science, Research and Sport of the SR, No. VEGA 1/0772/17)

6 CO-OPERATION

6.1. Co-operation in Slovakia

- Elcom s.r.o., Prešov
- Slovak Academy of Science
- Slovak Telekom, a.s.
- VUS - Výskumný ústav spojov, n.o., Banská Bystrica
- ZŤS výskumno-vývojový ústav Košice, a.s.
- Deloitte Advisory, s.r.o., Bratislava
- ITMG, s.r.o., Senec

6.1.1. Visitors to the Department

- Dr. Daniel Carruth, Mississippi State University, Starkville, USA, Center for Advanced Vehicular Systems, October 2017
- Mr. Christopher Hudson, Mississippi State University, Starkville, USA, Center for Advanced Vehicular Systems, October 2017
- Mr. Aryan Firouzian, University of Oulu, Finland, Faculty of Information Technology and Electrical Engineering (ITEE), Oulu Advanced Research on Service and Information Systems (OASIS), November 2017

6.2. 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 Lisabon, Portugal
- Instituto Superior Técnico (IST), Lisbon, Portugal
- Statens Räddningsverk, Sweden
- ŠkodaAuto Mladá Boleslav, Czech Republic
- Wuhan Technological Institute, Wuhan, China
- Second University of Naples, Italy
- Ilmenau University of Technology, Germany
- Ilmsens GmbH, Germany
- UWINLOC - Hosted by AIRBUS BizLab (France)
- BMF Infokom Inovátor (Hungary)
- 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
- Universitat Politècnica de Catalunya Barcelona Tech (UPC), Barcelona, Spain
- Technical University Budapest, Hungary
- Technical University of Ljubljana, Slovenia
- Technical University of Cluj-Napoca, Romania
- University of Firenza, Italy
- University of Gent, Belgium
- University of Maribor, Slovenia
- University of Sannio, Benevento, Italy
- University of Reggio Di Calabria, Italy
- University of Gävle, Sweden
- University in Oulu, Finland
- University of Veliko Turnovo, 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

6.2.1. Visit of Staff Members to Foreign Institutions

- Andráš,I., Iasi, Romania September 13-17, 2017
- Bugár,G., Copenhagen, Denmark November 22-25, 2017
- Bugár,G., Thessaloniki, Greece December 6-10, 2017
- Čonka,D., Valencia, Spain May 12-28, 2017
- Drutarovský,M., TU Ilmenau, Germany April 1-8, 2017
- Drutarovský,M., Zagreb, Croatia June 6 – July 1, 2017
- Drutarovský,M., Singapore, Republic of Singapore November 15-24, 2017
- Gamcová,M., Mladá Boleslav, Czech Republic October, 16-17, 2017
- Gamec,J., Mladá Boleslav, Czech Republic October, 16-17, 2017
- Galajda,P., TU Brno, Czech Republic March 23-24, 2017
- Galajda,P., TU Ilmenau, Germany April 1-8, 2017
- Galajda,P., TU Brno, Czech Republic April 19-21, 2017
- Galajda,P., TU Brno, Czech Republic June 19-20, 2017
- Galajda,P., Porto, Portugal September 17-21, 2017
- Galajda,P., Singapore, Republic of Singapore November 15-24, 2017
- Hajduk,V., TU Brno, Czech Republic April 18-23, 2017
- Hládek,D., Veliko Tarnovo, Bulgaria May 30 – June 4, 2017
- Hrabčák, D., Valencia, Spain May 12-28, 2017
- Hrabčák, D., Malenice, Czech Republic September 4-6, 2017
- Hrabčák, D.,University of Zadar, Croatia September 16-23, 2017
- Koctúr,T., University of Zadar, Croatia September 16-23, 2017
- Koctúrová,M., University of Zadar, Croatia September 16-23, 2017
- Kocur,D., Angova, Italy March 12-15, 2017
- Kocur,D., TU Ilmenau, Germany April 1-8, 2017
- Kocur,D., BUTE Budapest, Hungary May 23-24, 2017
- Kocur,D., TU Pardubice, Czech Republic May 25-26, 2017
- Kocur,D., TU Brno, Czech Republic June 19-20, 2017
- Kocur,D., Porto, Portugal September 17-21, 2017
- Kocur,D., Lisbon, Portugal September 27-29, 2017
- Kocur,D., Banff, Canada October 4-10, 2017
- Kocur,D., TU Ilmenau, Germany October 15-20, 2017
- Kocur,D., Singapore, Republic of Singapore November 15-24, 2017
- Kocur,D., TU Ilmenau, Germany December 9-12, 2017
- Matis,M., Malenice, Czech Republic September 4-6, 2017
- Matis,M., University of Zadar, Croatia September 16-23, 2017
- Michaeli,L., Vilanova i la Geltrú, Spain June 10-23, 2017
- Michaeli,L., Iasi, Romania September 13-17, 2017
- Michaeli,L., Benevento, Italy October, 7-15, 2017
- Nezník,D., Valencia, Spain May 12-28, 2017
- Ondáš,S., Debrecen, Hungary September 11-13, 2017
- Pečovský,M., TU Brno, Czech Republic April 18-23, 2017
- Pečovský,M., Erlangen, Germany September 25-28, 2017
- Pečovský,M. Singapore, Republic of Singapore November 15-24, 2017
- Pečovský,M., Erlangen, Germany September 25-28, 2017
- Pleva,M., Luton, Great Britain August 15-19, 2017

- Pleva,M., BUTE Budapest, Hungary November 8-10, 2017
- Pleva,M., Sofia, Bulgaria November 23-25, 2017
- Repko,M., Mladá Boleslav, Czech Republic October, 16-17, 2017
- Repko,M., Singapore, Republic of Singapore November 15-24, 2017
- Schneider,J., TU Brno, Czech Republic April 24-25, 2017
- Slovák,S., Warszawa, Poland September 25-27, 2017
- Slovák,S., Mladá Boleslav, Czech Republic October, 16-17, 2017
- Slovák,S., Singapore, Republic of Singapore November 15-24, 2017
- Staš,J., Veliko Tarnovo, Bulgaria May 30 – June 4, 2017
- Staš,J., University of Zadar, Croatia September 16-23, 2017
- Šaliga,J., TU Brno, Czech Republic June 5-7, 2017
- Šaliga,J., Rio de Janeiro, Brazil September 1-11, 2017
- Šaliga,J., Frankfurt, Germany Sept. 29 – Oct. 1, 2017
- Šaliga,J., Benevento, Italy October, 7-15, 2017
- Šaliga,J., Iasi, Romania September 13-17, 2017
- Šaliga,J., CVIT Prague, Czech Republic December 27, 2017;
- Švecová,M., TU Ilmenau, Germany October 15-20, 2017
- Švecová,M., Singapore, Republic of Singapore November 15-24, 2017
- Viszlay,P., Poznan, Poland November 16-20, 2017

6.3. 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 EUROPRACTICE IC Service.
- Juhár, J.: Member of the ISCA (International Speech Communication Association).
- Juhár, J.: Member of EU Domain Committee COST for ICT (Information and Communication Technologies) – National Delegate.
- 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 of the journal "Slaboproudý obzor".
- Kocur D.: Member of the editorial board of the journal "Infocommunications Journal".
- Kocur, D.: Member of “Informatics and Electrical Engineering Review Panel of National Research, Development and Innovation Office, Hungary”.
- Levický, D.: Member of Czech and Slovak Radioelectronics Society.
- Michaeli, L.: Head of Slovak IMEKO National Committee and head of the IMEKO Technical Committee TC-4 "Measurement of Electrical Quantities".
- Michaeli, L.: Member of the editorial board „Computer Standard & Interfaces“, Issued by Elsevier, Amsterdam, New York.
- Michaeli, L.: Member of the reviewer board “Measurement”. Journal IMEKO, Issued by Elsevier, Amsterdam, New York.
- Michaeli, L.: Co-ordinator of IMEKO Working Group “AD and DA metrology”.
- Michaeli, L.: Member of the IEEE, Instrumentation & Measurement Society.

- Pleva, M.: Member of European Network on High Performance and Embedded Architecture and Compilation (HiPEAC).
- Šaliga, J.: Member of the international board of IMEKO Technical Committee TC-4 "Measurement of Electrical Quantities".
- Šaliga, J.: Member of the editorial board of the journal "Radioengineering".
- Turán, J.: Senior Member of the IEEE.
- Turán, J.: Member of Czech and Slovak Radioelectronics Society.

6.4. Membership in Slovak Organizations and Societies

- Čižmár, 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.
- Kocur, D.: Member of the editorial board of the journal "Acta Electrotechnica et Informatica".
- Levický, D.: Member of the editorial board of the journal "Acta Electrotechnica et Informatica".
- Michaeli, L.: Member of the scientific board of Electrotechnical Faculty, University Transport and Communication, Žilina, Slovakia.
- Michaeli, L.: Member of the editorial board „Measurement Science Review“, Issued by SAV, Bratislava.
- Michaeli, L.: Editor in Chief of the editorial board of the journal "Acta Electrotechnica et Informatica".
- Šaliga, J.: Scientific Grant Agency of Slovak Republic.
- Šaliga, J.: Member of scientific board of Slovak Institute of Metrology.
- Šaliga, J.: Member of the editorial board of the journal "Acta Electrotechnica et Informatica".
- Turán, J.: Member of the Slovak Technical Standardization Committee No.53 for Cables, Conductors and Isolating Materials.
- Turán, J.: Member of the Slovak Technical Standardization Committee No.43 for Terminology.
- Turán, J.: Member of the editorial board of the journal "Acta Electrotechnica et Informatica".

6.5. Contracts, International Scientific Projects

- Civil Engineering Applications of Ground Penetrating Radar (COST Action TU1208)
- Wireless Power Transmission for Sustainable Electronics (COST Action IC1301)
- Algorithms, Architectures and Platforms for Enhanced Living Environments (AAPELE), (COST Action IC1303)
- Wearable Robots for Augmentation, Assistance or Substitution of Human Motor Functions (COST Action IC CA16116)
- Innovative ICT Solutions for the Societal Challenges (2015-1-HR01-KA203-

013124 ERASMUS+)

- Compressing Sensing in Ultra-Wideband (UWB) Sensors for passive radar localization (DAAD - Deutscher Akademischer Austauschdienst project no. APVV-0696-12)

7 THESES

Thesis type	Bachelor	Master	Doctoral
Number	33	21	6

8 OTHER ACTIVITIES

8.1. Conferences, seminars

The 8th Management Commitee/ Working Group Meeting and Workshop of the COST Action IC1301: Wireless Power Transmission for Sustainable Electronics (WiPE) was held in Kosice, Slovakia, from 16 to 17 of March 2017. The Working Group Meeting was organized by a team from the Department of Electronics and Multimedia Communications, Technical University of Kosice. The COST Action aims to address efficient Wireless Power Transmission (WPT) circuits, systems and strategies specially tailored for battery‐less systems. Battery‐free sensors, passive RFID, Near Field Communications (NFC) are all closely related concepts that make use of WPT and energy harvesting systems to remotely power up mobile devices or to remotely charge batteries, contributing to develop and foster the Internet of Things (IoT) evolution. In this context, this COST Action aims at bringing together RF circuit and system designers with different backgrounds to: 1) provide enhanced circuit and subsystem solutions to increase the efficiency in WPT; and 2) investigate the use of novel materials and technologies that allow minimizing cost and maximizing integration of the electronics with the environment and with the targeted applications. The COST Action expected benefits include the creation of a wide network of experts both from academia and industry that can address the existing and upcoming challenges in wireless power transmission scenarios in an interdisciplinary manner paving the way for the future generations of wireless power transmission solutions and the associated regulation. COST is an ideal framework towards joining efforts at an international level and establishing Europe as a leading scientific and industrial community in the field of wireless power transmission.
(http://www.cost-ic1301.org/?page=8th-meeting/invitation)

8.2. Awards

The Dean of the Faculty of Arts of the University of Prešov announced on 22 June 2017 the winners of the Dean Award for publishing and artistic activities in the category of humanities – linguistics for the year 2016. The award was won by Ing. Ján Staš, PhD. from the DEMC FEEI TU of Košice, as one of the authors of the collective monograph “Dictionary of Multi-word Naming Units“ created under the guidance of an Assoc. Prof. Martin Ološtiak, PhD. from the Institute of Slovak and Media Studies, Faculty of Arts of the University of Prešov.
(http://www.unipo.sk/filozoficka-fakulta/27179/)

8.3. Student Competitions and Rewards

- The Elfa award for the Best presentation at the Scientific Conference of Young

Researchers SCYR 2017 in the section "EEE 2nd year of study" was won by Ing. Imrich Andráš for the presentation of the paper "Signal Acquisition and Compression: Was Nyquist Wrong?".

