

DEPARTMENT OF MECHATRONICS AND ELECTRONICS

1 General Information

Department of Mechatronics and Electronics (KME) is part of the Faculty of Electrical Engineering at the University of Žilina. It is workplace which primary task is to train experts in area of electronics, industry automation, power-electronic and mechatronic systems on all levels of university education. Great importance is science-research activity of the department which is realized by variety of projects funded by international and national grants.

Department team is led by group of internationally recognized professors and associated professors with high scientific and educational erudition. Part of this group is also younger researchers and post-doctorate students. Strong part of collective is represented by intern doctorate students with significant participation in science-research activity.

The department supports wide variety of activities in addition to already mentioned. Department supports research for industrial, national and foreign subjects and variety of student's activities and projects.

Like the previous years, the last year could be considered as a very successful one. Within the year the updating of laboratory equipment in the building AB was completed. Significant progress has been made in building of centres of excellence laboratories.

In the last year the research activity of the Department has achieved a significant increasing implemented by means of grant projects. Department staff participated in several international and national projects. Centres of Excellence CEEX2 and CEKR2 have been built within the frame of which the Department has cooperated with several prestigious Slovak institutions (SAS Košice, The Technical University of Košice and Jesenius Faculty of Medicine of the Comenius University in Martin). These projects represent a very significant support to research which has been done in our Department.

In the year 2013 the Department involves fourteen members of educational staff, eight research workers, fourteen internal PhD students and thirteen external PhD students. From the point of view of internal structure it has been divided into two divisions. The first one is focused on power- and applied electronics, the second one is operating in the field of mechatronics and industry automation.

The Department provides educational process at all three levels of the university study. The bachelor degree is covered by the accredited course of study for Electrical Engineering (specialization in Mechatronic Systems). Master degree includes the accredited course of study for Power Electronic Systems (in Power Electronics specialization and Mechatronic and Automotive Systems specialization). In doctorate study the department staff participated in providing training courses in Powerline Electronics, Automation and Telecommunications. Within the frame of educational pedagogical operation the Department has been providing education of electronics, mechatronics, micro-computer systems involving industrial controllers and power electronics at the Faculty of Electrical Engineering, and also at further faculties of the University of Žilina. Such education has been dedicated for different study branches and specializations in the bachelor, magisterial and doctoral studies, both in internal and external ones.

The Department also has organized and provided research and development, expertizing and contracts, and develops publication activity in the field of electronics, control systems, mechatronics and power electronics mainly. Further education is provided by the Department in the field of power electronic systems, microcomputer control systems, industrial controllers and programmable logic systems.

Professional activities of the Department have been applied and disseminated on creation and operation of quality and reliable electronic devices and systems, application of programmable logic areas in design of electronic systems, reconfigurable circuits study as well as diagnostics and analyzing of the failures using image analysis. Topology

optimizing for power semiconductor converters and their electro-magnetic compatibility belongs to main activities of the Department.

In present time the Department operates with six laboratories dedicated for pedagogical operation, including final projects, final and master thesis providing. Beside above mentioned labs the Department offers for utilizing three high-tech workplaces dedicated for research and development activities and to experimental part of PhD study providing. It deals with the laboratory of power electronics, the laboratory of digital image processing and laboratories of digital signal processors and industrial programmable logic controllers.

2 Staff of the Department

Head of the Department: Pavol Špánik
Vice-head of the Department: Branislav Dobrucký
Secretary for Education: Anna Kondelová
Administrative Support: Andrea Prandová

2.1 Sections of the Department

2.1.1 Section of Electronics and Control Systems

Head of the Section: Jozef Čuntala
Professors: Branislav Dobrucký, Pavol Špánik
Associate Professors: Jozef Čuntala, Miroslav Hrianka, Libor Hargaš,
Jozef Budaj, Jozef Kuchta
Research Fellows: Dušan Koniár, Anna Kondelová, Ondrej Hock,
Michal Praženica, Slavomír Kaščák
Senior Lecturers (with PhD): Rastislav Pavlanin, Rastislav Havrila,
Peter Drgoňa, Michal Frivaldský
Senior Lecturers (without PhD): Jozef Lakatoš, Peter Šindler,

2.1.2 Section of Mechatronic Systems and Industry Automation

Head of the Section: Fedor Kállay
Professors: Fedor Kállay
Associate Professors: Pavel Pavlásek, Anna Simonová
Research Fellows: Marek Paškala

2.1.3 Postgraduate Students

Internal (full-time): Stanislav Štofán (until 31st March 2013),
Tomáš Kapusta (until 31st August 2013), Jozef Sedlák (until 31st August
2013), Slavomír Kaščák (until 31st August 2013), Roman Radvan,
Andrej Rybovič, Peter Čuboň, Marek Valčo, Jozef Šedo,
Juraj Koscelník, Zuzana Liptáková (until 30st September 2013),
Martin Galád (from 1st September 2013), Roman Mažgút (from 1st
September 2013), Tomáš Laškody (from 1st September 2013)

External (part-time): Marek Paškala, Anna Kondelová, Ivan Šišťík,
Peter Jeck, Ivan Lovás, Andrej Kaňovský, Jaroslav Ilončíak,
Matej Bielik, Erika Záhorcová Polčanová, Zuzana Ridzoňová,
Daniela Hívešová, Marián Novota, Anna Bystričanová Holásková