8.4. Compositions for Dissertation Examinations

- ANDRÁŠ, I.: Electronic Monitoring Systems for Environment. FEI TU Košice, Slovakia, March 2017. (supervisor: Šaliga, J.)
- DOLINSKÝ, P.: Unconventional Processing Methods of Signals from Biological Objects. FEI TU Košice, Slovakia, March 2017. (supervisor: Šaliga, J.)
- GREŠŠÁK, J.: Methods of Improving Acoustic Signals and their Applications. FEI TU Košice, Slovakia, January 2017. (supervisor: Juhár,J.)
- ORAVEC,J.: Transformation Methods of Image and Video Processing. FEI TU Košice, Slovakia, December 2016. (supervisor: Turán,J.)
- REPKO, M.: Analysis of Intrinsic Properties of Materials by UWB Radar. FEI TU Košice, Slovakia, February 2017. (supervisor: Gamec, J.)
- SLOVÁK, S.: Design of the Application Specific Integrated Circuits for UWB Applications. FEI TU Košice, Slovakia, February 2017. (supervisor: Galajda, P.)

9 PUBLICATIONS

9.1. Books

1. DRUTAROVSKÝ,M.: Kryptografia pre vstavané procesorové systémy. In: Košice: TU, Slovakia, 1st edition, 2017, 183 pp.
2. DRUTAROVSKÝ,M.: Signálové procesory a implementácia základných blokov spracovania signálov. In: Košice: TU, Slovakia, 1st edition, 2017, 129 pp.
3. KOCUR,D.-NOVÁK,D.-ŠVECOVÁ,M.: Multiple Person Localization Based on Their Vital Sign Detection Using UWB Sensor. In: Microwave Systems and Applications. Rijeka: InTech d.o.o., 2017, pp. 399-422.
4. KOCUR,D.-ŠVECOVÁ,M.: UWB radar signal processing for human beings detection, localization and tracking. In: Košice: TU, Slovakia, 1st edition, 2017, 100 pp.
5. LEVICKÝ,D.-STAŠ,J.: Multimédiá. In: Košice: TU, Slovakia, 1st edition, 2017, 113 pp.
6. MIHALÍK,J.: Číslicové filtre. In: Košice: TU, Slovakia, 1st edition, 2017, 63 pp.
7. MIHALÍK,J.-GLADIŠOVÁ,I.: Diskrétne spracovanie signálov (Návody na cvičenia). In: Košice: TU, Slovakia, 1st edition, 2017, 111 pp.
8. OVSENÍK,Ľ.-TURÁN,J.: Elektromagnetické vlny a antény (Vybrané kapitoly). In: Košice: TU, Slovakia, 1st edition, 2017, 327 pp.
9. OVSENÍK,Ľ.-TURÁN,J.: Elektromagnetické vlny a antény (Vybrané prednášky). In: Košice: TU, Slovakia, 1st edition, 2017, 339 pp.

9.2. Journals

1. ANDRÁŠ,I.: Dereverberácia reči s využitím lineárnej predikcie. In: Posterus, Vol. 10, no. 2 (2017), pp. 1-12.
2. BRODA,M.-HAJDUK,V.-LEVICKÝ,D.: Universal statistical steganalytic method. In: Journal of Electrical Engineering, Vol. 68, no. 2 (2017), pp. 117-124.

3. DOLINSKÝ,P.: Výukové pracoviská pre elektronické senzory neelektrických veličín. In: Posterus, Vol. 10, no. 1 (2017), pp. 1-8.
4. GAZDA,J.-BUGÁR,G.-VOLOŠIN,M.-DROTÁR,P.-HORVÁTH,D.-GAZDA,V.: Dynamic spectrum leasing and retail pricing using an experimental economy. In: Computer Networks, Vol. 121 (2017), pp. 173-184.
5. GLADIŠOVÁ,I.-MIHALÍK,J. Binárna morfologická filtrácia. In: Posterus, Vol. 10, no. 5 (2017), pp. 1-10.
6. HAJDUK,V.-DZIAK,M.-VOZŇÁK,M.-LEVICKÝ,D.: Analysis of steganographic methods in DCT domain. In: Acta Electrotechnica et Informatica, Vol. 17, no. 3 (2017), pp. 13-16.
7. HAJDUK,V.-LEVICKÝ,D.: Nastavenie parametrov svm klasifikátora v obrazovej stegoanalýze. In: Posterus, Vol. 10, no. 2 (2017), pp. 1-6.
8. HLÁDEK,D.-STAŠ,J.-JUHÁR,J.: Crowdsourcing language resources for speech recognition. In: Science. Business. Society, Vol. 2, no. 3 (2017), pp. 139-142.
9. HLÁDEK,D.-STAŠ,J.-ONDÁŠ,S.-JUHÁR,J.-KOVÁCS,L.: Learning string distance with smoothing for OCR spelling correction. In: Multimedia Tools and Applications, Vol. 76, no. 22 (2017), pp. 24549-24567.
10. HUSZANÍK,T.-OVSENÍK,Ľ.-TURÁN,J.: Performance Analysis of Optical Modulation Formats for 10 Gbits DWDM System. In: Carpathian Journal of Electronic and Computer Engineering, Vol. 10, no. 1 (2017), pp. 47-52.
11. IVANIGA,P.- IVANIGA,T.: 10 Gbps optical line using EDFA for long distance lines. In: Przegląd Elektrotechniczny, Vol. 93, no. 3 (2017), pp. 193-196.
12. IVANIGA,T.-IVANIGA,P.: Comparison of the Optical Amplifiers EDFA and SOA Based on the BER and Q-Factor in C-Band. In: Advances in Optical Technologies, Vol. 2017, art. no. 9053582 (2017), pp. 1-9.
13. IVANIGA,T.-TURÁN,J.-OVSENÍK,Ľ.: Verification of the SPM Impact in DWDM System Using AWG Multiplexer Demultiplexer. In: Acta Electrotechnica et Informatica, Vol. 17, no. 1 (2017), pp. 17-22.
14. IVANIGA,T.-IVANIGA,P.-TURÁN,J.-OVSENÍK,Ľ.: Analysis of possibilities of increasing the spanned distance using EDFA and DRA in DWDM system. In: Communications, Vol. 19, no. 3 (2017), pp. 88-95.
15. KAŇUCH,P.-RYBA,T.-GAMCOVÁ,M.-KAŇUCHOVÁ,M.-ĎURIŠIN,M.-SAKSL,K.-VARGOVÁ,Z.-VARGA,R.: Coexistence of ferromagnetism and superconductivity in rapidly quenched Ni2NbSn heusler alloy. In: Acta Physica Polonica A, Vol. 131, no. 4 (2017), pp. 1057-1059.
16. KOCUR,D.-FORTES,J.-ŠVECOVÁ,M.: Multiple moving person tracking by UWB sensors: the effect of mutual shielding persons and methods reducing its impacts. In: Eurasip Journal on Wireless Communications and Networking, Vol. 2017, no. 1 (2017), pp. 1-15.
17. KOVÁČ,O.-MIHALÍK,J.-ČAJKO,P.: Deskripcia textúr pomocou šesťkanálového DWT deskriptora. In: Posterus, Vol. 10, no. 2 (2017), pp. 1-9.
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19. MÁRTON,M.-OVSENÍK,Ľ.-ŠPES,M.: Design of antenna in program environment FEKO. In: Annals of Faculty Engineering Hunedoara - International Journal of Engineering, Vol. 15, no. 1 (2017), pp. 169-174.

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21. MÁRTON,M.-OVSENÍK,Ľ.-TURÁN,J.-ŠPES,M.: Design and analysis of microstrip antenna for 2.46GHz in Program Suite FEKO. In: Carpathian Journal of Electronic and Computer Engineering, Vol. 10, no. 1 (2017), pp. 31-34.
22. MIHALÍK,J.: Sieťové protokoly a kvalita videoservisu. In: Slaboproudý obzor, Vol. 73, no. 1 (2017), pp. 15-17.
23. NEKRASOV,A.-KACHATURIAN,A.-GAMCOVÁ,M.-KURDEL,P.-OBUKHOVETS,V.-VEREMYEV,V.-BOGACHEV,M.: Sea wind measurement by doppler navigation system with X-configured beams in rectilinear flight. In: Remote Sensing, Vol. 9, no. 9 (2017), pp. 1-17.
24. PAPAJ,J.-DOBOŠ,Ľ.-ČIŽMÁR,A.: Hybrid MANET–DTN and a new algorithm for relay nodes selection. In: Wireless Personal Communications, Vol. 96, no. 4 (2017), pp. 5145-5166.
25. PLEVA,M.-BOURS,P.–ONDÁŠ,S.-JUHÁR,J.: Improving static audio keystroke analysis by score fusion of acoustic and timing data. In: Multimedia Tools and Applications. Vol. 76, no. 24 (2017), p. 25749–25766.
26. ORAVEC,J.-OVSENÍK,Ľ.-TURÁN,J.: Šifrovanie obrazu s využitím logistického zobrazenia. In: Elektrorevue, Vol. 19, no. 1 (2017), pp. 25-32.
27. ORAVEC,J.-TURÁN,J.-OVSENÍK,Ľ.: Image Encryption Algorithm Based On Squared Sine Logistic Map. In: Carpathian Journal of Electronic and Computer Engineering, Vol. 10, no. 1 (2017), pp. 40-46.
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29. RAKOCI,F.-OVSENÍK,Ľ.-TURÁN,J.: Koncepcia virtuálneho laboratória pre prácu s optickým korelátorom. In: Posterus, Vol. 10, no. 3 (2017), pp. 1-5.
30. SOLUS,D.-OVSENÍK,Ľ.-TURÁN,J.-IVANIGA,T.-ORAVEC,J.-MÁRTON,M.: Biometric image recognition based on optical correlator. In: Advances in Electrical and Electronic Engineering, Vol. 15, no. 2 (2017), pp. 343-351.
31. SOLUS,D.-OVSENÍK,Ľ.-TURÁN,J.: Microchip pattern recognition based on optical correlator. In: Acta Electrotechnica et Informatica, Vol. 17, no. 2 (2017), pp. 38-42.
32. SOLUS,D.-OVSENÍK,Ľ.: The vertical traffic signs detection in different light conditions. In: Journal of Modern Technology and Engineering, Vol. 2, no. 2 (2017), pp. 167-175.
33. SOLUS,D.-OVSENÍK,Ľ.: Rozpoznávanie vzoru priemyselných obrazov s využitím optického korelátora. In: Posterus, Vol. 10, no. 2 (2017), pp. 1-6.
34. ŠPES,M.-BEŇA,Ľ.-MIKITA,M.-KOSTEREC,M.-LIPTAI,P.-MÁRTON,M.: Effectiveness analysis for relamping regard to an overall costs. In: ANNALS of Faculty Engineering Hunedoara: International Journal of Engineering, Vol. 15, no. 2 (2017), pp. 175-179.
35. ŠPES,M.-BEŇA,Ľ.-KOSTEREC,M.-MÁRTON,M.: Determining the current capacity of transmission lines based on ambient conditions. In: Journal of Energy Technology, Vol. 10, no. 2 (2017), pp. 61-69.
36. ŠPES,M.-BEŇA,Ľ.-MIKITA,M.-MÁRTON,M.-WACHTA,H.: Testing of digital protection relay REF543. In: Zeszyty Naukowe Politechniki Rzeszowskiej: Elektrotechnika, Vol. 25, no. 1 (2017), pp. 7-14.

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38. ŠPES,M.-BEŇA,Ľ.-KOSTEREC,M.-KRUŽELÁK,L.-MŮLLER,Z.-WACHTA,H.-MÁRTON,M.: Impact of Environmental Conditions on the Capacity of Power Lines. In: Acta Electrotechnica et Informatica, Vol. 17, no. 3 (2017), pp. 03-07.
39. STAŠ,J.-HLÁDEK,D.-VISZLAY,P.-KOCTÚR,T.: TEDxSK and JumpSK: A new Slovak speech recognition dedicated corpus. In: Journal of Linguistics, Vol. 68, no 2 (2017), pp. 346-354.
40. VAVREK,J.-FECILAK,P.-JUHAR,J.–CIZMAR,A.: Classification of Broadcast News Audio Data Employing Binary Decision Architecture. In: Computing and Informatics, Vol. 36, 2017, pp. 857 – 886.
41. VOKOROKOS,L.-IVCHENKO,A.-MARCHEVSKÝ,S.-PALAHINA,E.-PALAHIN,V.: Parameters estimation of correlated non-Gaussian processes by the method of polynomial maximisation. In: IET Signal Processing, Vol. 11, no. 3 (2017), pp. 313-319.

9.3. Patents

1. ORAVEC,M.-FIC,M.-ORAVEC,J.: Teplotná poistka na báze neodýmu pre spinklérové hlavice. In: Zverejnená patentová prihláška SK 100-2015 A3/, Banská Bystrica: ÚPV SK, 2017, 8 pp.

9.4. Other publications

Publication Type	Conferences		Other
	Foreign	Home	
Number	17	82	28

DEPARTMENT OF PHYSICS

ANNUAL REPORT 2017

Head of Department
doc. RNDr. Dušan Olčák, CSc.
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http://web.tuke.sk/feikf/sk/index.html,
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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 on 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 thermal and mechanical properties of materials and a desk top electron microscope for the study of surface structure of materials.

The Department of Physics provides compulsory courses in basic physics as well as a number of optional courses in various fields 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 on information technologies, and will be skilled in using computer in modelling and simulation of processes in microstructure of materials.

The graduates can find positions in industry (product testing, controlling production processes), in research and development institutes, and in 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.

2 STAFF

Professors: prof. RNDr. Vladimír Lisý, DrSc.

Associate Professors:
doc. RNDr. Júlia Hlaváčová, CSc.
doc. RNDr. Mária Kladivová, PhD.
doc. RNDr. Mária Kovaľaková, PhD.
doc. RNDr. Ladislav Novák, CSc.
doc. RNDr. Dušan Olčák, CSc.
doc. RNDr. Jana Tóthová, PhD.
prof. RNDr. Ján Ziman, CSc.

Assistant Professors:

RNDr. Anton Baran, PhD.
Mgr. Peter Duranka, PhD.
RNDr. Oľga Fričová, PhD.
RNDr. Zuzana Gibová, PhD.
RNDr. Viktor Hronský, CSc.
RNDr. Mária Hutníková, PhD.
RNDr. Ján Kecer, PhD.
RNDr. Jozef Kravčák, PhD.
Ing. RNDr. Jozef Onufer, PhD.
RNDr. Natália Šmídová, PhD.
RNDr. Peter Vrábel, PhD.

PhD. Students:

Ing. Michal Kopčík
Ing. Branislav Kunca
Ing. Alojz Šoltýs

Technical Staff:

Alena Jakabová
Ing. František Mižák

3 LABORATORIES

3.1 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

3.2 Special Measuring Instruments

- 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

4 TEACHING

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

- Faculty of Civil Engineering (SvF)
- Faculty of Electrical Engineering and Informatics (FEI)
- Faculty of Mechanical Engineering (SjF)
- Faculty of Metallurgy (HF)

- Faculty of Mining, Ecology, Process Control and Geotechnologies (FBERG)

4.1 Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Lecturer
Introduction to Physics (FEI)	1st	0/2	Kovaľaková, Fričová, Onufer, Šmídová
Physics 1 (SvF)	1st	2/2	Onufer
Introduction to Physics (SvF)	1st	0/2	Hutníková
Physics I (FEI)	2nd	2/2	Hlaváčová, Gibová, Fričová, Olčák
Physics I (FEI) – external study	2nd	2/2	Baran
Physics (FEI)	2nd	2/2	Gibová
Physics 1 (FBERG)	2nd	2/2	Tóthová
Physics I (FBERG)	2nd	2/2	Tóthová
Physics (FBERG)	2nd	2/2	Tóthová
Physics (FBERG) – external study	2nd	2/0	Vrábel
Physics 1 (FBERG) – external study	2nd	2/0	Vrábel
Physics I (FBERG) – external study	2nd	2/0	Vrábel
Physics II (FEI) – external study	2nd	2/0	Fričová
Physics (SjF)	2nd	2/2	Novák
Physics (SjF) – external study	2nd	2/0	Kecer
Physics II (SvF)	2nd	2/2	Onufer
Physics (SvF)	2nd	2/2	Kovaľaková
Physics 1 (HF)	2nd	2/2	Ziman
Physics 1 (HF) – external study	2nd	2/0	Ziman
Physics Fundamentals (HF) – external study	2nd	2/0	Ziman
Physics 2 (HF) – external study	2nd	2/0	Kladivová
Physics II (FEI)	3rd	3/2	Baran, Olčák
Physics 2 (HF)	3rd	2/2	Ziman
Physics II (FBERG)	3rd	2/2	Tóthová
Physical measurement	3rd	2/3	Gibová
Selected Topics in Physics	3rd	2/3	Kecer
Physics II (FEI)	4th	3/2	Baran
Thermodynamics and Statistical Physics	4th	3/2	Kladivová
Structure and Properties of Materials	4th	3/2	Kravčák
Solid State Physics	5th	2/2	Hronský
Experimental Methods for Materials Study	5th	3/3	Olčák, Kladivová, Fričová, Tóthová, Ziman, Kravčák
Basic Physics of Magnetic Materials	5th	2/2	Novák
Bachelor project	5th	2/6	Onufer
Progressive Materials	6th	2/0	Olčák
Professional experience	6th	0/6	Kovaľaková, Kravčák

4.2 Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Lecturer
Physics 2 (FBERG)	1st	2/2	Tóthová
Physics III (FBERG)	1st	2/3	Baran
Physics 2 (FBERG) – external study	1st	2/0	Vrábel
Physics of Solid Phase (FBERG)	1st	2/2	Hronský
Quantum Physics	1st	2/3	Hutníková
Theory of the electromagnetic field	1st	2/2	Kravčák

5 RESEARCH PROJECTS

- ***Modern amorphous and polycrystalline functional materials for sensors and actuators***, Project APVV, No. APVV-16-0079. Principal investigator: prof. RNDr. Rastislav Varga, DrSc. (Faculty of Science, Pavol Jozef Šafárik University in Košice). Co-operating organisation: Technical University of Košice. Principal investigator: prof. RNDr. Ján Ziman, CSc.

- ***Preparation and characterization of structure and properties of biodegradable multiphase modified starch-based polymer materials***, S.G.A. project No. 1/0570/17, Principal investigator: doc. RNDr. D. Olčák, CSc.

- ***Anomalous properties of suspensions of nanoparticles and polymers***, S.G.A. project No. 1/0348/15, Principal investigator: prof. RNDr. V. Lisý, DrSc.

- ***Dynamics of magnetization processes in amorphous ferromagnetic materials*****,** S.G.A. project, No. 1/0413/15. Principal investigator: prof. RNDr. J. Ziman, CSc.

- ***Studying of chosen biodegradable materials using NMR spectroscopy,*** Grant FEI TUKE – FEI-2015-12, Principal investigator: RNDr. Peter Vrábel, PhD.

6 CO-OPERATION

6.1 Co-operation in Slovakia

- Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava
- Faculty of Science, Comenius University in Bratislava
- Institute of Experimental Physics of the Slovak Academy of Sciences, Košice
- Institute of Inorganic Chemistry of the Slovak Academy of Sciences, Bratislava
- Institute of Physics, Faculty of Science, P. J. Šafárik University in Košice
- Joint Laboratory of Glass VILA, Alexander Dubček University of Trenčín

- Polymer Institute, Slovak Academy of Sciences, Bratislava

6.2 Visitors to the Department

- Doc. Dr. Antal Lovas, DrSc., Budapest University of Technology and Economics, Hungary

6.3 International Co-operation

- Budapest University of Technology and Economics, Hungary
- Central Physical Research Institute, RMKI KFKI, Budapest, Hungary
- Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Prague, Czech Republic
- Institute of Physics, A. Mickiewicz University, Poznan, Poland
- Joint Institute for Nuclear Research, Dubna, Russia
- Uzhorod National University, Ukraine

6.4 Membership in Slovak Organizations and Societies

- Gibová, Z.: member of the Slovak Physical Society (SFS)
- Hronský, V.: member of SFS and the Slovak Magnetic Society (SMAGS)
- Kecer, J.: member of SFS and SMAGS
- Kladivová, M.: member of the Slovak Physics Olympiad, SFS, JSMF, and SMAGS
- Kovaľaková, M.: member of SFS
- Kravčák, J.: member of SFS and SMAGS
- Lisý, V.: Scientific Grant Agency of the Slovak Republic, member of the permanent commission for the awards of DrSc. degrees in Condensed Matter Physics and Acoustics, member of SFS
- Novák, L.: member of SFS and SMAGS
- Olčák, D.: member of SFS and SMAGS
- 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

7 PUBLICATIONS

7.1 Journal Papers

[1] LISÝ, Vladimír - TÓTHOVÁ, Jana: Comment on “motional averaging of nuclear resonance in a field gradient”. In: Physical Review Letters. Vol. 117, no. 24 (2016), p. 9701-9701. - ISSN 0031-9007

[2] ZACHER, Tomáš - HRONSKÝ, Viktor - NAFTALY, Mira - ČAPLOVIČOVÁ, Mária - EMMERICH, Katja - STEUDEL, Annett - MEČIAROVÁ, Mária - JANEK, Marián: Terahertz time domain detection of imidazolium ionic liquid reactivity in nanohybrid materials based on Kaolinite and Halloysite. In: Applied Clay Science. Vol. 135 (2017), p. 475-484. - ISSN 0169-1317

[3] KUNCA, Branislav - MARCIN, Jozef - ŠVEC, Peter - KOVÁČ, Jozef - ŠVEC, Peter st. - ŠKORVÁNEK, Ivan: Influence of Co Doping on Induced Anisotropy and Domain Structure in Magnetic Field Annealed $(Fe_{1-x}Co_x)_{79}Mo_8Cu_1B_{12}$. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 759-761. - ISSN 0587-4246