3 Teaching

3.1 Courses in Bachelor and Master Degree Programmes

3.1.1 Bachelor Degree Programmes

Code Title	Semester	Lessons-Seminars-Exercises		Teachers
		hours/week		
<i>Courses at the Faculty of Electrical Engineering</i>				
31302 Electronics I	3	2-0-3		Čuntala
31212 Introduction to Industry Automation and Mechatronics	1;3	1-0-3		Pavlásek
31402 Automatic Regulation 1	4	2-2-0		Simonová
31413 Electric Light and Heat	4	2-1-1		Pavlásek
31414 Electromagnetic Compatibility	4	2-2-0		Špánik
31415 Electronics II	4	2-0-3		Hrianka
31426 Measurement of Non-Electric Parameters	4	2-0-2		Kállay
31427 Power Supplies	4	2-0-1		Špánik
31430 Computers in Industrial Automation	4	2-0-2		Kállay
31502 Power Electronics	5	3-1-2		Špánik
31511 Microprocessor Technology	5	3-0-2		Čuntala
31524 Logical Circuits	5	3-0-2		Hrianka
31528 Multimedia Technology	5	2-0-1		Pavlásek
31542 Image Processing and Analysis	5	2-0-2		Hrianka
31552 Computer and Office Technique	5	2-0-1		Pavlásek
31556 Mechatronics	5	2-0-2		Pavlásek
31557 Automatic Regulation 2	5	2-1-1		Simonová
31563 Design of Electronic Devices	6	2-2-6		Čuntala
31628 Power Semiconductor Systems	6	3-1-1		Špánik
31630 Bachelor Project Power Electronic Systems	6	0-0-6		Kállay
31634 Bachelor Project Mechatronic Systems	6	0-0-6		Kállay

Courses at the Faculty of Mechanical Engineering

2B092 Drives of Mechatronic Systems	5	2-0-1		Špánik
2B127 Electronics	6	2-0-2		Čuntala

3.1.2 Master Degree Programmes

Code Title	Semester	Lessons-Seminars-Exercises		Teachers
		hours/week		
<i>Courses at the Faculty of Electrical Engineering</i>				
32107 Electromagnetic Compatibility in Electr.	1	2-2-0		Špánik
32111 Information and Industrial Networks	1	2-0-2		Hargaš
32117 Design of ASIC	1	1-3-0		Čuntala
32119 Computers in Industrial Automation 2	1	2-0-2		Hargaš
32126 Control of Electric Actuators	1	3-1-1		Dobrucký
32129 Theory of Automatic Control 1	1	2-1-1		Simonová
32136 Power Semiconductor Converters	1	3-0-3		Špánik
32200 Analysis and Synthesis of PE Circuits	2	2-2-0		Špánik
32211 Measurement and Digit. Data Processing	2	2-2-0		Pavlásek
32216 Microprocessors, Microcomputers and DSP	2	2-0-3		Dobrucký
32233 Microproc. and Microcomputer Systems	2	3-0-3		Dobrucký

32236	Theory of Automatic Control 2	2	2-1-1	Simonová
32325	Design of ASIC	2	2-2-0	Čuntala
32341	Virtual Instrumentation	2,3	2-0-2	Hargaš
32300	Power Electronics Applications in ET & EE	3	3-0-1	Dobrucký
32324	Design and Construction of PE Systems	3	2-2-0	Špánik
32330	Semiconductor Sensors	3	2-2-0	Lakatoš
32334	Semestral Project	3	0-4-0	Špánik
31515	Mechatronic Systems	3	2-0-2	Pavlásek
32402	Diploma Thesis PES	4	0-2-0	
32404	Diploma Seminar	4	0-2-0	Špánik
32405	Discrete Control of Power Systems	4	6-0-6	Dobrucký
32406	Dispatching Systems	4	4-0-4	Kállay
32416	Industrial Informatics	4	4-0-4	Kállay

Courses at the Faculty of Mechanical Engineering

2N125	Electronic Control Elements	1	2-2-0	Špánik
2N244	Exploitation of Computer Networks	1	2-0-2	Hargaš
2N246	Microcomputer Technics	1	2-0-2	Čuntala
2N014	Information and Industry Networks	2	2-0-2	Hargaš
2N125	Electronic Control Elements	2	2-2-0	Špánik
2N140	Converter Drives	3	2-2-0	Špánik
2N141	Control Microcomputers	3	2-2-0	Dobrucký

Courses for Foreign Students – LLP/Erasmus Program

Course / Teacher / Student of University

- 31413 Electric Light and Heat (*Pavlásek*),
Izabela Baran, Ilona Karvatovicz, Przemyslaw Borkiewicz, Wioleta Wróbel,
Uniwersytet Technologiczno-Humanistyczny im. K. Pułaskiego w Radomiu, PL
- 31415 Electronics II (*Hrianka, Kondelová*),
Izabela Baran, Ilona Karvatovicz, Przemyslaw Borkiewicz, Wioleta Wróbel,
Uniwersytet Technologiczno-Humanistyczny im. K. Pułaskiego w Radomiu, PL
- 31430 Computers in Industrial Automation / Dobrucký
Artjomis Mihailovs, Transport and Telecommunication Institute, Latvia
Tiago Lobao Correia, Universidade do Porto, PT
- 31552 Computing and Office Technology / Pavlásek
Atanas Pavlov Velchev, College of Telecommunication and Post, BG
- 31628 Power Semiconductor Systems / Dobrucký
Özer Dönmez, Uludag University, TR
- 31212 Introduction to Industrial Automation and Mechatronics / Pavlásek
Juris Ormanis, Transport and Telecommunication Institute, Latvia
- 31302 Electronics 1 / Čuntala, Kondelová
Juris Ormanis, Transport and Telecommunication Institute, Latvia
- 31502 Power Electronics / Dobrucký
Burak Celikkol, Hüsein Karasu, Birol Öter, Uludag University, TR
- 31528 Multimedia Technology (*Pavlásek*),
Burak Celikkol, Hüsein Karasu, Uludag University, TR
- 31542 Image Processing and Analysis / Hargaš, Koniar
Birol Öter, Uludag University, TR