[4] RAJŇÁK, Michal - TIMKO, Milan - KOPČANSKÝ, Peter - PAULOVIČOVÁ, Katarína - TÓTHOVÁ, Jana - KURIMSKÝ, Juraj - DOLNÍK, Bystrík - CIMBALA, Roman - AVDEEV, Mikhail - PETRENKO, Viktor - FEOKTYSTOV, Artem: Structure and viscosity of a transformer oil-based ferrofluid under an external electric field. In: Journal of Magnetism and Magnetic Materials. Vol. 431 (2017), p. 99-102. - ISSN 0304-8853

[5] LISÝ, Vladimír - TÓTHOVÁ, Jana: Attenuation of the NMR signal in a field gradient due to stochastic dynamics with memory. In: Journal of Magnetic Resonance. Vol. 276 (2017), p. 1 - 6. - ISSN 1090-7807

[6] TÓTHOVÁ, Jana - LISÝ, Vladimír: Effect of stochastic dynamics on the nuclear magnetic resonance in a field gradient. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 1111 - 1113. - ISSN 0587-4246

[7] PAULOVIČOVÁ, Katarína - TÓTHOVÁ, Jana - RAJŇÁK, Michal - TIMKO, Milan - KOPČANSKÝ, Peter - LISÝ, Vladimír: Electro-rheological properties of transformer oil-based magnetic fluids. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 1141-1143. - ISSN 0587-4246

[8] KOVAĽAKOVÁ, Mária - FRIČOVÁ, Oľga - HUTNÍKOVÁ, Mária - HRONSKÝ, Viktor - OLČÁK, Dušan: Dynamics of 1H-13C Cross Polarization in Nuclear Magnetic Resonance of Poly(3-hydroxybutyrate). In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 1162-1164. - ISBN 0587-4246

[9] KOVAĽAKOVÁ, Mária - FRIČOVÁ, Oľga - HUTNÍKOVÁ, Mária - OLČÁK, Dušan - CHODÁK, Ivan: Molecular mobility in amorphous polylactic acid studied using 1H-13C cross polarization NMR. In: Applied Magnetic Resonance. Vol. 48, no. 1 (2017), p. 23-33. - ISSN 0937-9347

[10] ONUFER, Jozef - ZIMAN, Ján - REZNIČÁK, Matej - KARDOŠ, Slavomír: The influence of temperature on unidirectional effect in domain wall propagation. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 723-725. - ISSN 0587-4246

[11] KLEIN, P.; ONUFER, J.; ZIMAN, J.; et al.: Effect of Annealing on Domain Wall Mass in Amorphous FeCoMoB Microwires, Conference: IEEE International Magnetics Conference (Intermag) Location: Dublin, IRELAND Date: APR 24-28, 2017, IEEE TRANSACTIONS ON MAGNETICS, Volume: 53, Issue: 11 Article Number: 4300404 Published: NOV 2017

[12] LISÝ, Vladimír - TÓTHOVÁ, Jana: Attenuation of the NMR signal due to hydrodynamic Brownian motion. In: Journal of Molecular Liquids. Vol. 234 (2017), p. 182-186. - ISSN 0167-7322

[13] KLADIVOVÁ, Mária - ZIMAN, Ján - KECER, Ján - DURANKA, Peter: Study of Axial Dimension of Static Head-to-Head Domain Boundary in Amorphous Glass-Coated Microwire. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p.

639-641. - ISSN 1898-794X

[14] KLEIN, P. - VARGA, R - ONUFER, Jozef - ZIMAN, Ján - BADINI-CONFALONIERI, A - VAZQUEZ, M.: Effect of current annealing on domain structure in amorphous and nanocrystalline FeCoMoB microwires. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 681-683. - ISSN 0587-4246

[15] RYBA, T. - VARGOVÁ, Z. - ILKOVIČ, S. - REIFFERS, M. - KRAVČÁK, Jozef - GYEPES, R. - VARGA, R.: Magnetic and structural characterization of NiXSb (X = Mn, Cr) Heusler ribbon. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 857-859. - ISSN 0587-4246

[16] CHMIELEWSKÁ, E. - TYLUS, W. - DRÁBIK, M. - MAJZLAN, J. - KRAVČÁK, Jozef - WILLIAMS, C. - ČAPLOVIČOVÁ, M. - ČAPLOVIČ, Ľ.: Structure investigation of nano-FeO(OH) modified clinoptilolite tuff for antimony removal. In: Microporous and Mesoporous Materials. Vol. 248 (2017), p. 222-233. - ISSN 1387-1811

[17] HUBAČ, Lukáš - NOVÁK, Ladislav - BALLA, Sándor - LOVAS, Antal: Evolution of magnetic and mechanical properties in FINEMET-type precursor glasses during isothermal and pulse heat treatments. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 672-674. - ISSN 0587-4246

[18] KOVÁČ, Jozef - NOVÁK, Ladislav - VARGA, Lajos K.: Study of the magnetization processes in amorphous and nanocrystalline FINEMET by the numerical decomposition of the hysteresis loops. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 732-734. - ISSN 0587-4246

[19] NOVÁK, Ladislav - KOVÁČ, Jozef - HUBAČ, Lukáš: Influence of pulse heating on rayleigh area of amorphous FINEMET-type alloy. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 753-755. - ISSN 0587-4246

[20] KURIMSKÝ, Juraj - RAJŇÁK, Michal - CIMBALA, Roman - DOLNÍK, Bystrík - TÓTHOVÁ, Jana - PAULOVIČOVÁ, Katarína - TIMKO, Milan - KOPČANSKÝ, Peter - KOLCUNOVÁ, Iraida - PETRÁŠ, Jaroslav - DŽMURA, Jaroslav - BALOGH, Jozef: Ultrasound frequency analysis of a magnetic fluid in low-intensity external magnetic field. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 910-912. - ISSN 0587-4246

[21] BARAN, Anton - VRÁBEL, Peter - OLČÁK, Dušan: Solid state 13C nuclear magnetic resonance study of morphology and molecular mobility in quenched poly(3-hydroxybutyrate). In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 1144-1146. - ISSN 0587-4246

[22] FERTMAN, E. L. - FEDORCHENKO, A. V. - KHALYAVIN, D. D. - SALAK, A. N. - BARAN, Anton - DESNENKO, A. V. - KOTLYAR, O. V. - ČIŽMÁR, E. - FEHER, A. - SYRKIN, E. S. - VAISBURD, A. I. - OLEKHNOVICH, N. M. - PUSHKAREV, A. V. - RADYUSH, Yu. V. - STANULIS, A. - KAREIVA, A.: Multiferroic $Bi_{0.65}La_{0.35}Fe_{0.5}Sc_{0.5}O_3$ perovskite: Magnetic and thermodynamic properties. In: Journal of Magnetism and Magnetic Materials. Vol. 429 (2017), p. 177-181. - ISSN 0304-8853

7.2 Other publications

Publication Type	Articles on Internet	Conference Papers		Conference Abstracts		Textbooks
		Foreign	Home	Foreign	Home	0
Number	0	2	8	3	0	

DEPARTMENT OF MATHEMATICS AND THEORETICAL INFORMATICS

KATEDRA MATEMATIKY A TEORETICKEJ INFORMATIKY

ANNUAL REPORT 2017

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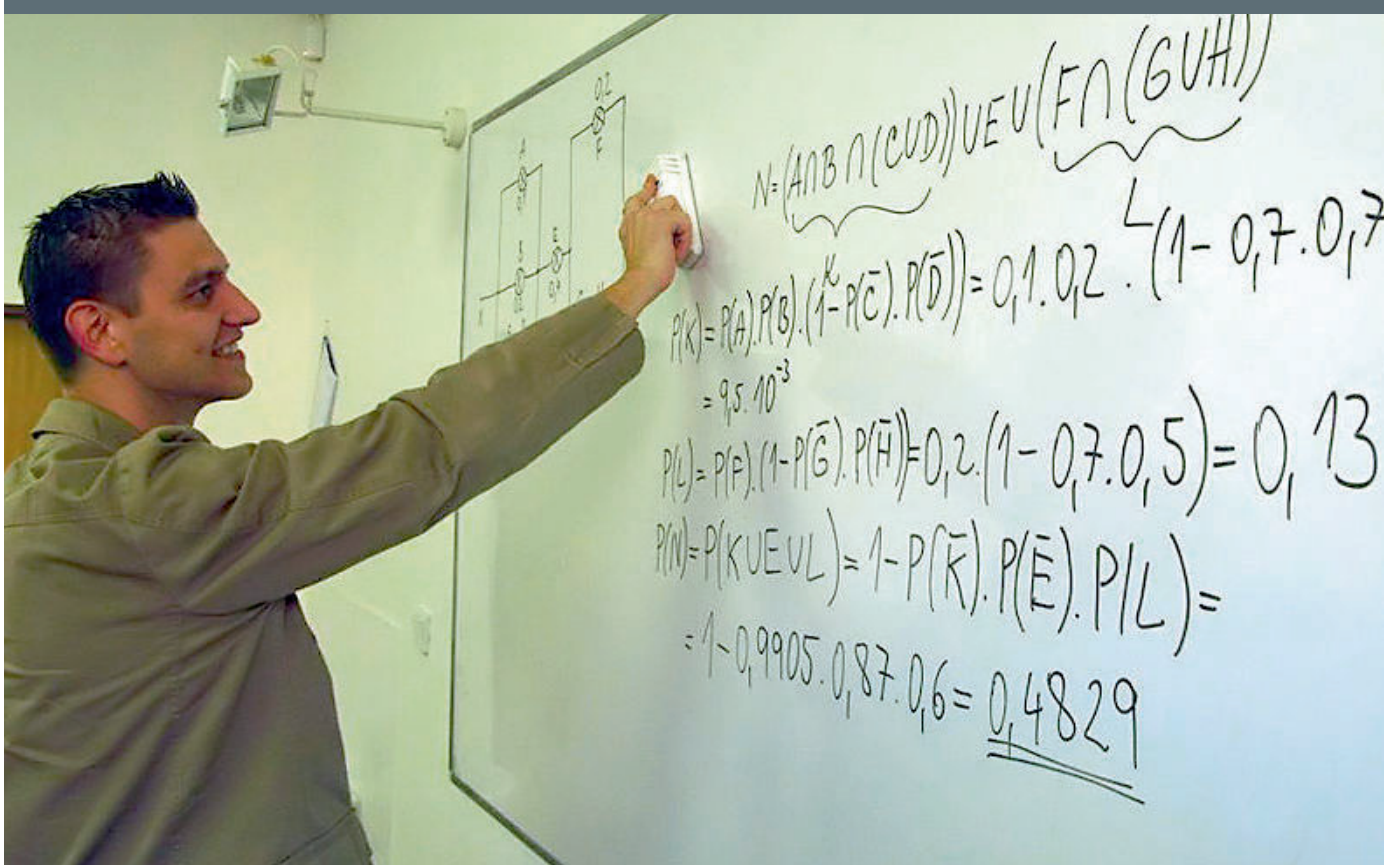
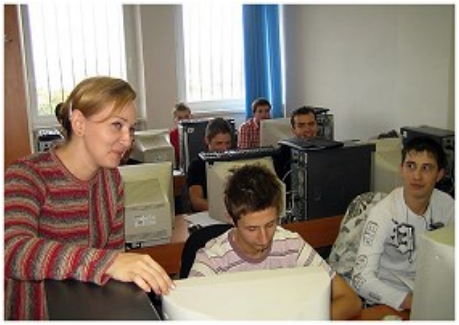


Department of Mathematics and Theoretical Informatics, before 1981 Department of Mathematical Informatics, was founded in 1969. The activities of the teachers are oriented to the mathematical research and education. The main educational goal is to prepare undergraduate students during the first two years of study in the following courses: Differential and integral calculus; Theory of complex variable functions; Ordinary differential equations; Qualitative theory of differential equations; Linear algebra; Mathematical statistics; Laplace, Fourier, and Z-Transformations; Numerical methods; Discrete mathematics and Mathematical modelling, Coding theory, Algorithms and complexity. In addition to the basic courses, the programs of the courses for graduate study were adjusted in co-operation with special departments. Members of the department prepared new lectures on various topics of applied mathematics for graduate study and for PhD students, such as Algorithms and complexity, Theory of queues, Fuzzy sets, Selected topics from mathematics, Financial mathematics, Optimization methods, Solving ill-posed problems. 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
- The study of the scaling laws in nonlinear systems and in the developed turbulence using renormalization group methods
- Algebraic structures and graph algorithms in max-plus and max-min algebras
- Topological graph theory – crossing numbers of graphs
- E-learning of mathematical subjects



2 STAFF

Professors:
prof. RNDr. Jozef Džurina, CSc.
prof. RNDr. Ján Plavka, CSc.

Associate Professors:
doc. RNDr. Blanka Baculíková, PhD.
doc. RNDr. Ján Buša, CSc.
doc. RNDr. Marián Klešč, PhD.
doc. RNDr. Helena Myšková, PhD.

Assistant Professors:
RNDr. Štefan Berežný, PhD.
RNDr. Emília Draženská, PhD.
RNDr. Anna Grinčová, PhD.
Mgr. Peter Mlynarčik, PhD.
RNDr. Monika Molnárová, PhD.
PhDr. Eva Ostertagová, PhD.
RNDr. Anna Pavlisková, PhD.
Mgr. Jana Petrillová, PhD.
Mgr. Ján Pribiš, PhD.
RNDr. Štefan Schrötter, CSc.
RNDr. Michal Staš, PhD.
RNDr. Mária Timková, PhD.

Technical Staff:
Bc. Lenka Ondejková

The Department consists of two parts:

- Mathematics Section
- Section of Theoretical Informatics

3 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)

4 TEACHING

4.1. Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Repetition of Mathematics	1st	0/3	Berežný, Grinčová, Draženská, Mlynarčik, Molnárová, Ostertagová, Petrillová, Schrötter, Staš, Timková
Repetition of Mathematics	1st	2/0	Buša
Mathematics I	2nd	3/2/2	Džurina, Baculíková, Grinčová
Mathematics I	2nd	4/3	Molnárová
Mathematics I	2nd	2/0	Buša
Discrete Mathematics	3rd	3/3	Klešč, Plavka
Mathematics II	3rd	3/3	Džurina, Pribiš
Mathematics II	3rd	2/0	Buša
Mathematics II	3rd	2/2	Grinčová
Theory of Coding	3rd	2/2	Plavka
Numerical Methods, Probability and Statictic	3rd	3/0	Klešč, Myšková
Numerical Methods, Probability and Statictic	3rd	2/0	Schrötter
Applications of Differential Equations	4 th	2/2	Baculíková
Algorithms and Complexity	4 th	2/2	Plavka
Discrete Mathematics	4 th	3/3	Klešč
Mathematical and Computing Modelling	5th	2/2/1	Džurina
Typographical System TEX	5th	1/2/1	Berežný
Financial Mathematics	6th	2/2	Grinčová
Operation Analysis	6th	2/2	Berežný

4.2. Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Applied Statistics	7th	2/2	Ostertagová
Differentional Equations and Variational Calculus	7th	2/2	Baculíková

Optimalization Methods	7th	2/2	Buša
Discrete Dynamic Systems	7th	2/2	Molnárová
Applied Mathematics	7th	3/2	Klešč
Discrete Dynamic Systems	8th	2/2	Molnárová
Linear and Quadratic Programing	8th	2/2	Staš
Graph Algorithms and Discrete Optimization	9th	2/2	Schrötter
Queueing Theory	9th	2/2	Berežný
Mathematical Methods for Neural Networks and Time Series	9th	2/2	Staš
Theory of Coding	9th	2/2	Plavka

5 RESEARCH PROJECTS

- **Invariants of non-planar graphs – crossing numbers**. VEGA Slovak Grant Agency No. 1/0389/15, duration 2015-2017, co-ordinator: Marián Klešč
- Grant FEI No. FEI-2015-22, duration 2017, co-ordinator: Jana Petrillová

6 CO-OPERATION

6.1. 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

6.1.1. Visitors to the Department

- Professor Marie Demlová, Czech Technical University in Prague, Faculty of Electrical Engineering, Department of Mathematics, Czech Republic
- Associate Professor Jiří Demel, Czech Technical University in Prague, Faculty of Civil Engineering, Czech Republic
- Associate Professor Emiliya Velikova, Angel Kanchev University of Rousse, Faculty of Natural Sciences and Education, Department of Mathematics, Bulgaria
- Dr. Edik Hayryan, Joint Institute for Nuclear Research, Dubna, Russia

6.2. 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
- JINR Dubna, Russia
- University of Miskolc, Hungaria
- Institute of Physics, Academia Sinica, Taiwan

6.3. Membership in International Organizations and Societies

- Buša, J.: Czechoslovak TeX Users Group (CSTUG)
- Klešč, M.: American Mathematical Society
- Plávka, J.: International Linear Algebra Society

6.4. Membership in Slovak Organizations and Societies

- Baculíková, B.: Slovak Mathematical Society
- Berežný, Š.: Slovak Mathematical Society
- Buša, J.: Slovak Mathematical Society
- Buša, J: Committee for the Cooperation of the Slovak Republic with JINR, Dubna
- Draženská, E.: Slovak Mathematical Society
- Džurina, J.: Slovak Mathematical Society
- Grinčová, A.: Slovak Mathematical Society
- Klešč, M.: OK 9-1-6 Discrete Mathematics
- Klešč, M.: Slovak Mathematical Society
- Molnárová, M.: Slovak Mathematical Society
- Plavka, J.: OK 9-1-6 Discrete Mathematics
- Schrötter, Š.: Slovak Mathematical Society

6.5. Contracts, International Scientific Projects

- CEEPUS – partner in CEEPUS III program CIII-HU-0028-10-1617 – Active Methods in Teaching and Learning Mathematics and Informatics, coordinator: Berežný, Š.

7 THESES

Thesis type	Bachelor	Master	Doctoral
Number	10	4	1

8 OTHER ACTIVITIES

8.1 Conferences and Workshops:

- Buša, J.: 18-th Conference of Košice Mathematicians, April 20-22, 2017, Herľany, Slovakia; co-organiser
- Buša, J.: The International Conference „Mathematical Modeling and Computational Physics, 2017“ (MMCP2017), July 3-7, 2017, Dubna, Russia, (mmcp2017.jinr.ru/); a member of the Organizing Committee and a member of the International Program Committee

8.2 Study tours:

- Berežný, Š.: School of Mathematics, University of Birmingham, United Kingdom
- Berežný, Š., Klešč, M.: Czech Technical University in Prague, Faculty of Electrical Engineering, Department of Mathematics, Czech Republic
- Berežný, Š., Pribiš, J.: JINR Dubna, Moscow region, Russia
- Myšková, H.: Palacký University, Faculty of Science, Olomouc, Czech Republic

8.3 Coordinator activity of CEEPUS:

- Molnárová, M.: Coordination meeting of the CEEPUS network CIII-HU-0028-11-1718, University of Miskolc, Department of Analysis of the Institute of Mathematics, Miskolc, Hungary

9 PUBLICATIONS

9.1. Books

[1] DRAŽENSKÁ Emília: Diskrétna matematika. Zbierka riešených a neriešených príkladov. 1. ed., TU Košice, 2017, 110 pp., ISBN 978-80-553-2297-1.

9.2. Journals

[1] BACULÍKOVÁ Blanka – DŽURINA Jozef: Remark on properties of Kneser solutions for third-order neutral differential equations. Applied Mathematics Letters. Vol. 63 (2017), p. 1-5. ISSN 0893-9659.

[2] BACULÍKOVÁ Blanka – DŽURINA Jozef: Oscillation of functional trinomial differential equations with positive and negative term. Applied Mathematics and Computation. Vol. 295 (2017), p. 47-52. ISSN 0096-3003.

[3] BACULÍKOVÁ Blanka: Oscillatory behavior of the second order functional differential equations. Applied Mathematics Letters. Vol. 72 (2017), p. 35-41. ISSN 0893-9659.

[4] BACULÍKOVÁ Blanka – RANI B. – SELVARANGAM S. – THANDAPANI E.: Properties of Kneser's solution for half-linear third order neutral differential equations. Acta Mathematica Hungarica. Vol. 152, No. 2 (2017), p. 525-533. ISSN 0236-5294.

[5] BEREŽNÝ Štefan: Laboratories for teaching of mathematical subjects. Acta Didactica Napocensia. Vol. 10, No. 1 (2017), p. 35-46. ISSN 2065-1430.

[6] BEREŽNÝ Štefan – STAŠ Michal: On the crossing number of the join of five vertex graph G with the discrete graph D_n. Acta Electrotechnica et Informatica. Vol. 17, No. 3 (2017), p. 27-32. ISSN 1335-8243.

[7] BUDAJOVÁ Kristína – KOMOVÁ Eva – BEREŽNÝ Štefan – GLASER-OPITZ Henrich: The vernier system at the faculty of aeronautics. Acta Didactica Napocensia. Vol. 10, No. 1 (2017), p. 47-52. ISSN 2065- 1430.

[8] BUŠA Ján – Buša Jr. Ján – DOVICA Miroslav – FABIAN Michal – IŽOL Peter: An algorithm of a freeform surfaces measurement adjustment using a specification of the workpiece coordinate system location. Advances in Science and Technology: Research Journal. Vol. 11, No. 3 (2017), p. 223-232. ISSN 2299-8624.
[9] DŽURINA Jozef – JADLOVSKÁ Irena: A note on oscillation of second-order delay differential equations. Applied Mathematics Letters. Vol. 69, No. 1 (2017), p. 126-132. ISSN 0893-9659.
[10] DŽURINA Jozef – JADLOVSKÁ Irena: Asymptotic behavior of third-order functional differential equations with a negative middle term. Advances in Difference Equations. Vol. 2017, p. 1-15. ISSN 1687-1847.
[11] DŽURINA Jozef – BACULÍKOVÁ Blanka: Properties of Kneser solutions for third-order differential equations. Applied Mathematics and Computation. Vol. 307 (2017), p. 165-169. ISSN 0096-3003.
[12] DŽURINA Jozef: Oscillatory behavior of the second order noncanonical differential equations. Applied Mathematics Letters. Vol. 73 (2017), p. 62-68. ISSN 0893-9659.
[13] FRANKOVSKÝ Peter – OSTERTAG Oskar – OSTERTAGOVÁ Eva – TREBUŇA František – KOSTKA Ján – VÝROSTEK Marek: Experimental analysis of stress fields of rotating structural elements by means of reflection photoelasticity. Applied Optics. Vol. 56, No. 11 (2017), p. 3064-3070. ISSN 1559-128X.
[14] GRINČOVÁ Anna – ANDREJIOVÁ Miriam – MARASOVÁ Daniela: Analysis of conveyor belt impact resistance data using a software application. Acta Polytechnica Hungarica. Vol. 14, No. 2 (2017), p. 113-130. ISSN 1785-8860.
[15] KLEŠČ Marián – PETRILLOVÁ Jana – VALO Matúš: On the crossing numbers of Cartesian products of wheels and trees. Discussiones Mathematicae Graph Theory. Vol. 37, No. 2 (2017), p. 399 - 413. ISSN 1234-3099.
[16] MARASOVÁ Daniela – AMBRIŠKO Ľubomír – ANDREJIOVÁ Miriam – GRINČOVÁ Anna: Examination of the process of damaging the top covering layer of a conveyor belt applying the FEM. Measurement. Vol. 112 (2017), p. 47-52. ISSN 0263-2241.
[17] MARASOVÁ Daniela – ANDREJIOVÁ Miriam – GRINČOVÁ Anna: Applying the heuristic to the risk assessment within the automotive industry supply chain. Open Engineering. Vol. 7, No. 1 (2017), p. 43-49. ISSN 2391-5439.
[18] MARASOVÁ Daniela – ANDREJIOVÁ Miriam – GRINČOVÁ Anna: Creation of the project of a logistic system for transportation of minerals - case study. TEM Journal. Vol. 6, No. 2 (2017), p. 205-213. ISSN 2217-8309.
[19] MOLNÁR Vieroslav – FEDORKO Gabriel – ANDREJIOVÁ Miriam – GRINČOVÁ Anna – MICHALIK Peter: Online monitoring of pipe conveyors part 2: Evaluation of selected operational parameters for the design of expert system. Measurement. Vol. 104 (2017), p. 1-11. ISSN 0263-2241.
[20] MYŠKOVÁ Helena – DRAŽENSKÁ Emília: Interval fuzzy matrix equations. Kybernetika. Vol. 53, No. 1 (2017), p. 99-112. ISSN 0023-5954.
[21] STAŠ Michal: On the crossing number of the join of the discrete graph with one graph of order five. Mathematical Modelling and Geometry. Vol.