4 Research & Development

The Department also has organized and provided research and development, expertizing and contracts, and develops publication activity in the field of electronics, control systems, mechatronics and power electronics mainly.

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Research and Development Laboratories

4.1 Laboratory of Electromagnetic Compatibility

The laboratory is built nowadays. In laboratory, will be realized research in emission a resistance of convertors with high switching frequency.

4.2 Laboratory of Physical Models

The laboratory of physical models offers base for development of physical models. Laboratory contains basic mechanical and electronic tools and measurement devices for electronic circuits. Laboratory is accessible for both employees and students which are supervised.

4.3 Laboratory of Doctoral Research

Employees of the Department are dealing with science-research activity in analysis and design of power convertor systems, electromagnetic compatibility and image analysis in biomedicine. There are realized also computer simulations and verifications.

4.4 Laboratory of Low Power Drives Research

Laboratory is focused on research, design and testing of two-phase low power drives and perspective control structures for low power drives. Development of convertors for two-phase drives and experiments in field of sensor-less motor position determination is realized. Equipment of laboratory includes dSpace work station, measurement devices, oscilloscopes, function generators, power analyzer, power supplies, convertors and electrical motors.

Education and Research Laboratories

4.5 Laboratory of Power Electronics

Lessons of Power Electronics Systems.

4.6 Laboratory of Industrial Automation

Lessons of Industrial Automation application.

4.7 Laboratory of Control Systems

Lessons of Control Systems and DSP programming.

4.8 Laboratory of Logic Circuits

Lessons of the Logic Systems and research in area of digital image processing.

4.9 Laboratory of Microelectronics

Lessons of ASIC design and methods of control, analysis and synthesis of power systems.

5 Research and Educational Projects

5.1 National Projects

5.1.1 Research Projects Funded by the Scientific Grant Agency of the Slovak Republic (VEGA)

VEGA 1/0943/11: Research of Adaptive Multi-Tank Power System for Renewable Energy Sources

Summary: Project is dealing with development of system for accumulation and distribution of electric energy from renewable energy sources. Primary source of energy is photovoltaic cell.

Realization: 01/2011 – 12/2013

Coordinator: Pavol Špánik

Co-operator: Branislav Dobrucký, Fedor Kállay, Miroslav Hrianka, Libor Hargaš, Anna Kondelová, Marek Paškala, Michal Frivaldský, Dušan Koniar, Anna Simonová, Tomáš Kapusta, Jozef Šedo

VEGA 1/0184/13: Research of indirect computing algorithms and tools for evaluation of power loss in power electronic device's component with support of physical model simulation postprocessing

Summary: Design and verification of methodology for evaluation of power losses of individual components of power electronic device, on the basis of dynamical measurement of surface thermal field, with use of thermal camera and comparison of thermal field of physical model with dynamical injection of power into individual component of this device.

Realization: 01/2013 – 12/2015

Coordinator: Peter Drgoňa

Co-operator: Jozef Čuntala, Pavol Špánik, Anna Kondelová, Peter Šindler, Jozef Lakatoš, Onderej Hock, Peter Čuboň, Rastislav Pavlanin

5.1.2 Research Projects Funded by the Slovak Research and Development Agency (APVV)

APVV-0138-10: Research and Development of the Small Power Drives with Two-phase Motors

Summary: Development of two-phase low power electric drives concerning to home appliances and industrial low power applications.

Realization: 05/2011 – 10/2014

Coordinator: Pavel Záskalický, TUKE Košice

Sub-Coordinator: Branislav Dobrucký

Co-operators: Michal Frivaldský, Peter Drgoňa, Michal Praženica, Ján Kašša, Slavomír Kaščák

APVV-0314-12: Research and Development of New Generation of Power Supplies Based on Converters with High Power Density, High Efficiency, Low EMI and Circular Energy

Summary: Project is focused on research and development of new generation of switched mode power supplies, which are based on LLC, LLCLC and LCTLC topology with high power density and multifunction output and with double half-bridge DC/DC converter characterized by low circulating energy and low EMI. Co-operation with Elteco.

Realization: 10/2013 – 09/2017

Coordinator: Branislav Dobrucký

Co-operators: Pavol Špánik, Peter Šindler, Peter Drgoňa, Michal Frivaldský, Michal Praženica, Juraj Koscelník

APVV-0433-12: Research and Development of Intelligent System for Wireless Energy Transfer in Electromobility Application

Summary: The project is focused on problem of systems for wireless energy transfer, representing progressive solution for supplying of mobile and industrial devices. Task of this project is research of major effects on efficiency of systems for wireless energy transfer, usable for realization of charging points in the area of electromobility.