5, No. 2 (2017), p. 12-20. ISSN 2311-1275.

[22] SVETLÍK Jozef – BUŠA Ján – BRESTOVIČ Tomáš – DOBRÁNSKY Jozef – KRÁĽ Jr. Ján: Film thickness estimation for the oil applied to the inner surface of slim tubes. Applied Sciences. Vol. 7, No. 10 (2017), p. 1-15. ISSN 2076-3417.

9.3. Other publications

Publication Type	Confereces		Other
	Foreign	Home	
Number	0	1	3

DEPARTMENT OF THEORETICAL AND INDUSTRIAL ELECTRICAL ENGINEERING

ANNUAL REPORT 2017

Head of Department
prof. Ing. Dobroslav Kováč, PhD.
E-mail: Dobroslav.Kovac@tuke.sk

http://ktpe.fei.tuke.sk
Tel./Fax: +421 55 602 2801

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:

- Study of the electrical, magnetic and structural properties of lanthanides and their thin films at low temperatures and in magnetic fields.
- 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 and smart information circuits in industrial systems.
- DSP systems.

2 STAFF

Professors:	prof. Ing. Dobroslav Kováč, PhD. prof. Ing. Irena Kováčová, PhD.
Associate Professors:	doc. Ing. Ján Dudáš, DrSc. doc. Ing. Miroslav Mojžiš, PhD. doc. RNDr. Darina Špaldonová, PhD. doc. Ing. Iveta Tomčíková, PhD. doc. Ing.Ján Molnár, PhD. doc. Ing. Tibor Vince, PhD. doc. Ing. Milan Guzan, PhD.
Assistant Professors:	Ing. Radoslav Bučko, PhD. Ing. Anna Hodulíková, PhD. Ing. Jozef Dziak, PhD.
Technical staff:	Jozef Lenart Danuša Topolčaniová
PhD. Students:	Ing. Matej Bereš Ing. Dávid Schweiner Ing. Patrik Jacko

3 LABORATORIES

- laboratory for industrial control systems
- laboratory for electrical measurement
- laboratory for basics of electrical engineering
- PC laboratories
- laboratory for Internet remote measuring systems
- laboratory microcontrollers
- laboratory for DSP systems
- laboratory for basics of electronics

4 TEACHING

4.1. Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Fundamentals of Electrical Engineering	1st	2/2	Tomčíková, Dudáš, Hodulíková
Electrotechnics	2nd	3/2	Guzan, Hodulíková, Špaldonová, Tomčíková
Digital Measurement	2nd	2/2	Mojžiš
Electrotechnical Practical Lessons	2nd	0/3	Mojžiš, Bučko
MS Office in Technical Practice	2nd	2/2	Špaldonová
Programming of Industrial Applications I	2nd	2/2	Vince
Windows server	3rd	2/2	Vince
Industrial Electrical Engineering	3rd	3/3	Molnár, Bereš
CAD systems in Electrotechnics	3rd	2/3	Špaldonová, Tomčíková, Guzan
Informatics and Industrial Measurement	3rd	2/2	Mojžiš, Guzan
Computational, Office and Multimedial Technique	4th	2/2	Guzan
Programming of Industrial Applications II	4th	2/2	Dziak, Bereš
Semestral Project II	4th	0/3	Kováč
Metrology	5th	2/2	Mojžiš, Guzan
Modelling and Measurement	5th	2/2	Molnár
Applied Electronics	5th	2/3	Kováčová
Database Systems SQL ORACLE	5th	2/2	Molnár
Bachelor´s Project	5th	0/6	Kováč, Tomčíková

4.2. Graduate study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Software Application Development in Industrial Electrical engineering	7th	2/2	Vince
DSP Processor Application	7th	2/2	Jacko
Project management	7th	2/2	Dziak

Applied MATLAB	7th	2/2	Tomčíková
Automated measurement systems and systems controlled via Internet	7th	2/2	Molnár
Control Systems	8th	2/2	Kováč
Control electronics	8th	2/2	Kováčová
Linux II	8th	2/2	Molnár
Economical Analyses and Accounting	8th	2/2	Kováčová
Numerical methods in electrical engineering	9th	2/2	Špaldonová
Windows server II	9th	2/2	Vince
CAM systems	9th	2/2	Bučko
Visualization Programs for Controlling Systems	9th	2/2	Vince
Diploma Project	9th	2/6	Kováčová
Main knowledge of study field and its use	10th	0/4	Kováč

4.3. Doctoral study (PhD.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Selected Chapters of Theory Electrical Enginering	1st	5/5	Kováč
Industrial Electrical Engineering	2nd	5/5	Kováč
Subject of Specialization	3rd	5/5	Kováčová
Disertation Project	3rd	5/10	Kováč
Disertation Thesis	8th	5/10	Kováč

5 RESEARCH PROJECTS

- ***Centre of Excellence of the Integrated Research & Exploitation the Advanced Materials and Technologies in the Automotive Electronics***. ITMS 26220120055, activity 2.5 - Laboratory for modeling and measuring (MODMER), duration: 2010-2013, co-ordinator: D. Kováč, members: I. Tomčíková, M. Guzan, T. Vince, R. Bučko, J. Molnár, M. Bačko, J. Perduľak.
- ***Investigation of postnatal neurogenesis in relation to neurodegeneration.*** Project VEGA No. 2/0069/15, duration: 2015-2017, co-ordinator: J. Molnár, members: I. Kováčová, D. Kováč, T. Vince, M. Bereš.

6 CO-OPERATION

6.1. 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 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
- Ausys, s.r.o

6.2. 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

6.3. Membership in International Organizations and Societies

- D. Kováč: Member of the team of evaluators of The Grant Agency of Czech Republic
- D. Kováč: Member of Editorial Board of Journal “Acta Technica”

6.4. 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 the Slovak Committee for Measuring and Evaluating of Electrical Power

- D. Kováč: Member of Editorial Board of Journal "Acta Electrotechnica et Informatica"
- D. Kováč: Member of Slovak Commission for Ph.D. Study in the Branch of Theoretical Electrical Engineering
- D. Kováč: Member of Scientific council of FEE&I TU of Košice
- M. Mojžiš: Member of Technical Standardization Committee

7 THESES

Thesis type	Bachelor	Master	Doctoral
Number	10	13	0

8 OTHER ACTIVITIES

9 PUBLICATIONS

9.1. Books

[1] DUDÁŠ, J.: Lexicon of lesser-known and confusing secular and religious concepts. Turany, 1st edition, 2017, 581 pages, ISBN 978-80-972644-3-7

9.2. Journals

[1] KOVÁČ, D. - KOVÁČOVÁ, I. - VINCE, T. - MOLNÁR, J. - PERDUĽAK, J. - BEREŠ, M. - DZIAK, J.: An automated measuring laboratory (VMLab) in education. In: *International Journal of Engineering Education*, Vol. 32, no. 5 (2017), p. 2250-2259, ISSN 0949-149X

9.3. Textbooks

[1] KOVÁČ, D.: Sensors and sensor systems. 1st edition, *TU Košice*, 2017, 78 p., ISBN 978-80-553-3122-5
[2] KOVÁČOVÁ, I.: Electronic circuits in industrial electrotechnics 1st part. 1st edition, *TU Košice*, 2017, 91 p., ISBN 978-80-553-3111-9
[3] KOVÁČOVÁ, I.: Electronic circuits in industrial electrotechnics 2nd part. 1st edition, *TU Košice*, 2017, 89 p., ISBN 978-80-553-3112-6
[4] ŠPALDONOVÁ, D.: Electromagnetism. 1st edition, *TU Košice*, 2017, 227 p., ISBN 978-80-553-2807-2
[5] KOVÁČ, D.: Control systems. 1st edition, *TU Košice*, 2017, 74 p., ISBN 978-80-553-3189-8
[6] ŠPALDONOVÁ, D.: Comsol - ACDC module. 1st edition, *TU Košice*, 2017, 89 p., ISBN 978-80-553-2816-4
[7] DZIAK, J.: Basic knowledge of project management for students of industrial branches. 1st edition, *TU Košice*, 2017, 68 p., ISBN 978-80-553-2819-5
[8] KOVÁČ, D.: Basics of Electrical Engineering 1. 1st edition, *TU Košice*, 2017, 71 p., ISBN 978-80-553-2867-6
[9] KOVÁČ, D.: Basics of Electrical Engineering 2. 1st edition, *TU Košice*, 2017, 68 p., ISBN 978-80-553-2875-1

[10] KOVÁČOVÁ, I.: Thermal and energy balance of the building. 1st edition, *TU Košice*, 2017, 69 p., ISBN 978-80-553-2884-3
[11] KOVÁČ, D.: DC - DC converters for alternative power sources. . 1st edition, *TU Košice*, 2017, 68 p., ISBN 978-80-553-2677-1
[12] KOVÁČOVÁ, I.: Electronics Basics 1. 1st edition, *TU Košice*, 2017, 70 p., ISBN 978-80-553-2675-7
[13] KOVÁČOVÁ, I.: Electronics Basics 2. 1st edition, *TU Košice*, 2017, 78 p., ISBN 978-80-553-2676-4
[14] KOVÁČ, D.: Basics of Electrical Engineering 3. 1st edition, *TU Košice*, 2017, 78 p., ISBN 978-80-553-2681-8
[15] KOVÁČOVÁ, I.: Visualization and control with Control Panel and Control Web. 1st edition, *TU Košice*, 2017, 120 p., ISBN 978-80-553-2680-1