Realization: 10/2013 – 09/2017

Coordinator: Pavol Špánik

Co-operators: Libor Hargaš, Peter Drgoňa, Michal Frivaldský, Dušan Koniar, Michal Praženica, Ondrej Hock, Marek Valčo, Jozef Šedo, Peter Čuboň

5.1.3 Projects of European Structural Funds

ITMS 26220120046: CEEX2 Centre of Power Electronic Systems and Materials for their Components, Operational Program Research and Development II

Summary: Completion and updating of workplaces of power electronic systems. Completion and updating of workplaces for power electronic system materials.

Realization: 09/2010 – 05/2014

Coordinator: Pavol Špánik, Branislav Dobrucký

Co-operators: Jozef Čuntala, Peter Šindler, Peter Drgoňa, Anna Simonová, Marek Paškala, Libor Hargaš, Michal Frivaldský, Pavel Pavlásek, Rastislav Pavlanin

ITMS 2622010034: CEKR2 Centre for Experimental and Clinical Respiriology II

Summary: Workstation updating of experimental and clinical respirology.

Realization: 01/2010 – 12/2013

Coordinator: Miroslav Hrianka

Co-operator: Libor Hargaš, Anna Simonová, Stanislav Štofán, Jozef Lakatoš

ITMS 26220220019: MKC Ciliary Kinetics Measurement of Respiratory Tractus

Summary: Design and assembly of measurement system for analysis of micro objects kinematics

Realization: 03/2009 – 03/2013

Coordinator: Miroslav Hrianka

Co-operator: Libor Hargaš, Dušan Koniar

ITMS 26110230004: Systemisation of Advanced Technology and Knowledge Transfer between Industrial Sphere and University Environment

Summary: Strategic objective of the project is – according to the main goal of the call OPV-2009/1.2/01-SORO – Support of innovative forms of education at universities and development of human resources in research and development of operating programme Education – Universities and research and development as driving means for knowledge society development

Realization: 05/2010 – 04/2013

Coordinator: Milan Šaga, Faculty of Mechanical Engineering, University of Žilina

Co-operator: Pavol Špánik, Branislav Dobrucký, Michal Frivaldský, Jozef Čuntala

ITMS 26110230005: Flexible and Attractive Education at University of Žilina for Needs of Labour Market, and Knowledge Society

Realization: 2010 – 03/2013

Coordinator: Renáta Švarcová

Co-operator: Pavol Špánik, Branislav Dobrucký, Pavel Pavlásek, Libor Hargaš, Jozef Čuntala

ITMS 26220220078: Research of High-Economic components of Electric Drive Systems of Driving Traction Vehicles and Urban Mass Transportation Vehicles

Summary: Research of components of electric drive systems for electric locomotives and urban mass transportation vehicles using of latest principles, materials, circuit and construction solutions leading to primary energy savings, minimising of back influences onto supply system and emission minimising.

Realization: 09/2010 – 05/2014

Coordinator: Pavol Špánik

Co-operator: Fedor Kállay, Peter Šindler, Michal Frivaldský, Anna Kondelová, Peter Drgoňa, Marek Paškala, Slavomír Kaščák

ITMS 26220220046: The Development of Parallel Kinematic Structures Prototypes for Application in the Area of Production Machines and Robots

Realization: 09/2009 – 05/2013

Coordinator: Viera Poppeová, Faculty of Mechanical Engineering, University of Žilina

Co-operator: Peter Šindler

ITMS 26220220088: Applied Research and Development of Inovative Energy Resources for Ultra High Pressure Pulses

Summary: Project deals with analysis and design of plasmabit electrical part for deep drill holes. Energy transfer is investigated in operation steady states as well as critical states.

Realization: 09/2010 – 08/2013

Coordinator: Pavol Rafajdus

Co-operator: Branislav Dobrucký

ITMS 26110230089 Universities as engines of knowledge society development

Summary: Reform of educational system and professional training, modern education for a knowledge society.

Realization: 05/2013 – 11/2015

Coordinator: Helga Jančovičová, UIPŠ.

Co-operator: Pavlásek Pavel

ITMS 26110230079 Innovation and globalization of education – means for quality increasing at University of Žilina in European educational area

Realization: 02/2013 – 08/2015

Coordinator: Renáta Švarcová, ŽU

Co-operator: Branislav Dobrucký, Jozef Čuntala, Peter Drgoňa, Michal Frivaldský, Libor Hargaš, Dušan Koniar, Anna Simonova, Pavol Spanik

5.2 International Projects**5.2.1 CEEPUS II Projects****CII-SK-0030-06-1011: From preparation to development, implementation and utilisation of joint programs in study area of Production Engineering – contribution to higher flexibility and mobility of students in central European region**

Summary: Computer aid for production technologies

Realization: 01/2008 – 08/2013

Coordinator: Ivan Kuric, Faculty of Mechanical Engineering, University of Žilina

Co-operators: Fedor Kállay

5.2.2 Custom-made Research Projects**P-103-0007/08: Analysis of heat fields in power electronic systems**

Summary: Project deals with appraisal of lifetime of supercapacitors.

Realization: 06/2012 – 07/2013

Customer: Panasonic Electronic Devices Europe GmbH

Coordinator: Pavol Špánik

Co-operators: Jozef Čuntala, Branislav Dobrucký, Jozef Lakatoš, Libor Hargaš, Michal Frivaldský, Peter Drgoňa, Roman Radvan

6 Co-operation**6.1 Co-operation Partners in Slovakia**

EVPÚ a.s Nová Dubnica

Panasonic Electronic Devices Slovakia, s.r.o., Trstená

NES Nová Dubnica

Power-One, Dubnica nad Váhom

Siemens s.r.o., Bratislava, Žilina

Vedeckotechnologický park, Žilina

LJF Martin, UK Bratislava

ABB Slovakia, Bratislava

DataTherm, s.r.o. Žilina

Robotec s.r.o. Sučany

CONTINENTAL MATADOR s.r.o. Púchov

HAGARD: HALL a.s. Nitra, Žilina

IPESOFT s.r.o. Žilina

Považská cementáreň a.s., Ladce

Energocontrols s.r.o. Žilina

ControlTech, s.r.o. Trnava

Schneider Electric Slovakia, s.r.o., Bratislava, Žilina

MACRO, s.r.o., Žilina

SSE, a.s. Žilina

Súkromná zvaračská škola, Žilina

Department of el. engineering, mechatronics and industrial engineering, FEI TU Košice

Department of mechatronic systems, FM TUAD, Trenčín
 Department of automation and regulation, FEI STU, Bratislava
 Department of electric machines and apparatus, FEI STU, Bratislava
 INA Kysuce, a.s. Kysucké Nové Mesto
 KIA Motors, s.r.o. Žilina
 GRANIT, s.r.o. Žilina
 AAUTO, s.r.o. Žilina
 VIP AUTO, s.r.o. Žilina
 TEAM DC, Bratislava
 GS1 Slovakia, Žilina
 Htest Slovakia, Banská Bystrica
 SSC, Bratislava
 NDS, Bratislava
 SEMIKRON s.r.o. Vrbové
 EMIS s.r.o. Bratislava
 Pneustyle s.r.o. Žilina
 AXONpro a.s. Bratislava
 Samsung Electronics Slovakia s.r.o. Galanta

6.2 International Co-operation Partners

Università degli studi di Catania, IT, DIEES, Prof. Alfio Consoli
 Panasonic Electronic Devices Co., Ltd., Kadoma, JPN
 Panasonic Electronic Devices Europe GmbH, Lüneburg, DE
 Politecnico di Bari, IT, DEE, Prof. Francesco Cupertino
 University of Nottingham, UK, Prof. Greg ASHER, Prof. Pat Wheeler
 University of Picardie – Jules Verne, Amiens, FR, Prof. Gérard-André Capolino
 National University of Ireland, Dublin, IRL, Prof. Annroi de Paor
 University of Porto, PT, Prof. Maciel Barbosa
 Technische Universität Dresden, DE, Dr. Peter Büchner
 Technische Universität Darmstadt, DE, Prof. Andreas Binder
 Technikum Wien, AT, Prof. Felix Himmelstoss
 Technische Universität Bochum, DE, Prof. Andreas Steimel
 National Instruments Czech Republic, s.r.o., CZ, Peter Brieška
 Technical University RWTH Aachen, DE, Prof. Blazek Vladimir
 Politechnika Radomska, PL, Prof. Miroslav Luft, Assoc. Prof. Elzbieta Szychta
 XILINX USA, University program
 Humusoft s.r.o. Praha, CZ, Karel Bittner
 TU – VŠB Ostrava, CZ, Prof. Pavel Brandstetter, Prof. Petr Chlebiš
 FAIRCHILD Semiconductor - Power Franchise, EU
 FreeScale s.r.o., Rožňov pod Radhoštěm, CZ
 Rockwell Automation s.r.o., Praha, CZ
 Technological & Cultural Park of Lavrion, GR
 TIM Science Park, Timisoara, RO
 University Ioan Slavici, Timisoara, RO
 The University of Strathclyde, Glasgow, UK
 EQUINOCCIO Madrid, ES

6.3 Visitors to the Department

<i>Name</i>	<i>Institution</i>	<i>Length of stay</i>
Asoc. Prof. Mahmud Ali Rzig ABDALMULA, MSc., PhD.	Univ. of Aljabel Algarbi, Sabrata, Libya	21 days
Minoru KUBO, MSc., PhD.	Panasonic, Kobe, Japan	1 day
Naoki YUDA, MSc., PhD.	Panasonic, Japan	1 day

Dipl.-Ing. Norbert GLAPA	Panasonic, DE	1 day
Yoshihide KANAKUBO, MSc., PhD.	Panasonic, DE	1 day
Nicky NAKAJIMA, MSc., PhD.	Panasonic, DE	1 day
Ing. Peter Durana, PhD.	Panasonic, DE	1 day
Asoc. Prof. Dmitry KOLOSOV, PhD.	RSTU, Rostov on Don, RF	1 day
Ing. Zdeněk HALÁMKA, PhD.	ABB s.r.o., Ostrava-Hrabová, CZ	1 day
Bc. Andrea DZIDKOVÁ	ABB s.r.o., Ostrava-Hrabová, CZ	1 day
Ing. Lucie HALASOVÁ	ABB s.r.o., Plzeň, CZ	1 day

6.4 Visits to Foreign Institutions

Name	Institution	Length of stay
Prof. Ing. Branislav DOBRUCKÝ, PhD.	University of Catania, IT	5 days
Prof. Ing. Pavol ŠPÁNIK, PhD.	UNICT Catania, IT	5 days
Ing. Michal Frivaldský, PhD.	UNICT Catania, IT	5 days
Prof. Ing. Pavol ŠPÁNIK, PhD.	UNICT Catania, IT	7 days
Ing. Michal Frivaldský, PhD.	UNICT Catania, IT	7 days
Ing. Peter Drgoňa, PhD.	UNICT Catania, IT	7 days