9.4. Other publications

Publication Type	Confereces		Other
	Foreign	Home	
Number	7	2	55

DEPARTMENT OF TECHNOLOGIES IN ELECTRONICS

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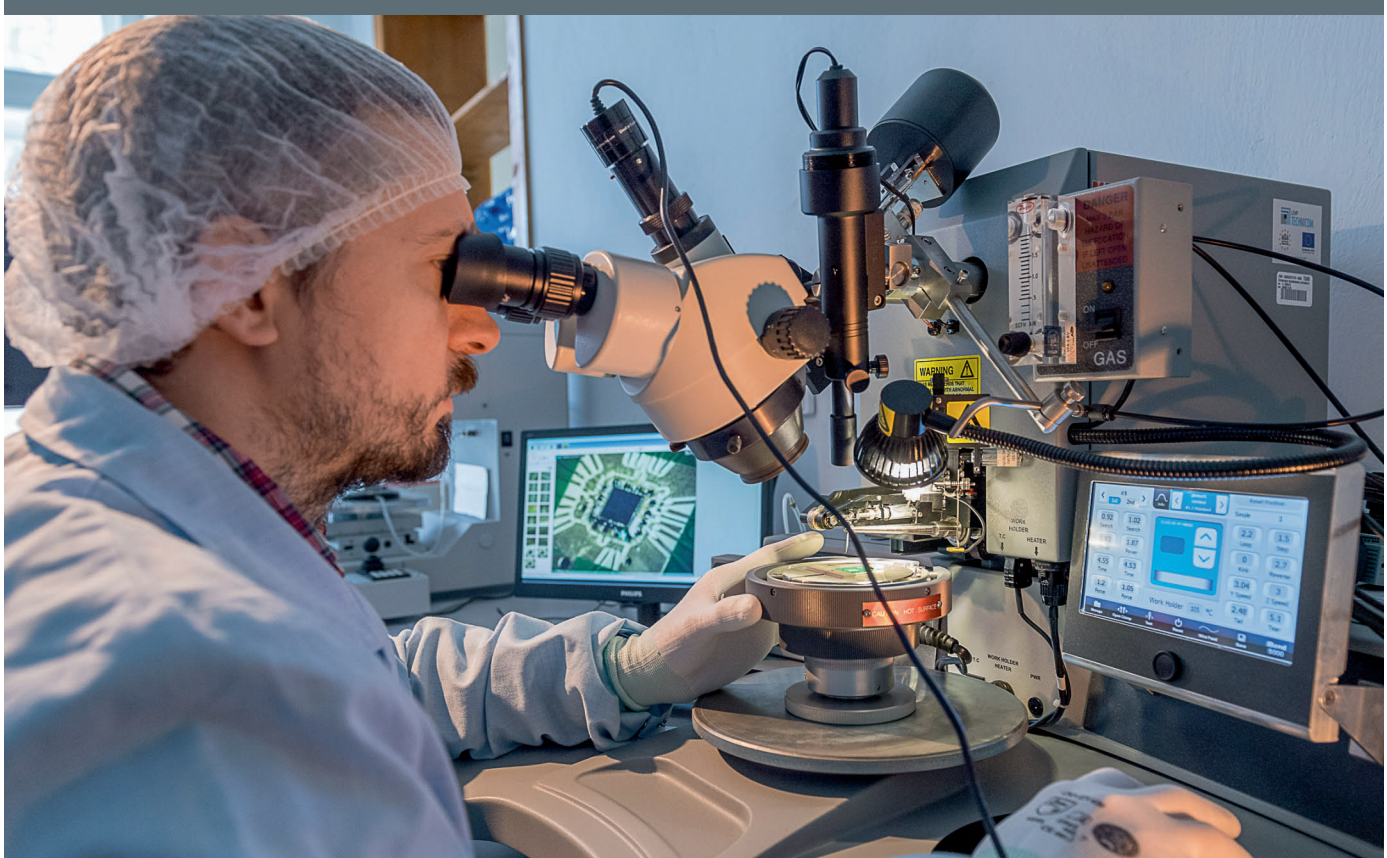
ANNUAL REPORT 2017



The Department of Technologies in Electronics (Katedra technológií v elektronike – KTE) was founded in 1991. The Department offers three types of full-time courses:
Bachelor's Degree course “Technologies in 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.

Master's Degree course "*Technologies in automotive electronics*" lasts in normal way 2 years and is leading to degree Ing. The graduates get theoretical and practical skills in the area of automotive electronic with the aspect on progressive materials and technologies.

PhD. course "*Technologies in automotive electronics*" 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 automotive electronics.

The subjects in the degree courses are orientated to technologies in electronics with the accent on automotive electronics: mounting technology in electronics, printed circuit boards, thick film technology, LTCC technology and polymer technology.

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,
- research and development of microsystems and hybrid sensors,
- LTCC multilayer modules,
- printing technologies in electronic (InkJet-printing, screen-printing),
- quality and reliability of electronic systems.

2 STAFF

Professors:	prof. Ing. Alena Pietriková, CSc. prof. Ing. Stanislav Slosarčík, CSc. prof. Ing. Juraj Banský, CSc. Dr.h.c. prof. Ing. Miloš Somora, CSc.
Associate Professors:	doc. Ing. Juraj Ďurišin, PhD.
Assistant Professors:	Ing. Slavomír Kardoš, PhD. Ing. Ľubomír Livovský, PhD. Ing. Igor Vehec, PhD. Ing. Pavol Cabúk, PhD. Ing. Ondrej Kováč, PhD. Ing. Tibor Rovenský, PhD. Ing. Peter Lukács, PhD. (new employee from July 2017)
Research Staff:	Igor Vehec
Secretary:	Mgr. Alena Focková
Internal Ph.D. Students:	Ing. Peter Lukács (defended PhD. thesis in June 2017) Ing. Tomáš Girašek Ing. Peter Balog Ing. Samuel Žuk Ing. Peter Čech Ing. Marek Fecík Ing. Tomáš Lenger

3 LABORATORIES

3.1 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.

3.2 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.
- Laboratory of Quality and Reliability (thermal shock and climatic chamber, pull/shear test).
- Laboratory of Material Analysis (grinder-polisher, material microscopy).

4 TEACHING

4.1 Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Fundamentals of Materials Engineering	1st	2/2	Pietriková, Kardoš, Vehec, Cabúk
Fundamentals of Car Construction	3rd	3/2	Ďurišin, Cabúk
Fundamentals of Microelectronic Technologies	4th	2/2	Vehec
Fundamentals of Technologies in Electronics	4th	2/2	Kardoš
Measurement of Electronics Structures	5th	2/2	Cabúk
Bachelor Project	5th	0/8	Pietriková
Automated Measuring Systems	6th	2/2	Livovský
Methods of Quality Evaluation in Technologies in Automotive Electronics	6th	2/2	Ďurišin
Bachelor Work	6th	0/12	Pietriková

4.2 Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Production Processes in Electronics I	1st	3/3	Pietriková
Design Systems in Electronic	1st	2/2	Livovský
Physical principles and design of microsystems	1st	3/2	Somora

Diploma Project 1	2nd	0/4	Pietriková
Production Processes in Electronics II	2nd	2/3	Slosarčík
Methods of Reliability in Electronics	2nd	2/2	Pietriková
Quality Management	2nd	2/2	Pietriková
Diploma Project 2	3rd	0/8	Pietriková
Manufacturing Technologies, Structure, Properties and Applications of Sensors	3rd	2/2	Banský
Microcontrollers in Automotive Electronics	3rd	2/2	Livovský
Main Knowledge of Study Field Progressive Materials and Technologies in Automotive Electronic and its Application	4th	2/2	Pietriková
Diploma Work	4th	0/18	Slosarčík

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

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Fundamentals of Material Engineering	1st (Bc.)	2/2	Pietriková, Kardoš
Production Processes in Electronics I	1st (Ing.)	3/2	Pietriková
Design systems in electronics	1st (Ing.)	2/2	Livovský, Rovenský
Physical principles and design of microsystems	1st (Ing.)	3/2	Somora, Kardoš

4.4 Postgraduate Study (PhD.)

Subject	Semester	Lectures/exercises (hours per week)
Electrotechnology and Materials	1st	0/2
Scientific Research 1	1st	0/10
Analyse Methods of Electronic Materials and Structures	2nd	0/10
Scientific Research 2	3rd	0/10
Subject of the Branch	3rd	0/10
Scientific Research 3	5th	0/10
Scientific Research 4	6th	0/10
Scientific Research 5	7th	0/10
Dissertation Project	8th	0/20
Dissertation Thesis	8th	0/20

4.5 PhD. Students at the Branch of Electrotechnology and Materials

Name of PhD student	Thesis	Year of study/form	Supervisor
Čech, P.	Active and passive components integration into MCM modules based on LTCC for HF applications	1 / internal	Pietriková
Fecík, M.	Ink Jet Printing technology in electronics	1 / internal	Pietriková
Lenger, T.	Creation and properties of embedded structure in electronic	1 / internal	Pietriková
Žuk, S.	Contribution to Analyse and Development of Capacitive and Inductive Sensor Based on Film Technology	3 / internal	Pietriková
Balog, P.	System for Movement of Paraplegics	4 / internal	Slosarčík
Girašek, T.	Contribution to development of new generation joints in power electronics	4 / internal	Pietriková
Lukács, P.	Layers Based on Silver Nanoparticles Realized by Inkjet Printing Technology	defended in 2017	Pietriková

5 RESEARCH PROJECTS

5.1. Structural Funds

- Participation on the project from structural funds: **University Science Park TECHNICOM for Innovation Applications Supported by Knowledge Technology** (Univerzitný vedecký park TECHNICOM pre inovačné aplikácie s podporou znalostných technológií). ITMS: 26220220182. Coordinator: prof. Ing. Stanislav Kmeť, CSc. Duration: 2013 - 2015+.

5.2. Visegrad Funds

- **V4 Seminars for young scientists on publishing techniques in the field of engineering science**. Project ID: #21730020. Duration: 2017 - 2018.

5.3. Research Projects

- ***Development of New Generation Joints of Power Electronics Using Nonstandard Sn-based Alloys*** (Vývoj novej generácie spojov výkonovej elektroniky s použitím neštandardných zliatin na báze cínu). Project APVV-14-0085. Coordinator: prof. Ing. Alena Pietriková, CSc. Duration: 2015 - 2018.
- ***Vertical Lower Limbs Rehabilitation Device for Spatial Mobility of Patient*** (Vertikálne rehabilitačné zariadenie dolných končatín umožňujúce priestorovú mobilitu pacienta). Project VEGA 1/0074/15. Coordinator: prof. Ing. Stanislav Slosarčík, CSc. Duration: 2015 - 2018.
- ***Promotion of modern teaching methods at the Laboratory of automotive electronics*** (Podpora moderných metód výučby v Laboratóriu automobilovej elektroniky). Project KEGA 021TUKE-4/2017. Coordinator: prof. Ing. Alena Pietriková, CSc. Duration: 2017 - 2019.
- ***Optimization of Adhesive Mechanism of Silver Layers on Polymeric Substrates Realized by InkJet Technology*** (Optimalizácia adhézneho mechanizmu strieborných vrstiev na polymérnych fóliách realizované InkJet

Printing technológiou). Project FEI-2015-24. Coordinator: Ing. Peter Lukács. Duration: 2017.

6 CO-OPERATION

6.1. Co-operation in Slovakia

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

6.1.1. Industrial Partners

- Magneti Marelli Slovakia, s.r.o.
- ELCOM, s.r.o., Prešov
- PreDops, s.r.o., Prešov
- MICRONIC, s.r.o., Kysak
- ELPRO, s.r.o., Košice
- Sensor, s.r.o., Košice
- Semikron, s.r.o., Vrbové
- SMK Logomotion, Bratislava
- Michatek, k.s., Michalovce
- Samsung Electronics Slovakia, s.r.o., Galanta
- Panasonic Industrial Devices Slovakia, s.r.o.

6.1.2. Academic Partners

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

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

6.2. 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,
- IMT Bucharest, Romania, bilateral co-operation SK/Ro project,
- University POLITEHNICA of Bucharest (UPB), COST,
- Budapest University of Technology and Economics (BME), COST,
- Politechnika Rzeszow, Poland.