Participation in Foreign conferences:

Active:

Prof. Ing. Branislav Dobrucký, PhD.	OPSFA 2013, Sousse, Tunis	6 days
Prof. Ing. Branislav Dobrucký, PhD.	IASTED 2013, Banf, Alberta, CA	6 days
Prof. Ing. Branislav Dobrucký, PhD.	ICERI 2013, Sevilla, ES	5 days
Ing. Peter Čuboň	TCP 2014, Praha, CZ	2 days
Ing. Marek Valčo	TCP 2014, Praha, CZ	2 days
Ing. Juraj Koscelník	TCP 2014, Praha, CZ	2 days
Ing. Tomáš Laškody	TCP 2014, Praha, CZ	2 days
Ing. Martin Galád	TCP 2014, Praha, CZ	2 days
Ing. Peter Čuboň	Poster 2014, Praha, CZ	2 days
Ing. Marek Valčo	Poster 2014, Praha, CZ	2 days
Ing. Jozef Šedo	Poster 2014, Praha, CZ	2 days
Doc. Ing. Miroslav Hrianka, PhD.	Vojtek – Rudnik days, Rabka, PL	3 days
Doc. Ing. Libor Hargaš, PhD.	Vojtek – Rudnik days, Rabka, PL	3 days
Doc. Ing. Dušan Koniar, PhD.	Vojtek – Rudnik days, Rabka, PL	3 days

7 Other Activities

7.1 Specialized Lectures, Courses Organized by the Department

Title of Lecture/Course: Power Supply Seminar

Customer: Department of Mechatronics and Electronics, University of Žilina
 Lecturer: Tomáš Pokorný, Ján Starý, Jakub Hájek
 Date: 4th June 2013

Title of Lecture/Course: Freescale Seminar

Customer: Department of Mechatronics and Electronics, University of Žilina
 Lecturer: Rastislav Pavlanin
 Date: 24th June 2013

Title of Lecture/Course: eSeminar: Biometric Identifiers

Customer: GS1 SLOVAKIA, Department of Mechatronics and Electronics,
 University of Žilina

Lecturer: Pavel Pavlásek
Date: 9th December 2013

Title of Lecture/Course: Biometric Identification Systems

Customer: GS1 SLOVAKIA, Department of Mechatronics and Electronics,
University of Žilina

Lecturer: Miroslav Štaffen, Pavel Pavlásek
Date: 11th December 2013

Title of Lecture/Course: Control of Tunnel Operation

Distant Education for Operators at the Bôrik Tunnel

Customer: SSC

Lecturer: Fedor Kállay
Date: November 2013

7.2 Invited Lectures/Papers

Position 'Sensing' of PMSM Using HF Signal Applied to the Model of the Motor: Simulation and Experimental Results

Lecturer: Pavol Špánik, Branislav Dobrucký

Where/Date: Workshop in Memoriam pf Alfio Consoli, Catania, IT / 28th January 2013

7.3 Membership in International Institutions/Committees

Branislav Dobrucký	- Senior Member of IEEE IE Society - Reviewer for Publishing Company Elsevier, NL - Reviewer for EPE journal, Brussels, BE - Steering Executive Committee of International IASTED 2013 Conference - Member of SMTC 2013 Evaluation Committee - competition
Pavel Pavlásek	- Member of the Editorial Board of the Inžinierske stavby Journal - Member of Brandon Hall Excellence in Learning Technology Awards - Expert of FP7 Programme NMP – 2007 – 3.4 – 1 - Expert of Romanian Ministry of Education, Research and Youth - Member of European Committee expert team of science and research
Pavol Špánik	- Senior Member of IEEE IE Society - Member of the Scientific Board of FEI – TU Ostrava, CZ - Member of the Electronics Committee, FEI – TU Ostrava, CZ
Michal Frivaldský	- Member of IEEE IE Society
Peter Drgoňa	- Member of IEEE IE Society

7.4 Membership in National Institutions/Committees

Branislav Dobrucký	- Steering Programme Committee of ALER 2013 Conference - Steering Programme Committee of TRANSCOM 2013 Conference
Pavel Pavlásek	- Member of the Commission of Transport and Road Administration port (The Žilina Self-governing region) - Member of the Grant Commission for Education and Culture No.2 of the Ministry of Education of Slovak Republic - Member of the Commission of the Ministry of Education of Slovak Republic for Selection of the Aid of Candidates from Developing Countries and Compatriots - Representative of Regional Assembly of Žilina Self-governing Region - Member of the Supervisory Board of SSE – Distribúcia a.s. Žilina - Member of the Supervisory Board of Letisková spoločnosť a.s. Žilina

- Pavol Špánik - Member of the Working Group „Industry Technologies“ at Ministry of Education, Science, Research and Sport of the Slovak Republic
 - Member of the Working Group „Electro-mobility“ at Ministry of Economy of the Slovak Republic
- Libor Hargaš - Member of the Scientific Board of the journal Modeling and Control of Mechanic and Mechatronic Systems in American Journal of Mechanical Engineering, special issue committee

7.5 Membership in University Boards

- Branislav Dobrucký - Member of the Editorial Board of ZU Scientific Journal – Communication – Scientific Letters
 - Member of the Scientific Board of FEE ZU
 - Member of the Electrical Engineering Committee, FEE ZU
 - Member of the Automation and Control Committee – Process Control, FEE ZU
- Pavol Špánik - Member of the Senate ZU
 - Member of the Academic Senate of FEE ZU
 - Member of the Scientific Board of FEE ZU
 - Member of the Electrical Engineering Committee, FEE ZU
 - Member of the Power Engineering Committee, FEE ZU
 - Member of the Automation and Control Committee – Process Control, FEE ZU
 - Member of the Measurement Technique Committee, FEI TU Košice
- Pavel Pavlásek - Member of the Technical Subjects Didactics Committee, STU Bratislava
- Michal Frivaldský - Member of the Academic Senate of FEE ZU

7.6 Awards

NI days Eastern Europe, Bratislava – Automating Microscopic High-Speed Particle Analysis in Medical Applications Using DAQ, NI-IMAQ, NI LabVIEW, and Vision Software – the best Slovak contribution, research team: Dušan Koniar, Libor Hargaš, Miroslav Hrianka, Stanislav Štofán

8 Publications

Books and textbooks

- [1] HRIANKA, M., HARGAS, L., KONIAR, D.: Electronics – Logic circuits, University of Žilina, 2013, EDIS, CD-ROM, ISBN 978-80-554-0662-6, (in Slovak)
- [2] SPANIK, P., CUNTALA, J., FRIVALDSKY, M., DRGONA, P., RADVAN, R.: Electronics, Principles of semiconductor elements and circuits, University of Žilina, 2013, EDIS, CD-ROM, ISBN 978-80-554-0724-1, (in Slovak)

Journals indexed in a world-wide database (Thomson Scientific Master Journal List, Scopus)

- [3] FRIVALDSKY, M., DRGONA, P., SPANIK, P.: *Experimental Analysis and Optimization of Key Parameters of ZVS Mode and its Application in the Proposed LLC Converter Designed for Distributed Power System Application*, In: *International Journal of Electrical Power Energy Systems*, pp. 448-456, 2013/47, ISSN 0142-0615

- [4] SPANIK, P., FRIVALDSKY, M., DRGONA, P., CUNTALA, J., GLAPA, N.: *Design procedure of simple and accurate model of electric double layer capacitor (EDLC) targeting fast verification purposes of heat transfer simulations*, In: *Electrical Engineering - Archiv für Elektrotechnik*, 2013, 5/95, ISSN 0948-7921, Electr Eng DOI 10.1007/s00202-013-0284-8
- [5] DOBRUCKY, B., BENOVA, M., FRIVALDSKY M., RADVAN R., GOMBARSKA D.: *Comparative Analysis of (HF) Non-Linear Circuits Modelled by Different Environments*, In: *Electronics and Electrical Engineering*, Publisher: Technologija, Kaunas (LT), 2013, Vol. 19, No. (4), pp. 25 - 28, ISSN 1392-1215, Thomson index
- [6] DOBRUCKY, B., KASCAK, S., PRAZENICA, M.: *Speed/Position Sensorless Control of Two-Phase Induction Motor Drive System using Virtual Injection Method*, In: *Journal of Solid State Phenomena*, Trans Tech Publications Inc. (CH), Vol. 198, pp. 557-582, ISSN 1662-9779, Thomson index
- [7] SPANIK, P., SEDO, J., DRGONA, P., FRIVALDSKY, M.: *Real Time Harmonic Analysis of Recuperative Current through Utilization of Digital Measuring Equipment* In: *Electronics and Electrical Engineering*, Publisher: Technologija, Kaunas (LT), 2013, Vol. 19, No. (5), pp. 33 - 38, ISSN 1392-1215, Thomson index
- [8] DOBRUCKY, B., BENOVA, M., ABDALMULA M.A.R., KASCAK, S.: *Design Analysis of LCTLC Resonant Inverter for Two-Stage 2-Phase Supply System*, In: *Automatika – Journal for Control, Measurement, Electronics, Computing and Communications*, Vol. 54, No. 3, 2013, pp. 299-307, ISSN 0005-1144, Thomson index
- [9] BENOVA, M., GOMBARSKA, D., DOBRUCKY, B.: *Using Euler's and Taylor's expansion method for solution of non-linear differential equation system in pharmacokinetics*, In: *Przegląd Elektrotechniczny*, R. 89, Nr. 2a/2013 , pp. 259 - 261, ISSN 0033-2097, Scopus
- [10] KASCAK, S., DOBRUCKY, B., PRAZENICA, M.: *A New Approach for Estimation of Speed/Position of Two-Phase Induction Machine Using Virtual High Frequency Injection Method*, In: *International Review of Electrical Engineering - IREE*, Vol. 8, No.4, 2013, pp. 1156-1161, ISSN 1827-6660, Scopus
- [11] PRAZENICA, M., KABASTA, M., KASCAK, S., KOSCELNIK, J., BUDAY, J.: *Two-Phase Two-Stage HF Matrix Converter for Supplying Two-Phase Motor Load*, In: *Communications - scientific letters of the University of Žilina*, Vol. 15, No. 3 (2013), pp. 63-67., ISSN 1335-4205, Scopus
- [12] FRIVALDSKY, M., DOBRUCKY, B., SCELBA, G., SPANIK, P., DRGONA, P.: *Bidirectional Step-Up/Step-Down DC-DC Converter with Magnetically Coupled Coils*, In: *Communications - scientific letters of the University of Žilina*, Vol. 15, No. 3 (2013), pp.21-25., ISSN 1335-4205, Scopus
- [13] DOBRUCKY, B., POKORNY, M., BENOVA, M., ABDALMULA, M.A.R.: *Modelling of Power Converters Using Z-Transform*, In: *Communications - scientific letters of the University of Žilina*, Vol. 15, No. 3 (2013), pp.43-47., ISSN 1335-4205, Scopus
- [14] JANOUS, S., SEDLAK, J., PRAZENICA, M., KUČHTA, J.: *Implementation of Three Phase-Discontinuous Space Vector Modulation Using Single DSC-PWM Module*, In: *Communications - scientific letters of the University of Žilina*, Vol. 15, No. 3 (2013), pp. 39-42., ISSN 1335-4205, Scopus
- [15] SZYCHTA, E., KRAWCZYK, G., BUDAY, J., KUČHTA, J., MICHALIK, J.: *Simulation studies of the underground DC traction substation with and without energy storage device*, In: *Communications - scientific letters of the University of Žilina*, Vol. 15, No. 3 (2013), pp. 26-31., ISSN 1335-4205, Scopus
- [16] OLSZOWSKI, S., BUDAY J., KUČHTA J., MICHALIK, J.: *Analyses of the Causes of Common Rail Piezoelectric and Electromagnetic Injectors' Premature Destruction in*