6.3. Visitors to the Department

- Potencki, J., Poland (Rzeszów) 23.06. – 23.06.2017
- Tomaszewski, G., Poland (Rzeszów) 23.06. – 23.06.2017

6.4. Visits of Staff Members to Foreign Institutions

- Cabúk, P., Hungary (Budapest) 20.03. – 23.03.2017
- Slosarčík, S., Poland (Rzeszów) 31.03. – 01.04.2017
- Žuk, S., Bulgaria (Sofia) 10.05. – 14.05.2017
- Girašek, T., Bulgaria (Sofia) 10.05. – 14.05.2017
- Focková, A., Bulgaria (Sofia) 10.05. – 14.05.2017
- Pietriková, A., Bulgaria (Sofia) 10.05. – 14.05.2017
- Vehec, I., CZ (Pilsen) 23.05. – 26.05.2017
- Livovský, Ľ., CZ (Pilsen) 23.05. – 26.05.2017
- Kardoš, S., CZ (Pilsen) 23.05. – 26.05.2017
- Pietriková, A., CZ (Pilsen) 23.05. – 26.05.2017
- Cabúk, P., CZ (Pilsen) 23.05. – 26.05.2017
- Slosarčík, S., Austria (Salzburg) 31.05. – 03.06.2017
- Ďurišin, J., Spain (Donostia-San Sebastian) 17.06. – 25.06.2017
- Ďurišin, J., Germany (Hamburg) 06.09. – 10.09.2017
- Pietriková, A., Poland (Warsaw) 11.09. – 12.09.2017
- Žuk, S., Poland (Warsaw) 11.09. – 13.09.2017
- Girašek, T., Poland (Warsaw) 11.09. – 12.09.2017
- Slosarčík, S., Poland (Rzeszów) 27.10. – 27.10.2017
- Cabúk, P., CZ (Brno) 08.11. – 11.11.2017
- Pietriková, A., CZ (Brno) 08.11. – 11.11.2017
- Vehec, I., CZ (Brno) 08.11. – 11.11.2017
- Žuk, S., CZ (Brno) 08.11. – 11.11.2017

6.5. Membership in International Organizations and Societies

- Banský, J.: Honorary Consul of Federal Republic Germany in Slovak Republic.
- Pietriková, A.: Member of the International Steering Committee for International Spring Seminar on Electronics Technology – ISSE.
- Slosarčík, S.: Member of the International Steering Committee for IMAPS – Czech and Slovak.
- Slosarčík, S.: Member of "Scientific Committee", International Interdisciplinary PhD Workshop I2PhDW.
- Pietriková, A.: Member of the International Steering Committee for IMAPS Poland Conference.
- 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).
- Slosarčík, S.: Member of "International Program Committee", The International Conference on Advances in Electronic and Photonic Technologies.
- Pietriková, A.: Member of IMAPS CZ&SK.
- Slosarčík, S..: Member of IMAPS CZ&SK.
- Livovský, Ľ.: Member of IMAPS CZ&SK.
- Cabúk, P.: Member of IMAPS CZ&SK.
- Vehec, I.: Member of IMAPS CZ&SK.

6.6. Membership in Slovak Organizations and Societies

- Banský, J.: Vice-Chairman of the Board of Directors "East Slovakian Investment Agency".
- Pietriková, A.: Member of the SRDA (APVV) Agency Council for Programme "Support for building personnel infrastructure in all sectors of research and development in Slovakia for the period 2016-2019" (LP).
- Pietriková, A.: Member of Editorial Board "ACTA ELECTROTECHNICA ET INFORMATICA".
- Pietriková, A.: Member of Cultural and Educational Commission KEGA No.3.
- Pietriková, A.: Chair of the Commission for Ph.D. Study in the Branch "5-2-12 Electrotechnology and Materials" at FEI TU Košice.
- Pietriková, A.: Member of the Commission for Ph.D. Study in the Branch "5-2-12 Electrotechnology and Materials" at Faculty of Electrical Engineering, University of Žilina.
- Slosarčík, S.: Member of the Slovak Metrology Society.
- Pietriková, A.: Member of Scientific Board at TUKE.
- Pietriková, A.: Vice-president of Scientific board at FEI TUKE.
- Livovský, Ľ.: Member of the Faculty Academic Senate at FEI TUKE.

7 THESES

Thesis type	Bachelor	Master	Doctoral
Number	11	7	1

8 OTHER ACTIVITIES

8.1. Invited Lectures

- CABÚK, P.: Software for the simulation during design process (Software pre simulácie v priebehu návrhu zariadenia). 3rd IMAPS Flash Conference, November 9-10, 2017, Brno, Czech Republic.

8.2. Competitions and Rewards

- LUKÁCS, P.: Dean Prize for the article: Layers Based on Silver Nanoparticles Realized by Inkjet Printing Technology, 17th Scientific Conference of Young Researchers, Herlany, Slovakia, 16.5.2017.
- GIRAŠEK, T.: Elfa Prize for the article: Analyzing of heat transfer and joints quality in power electronic devices, 17th Scientific Conference of Young Researchers, Herlany, Slovakia, 16.5.2017.

9 PUBLICATIONS

9.1. Textbooks

[1] LUKÁCS, P. - ROVENSKÝ, T.: Návody na cvičenia z predmetu Základy inžinierstva materiálov. 1. vyd - Košice : TU - 2017. - 78 s. [CD-ROM]. - ISBN 978-80-553-2841-6
[2] KARDOŠ, S.: Design, packaging and integration in electronics. 1. vyd - Košice : Technická univerzita - 2017. - 70 s. (including animation slides) [CD-ROM]. - ISBN 978-80-553-2813-3.

[3] KARDOŠ, S. - HERSTEK, R.: Princípy činnosti a postupy výroby MEMS senzorov pre automobilové systémy. 1. vyd - Košice : Technická univerzita - 2017. - 75 s. (vrátane vizualizácií) [CD-ROM]. - ISBN 978-80-553-2826-3

9.2. Current Journals

[1] LUKÁCS, P. - PIETRIKOVÁ, A. - BALLOKOVÁ, B. - JAKUBÉCZYOVÁ, D. - KOVÁČ, O.: Investigation of nano-inks' behaviour on flexible and rigid substrates under various conditions. In: Circuit World. Vol. 43, no. 1 (2017), p. 2-8. - ISSN 0305-6120

[2] LIVOVSKÝ, Ľ. - PIETRIKOVÁ, A.: Real-time profiling of reflow process in VPS chamber. In: Soldering and Surface Mount Technology. Vol. 29, no. 1 (2017), p. 42-48. - ISSN 0954-0911

[3] ĎURIŠIN, M. - PIETRIKOVÁ, A. - ĎURIŠIN, J. - SAKSL, K.: Structure and thermal behavior of lead-free solders prepared by rapid solidification of their melt. In: Soldering and Surface Mount Technology. Vol. 29, no. 1 (2017), p. 49-53. - ISSN 0954-0911

[4] ONUFER, J. - ZIMAN, J. - REZNIČÁK, M. - KARDOŠ, S.: The influence of temperature on unidirectional effect in domain wall propagation. In: Acta Physica Polonica A. Vol. 131, no. 4 (2017), p. 723-725. - ISSN 0587-4246

[5] LUKÁCS, P. - PIETRIKOVÁ, A. - CABÚK, P.: Dependence of electrical resistivity on sintering conditions of silver layers printed by InkJet printing technology. In: Circuit World. Vol. 43, no. 2 (2017), p. 80-87. - ISSN 0305-6120

[6] PIETRIKOVÁ, A. - ROVENSKÝ, T. - KOVÁČ, O.- VEHEC, I. - ĎURIŠIN, J.: Influence of firing profile on microstructural and dielectric properties of LTCC substrates. In: Microelectronics International. Vol. 34, no. 3 (2017), p. 127-130. - ISSN 1356-5362

[7] SAKSL, K. - ĎURIŠIN, J. - BALGA, D. - MILKOVIČ, O. - BRESTOVIČ, T. - JASMINSKÁ, N. - ĎURIŠIN, M. - GIRMAN, V. - BALKO, J. - KATUNA, Y. - ŠULÍKOVÁ, M. - ŠÚĽOVÁ, K. - FEJERČÁK, M. - BOLDI, J. - BERTRAM, F.: Devitrification and hydrogen storage capacity of the eutectic $Ca_{72}Mg_{28}$ metallic glass. In: Journal of Alloys and Compounds. Vol. 725 (2017), p. 916-922. - ISSN 0925-8388

9.3. Journals registered in Web of Science or SCOPUS

[1] KARDOŠ, S. - BALOG, P. - SLOSARČÍK, S.: Gait dynamics sensing using IMU sensor array system. In: Advances in Electrical and Electronic Engineering. Vol. 15, no. 1 (2017), p. 71-76. - ISSN 1336-1376

[2] PIETRIKOVÁ, A. - GIRAŠEK, T. - LUKÁCS, P. - WELKER, T. - MÜLLER, J.: Simulation of cooling efficiency via miniaturised channels in multilayer LTCC for power electronics. In: Jurnal of Electrical Engineering. Roč. 68, č. 2 (2017), s. 132-137. - ISSN 1335-3632

9.4. Journals

[1] ŽUK, S. - PIETRIKOVÁ, A.: Capacitive Sensors Realized on Flexible Substrates. In: ElectroScope. Vol. 2017, no. 2 (2017), p. 1-5. - ISSN 1802-4564

[2] VEHEC, I. - PIETRIKOVÁ, A.: Degradation of Al-1%Si Wires Bonded onto Copper Pads. In: ElectroScope. Vol. 2017, no. 2 (2017), p. 1-5. - ISSN 1802-4564

[3] GIRAŠEK, T. - PIETRIKOVÁ, A.: Tepelná analýza LTCC substrátov s vnútornými kanálikmi. In: DPS Elektronika od A do Z. Vol. 8, no. 1 (2017), p. 10-12. - ISSN 1805-5044
[4] KOVÁČ, O. - GLADIŠOVÁ, I.: Multifocal images fusion. In: Acta Electrotechnica et Informatica. Roč. 17, č. 3 (2017), s. 22-26. - ISSN 1335-8243
[5] GIRAŠEK, T. - PIETRIKOVÁ, A. - WELKER, T. - MÜLLER, J.: Simulation of heat transfer by cooling channels in LTCC substrate. In: Acta Electrotechnica et Informatica. Roč. 17, č. 2 (2017), s. 11-15. - ISSN 1335-8243
[6] KARDOŠ, S. - BUŠEK, D.: Visualization of MEMS structures for education of automobile microsystems. In: Acta Electrotechnica et Informatica. Roč. 17, č. 3 (2017), s. 17-21. - ISSN 1335-8243
[7] CABÚK, P.: Pokročilé termálne modely výkonových komponentov. In: DPS : Elektronika od A do Z. Vol. 8, no. 3 (2017), p. 24-26. - ISSN 1805-5044
[8] JURČIŠIN, M. - SLOSARČÍK, S. - BALOG, P.: Software tool and peripherals of system for measuring of intra-abdominal pressure. In: Transactions of the Universities of Košice. Roč. 2017, č. 1 (2017), s. 47-55. - ISSN 1335-2334
[9] CABÚK, P.: FloEDA Bridge – Nástroj pre import geometrie DPS. In: DPS : Elektronika od A do Z. Vol. 7, no. 6 (2016), p. 16-17. - ISSN 1805-5044
[10] CABÚK, P.: Použitie Peltierovho článku pri chladení elektronických komponentov. In: DPS : Elektronika od A do Z. Vol. 7, no. 4 (2016), p. 10-11. - ISSN 1805-5044

9.5. Patents

[1] LIVOVSKÝ, Ľ. - PIETRIKOVÁ, A.: Spôsob spojitého riadenia teplotného profilu pretavovania spájkovacej pasty v prostredí nasýtených pár vriacej kvapaliny. PP 80-2017, In: Banská Bystrica: ÚPV: 2017, 7 s.

9.6. Other publications

Publication Type	Conferences		Other
	Foreign	Home	
Number	3	5	5

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www.fei.tuke.sk