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- [17] DOBRUCKY, B., BENOVA, M., KASCAK, S.: *Analysis of LCTLC Resonant Converter Quantities for Different Output*, In: *ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering (TOME VI)*, Hunedoara - Romania 2013, Vol. VI, No. 1, pp. 109-114 , ISSN 2067-3809, EBSCO, Index Copernicus
- [18] SEDLAK, J., BRANDT, M., SEEWALD, R.: *Impact of Remanent Magnetization in The Area of Distribution Transformers Diagnostic by SFRA Method*, In: *ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering (TOME VI)*, Hunedoara - Romania 2013, Vol. VI, No. 1, pp. 43-46 , ISSN 2067-3809, EBSCO, Index Copernicus

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- [19] DOBRUCKY, B., KOSCELNIK, J., PRAZENICA, M., HRASKO, M.: *Analysis of Gear Reducer used in Dual-Axes Manipulator*, In: *Journal of Mechatronics*, 2013, Vol.1, No. 1, pp. 66-71, ISSN 2326-2885

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- [20] CERNAN, P., DOBRUCKY, B.: *Optimization of Efficiency of Dual Flyback Inverter for Photovoltaic Applications Using Silicon Carbide Devices*, In: *Proceedings of the IASTED International Conference Modelling and Simulation (MS 2013)* July 17 -19, 2013 Banff, Canada, 802-054, pp. 185-189, ISBN 978-0-88986-956-1, Scopus
- [21] HARGAS, L., KONIAR, D., HRIANKA, M., JOSKOVA, M., DURDIK, P., BANOVCIN, P.: *Contactless Parameters Measurement of Motion Object by Virtual Instrumentation*, In: *International Conference on Applied Electronics 2013*, 10-12 September, Pilsen, IEEE CFP1369A-PRT, pp. 93-96, ISSN 1803-7232, Thomson
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- [23] HOCK, O., KOSCELNIK, J., KASCAK, S., HAVRILA, R.: *Control of the Two-Stage Two-Phase Matrix Converter Using Field Programmable Circuit*, In: *International Conference on Applied Electronics 2013*, 10-12 September, Pilsen, IEEE CFP1369A-PRT, pp. 97-100, ISSN 1803-7232, Thomson
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- [26] VALCO, M., SEDO, J.: *Control of PWM Inverter Output Voltage*, In: *Proceedings of the 17th International Student Scientific Conference on Electrical Engineering, POSTER 2013, May 16, 2013, Prague, ISBN 978-80-01-05242-6*,

- [27] KOSCELNIK, J., KAPUSTA, T.: *Switching Mode Power Supply Multi-Resonant Converters*, In: *Proceedings of the 17th International Student Scientific Conference on Electrical Engineering, POSTER 2013, May 16, 2013, Prague, ISBN 978-80-01-05242-6*
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- [29] SPANIK, P., FRIVALDSKY, M., DRGONA, P., KUČHTA, J.: *Properties of SiC Power Diodes and their Performance Investigation in CCM PFC Boost Converter*, In: *17th International Conference on Electrical Drives and Power Electronics EDPE 2013, 6th joint Croatian-Slovak Conference, October 2–4, 2013, Dubrovnik, Croatia, pp. 22-25, CD-ROM, ISBN 978-953-56937-8-9, ISSN 1339-3944*
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- [31] LASKODY, T., KASCAK, S., PRAZENICA, M., DOBRUCKY, B.: *Space Vector PWM for Two-Phase Inverter in MATLAB-Simulink*, In: *International Conference Technical Computing Prague 2013, 13.11.2013 Prague, pp. 38, Collection of abstracts + Full paper CD-ROM, ISBN 978-80-7080-836-4, ISSN 2336-1662*
- [32] RADVAN, R., CUBON, P., STANCEK, J., SPANIK, P., URICEK, J.: *Calculation of Required Power for Electric Vehicle in Custom MATLAB GUI*, In: *International Conference Technical Computing Prague 2013, 13.11.2013 Prague, pp. 51, Collection of abstracts + Full paper CD-ROM, ISBN 978-80-7080-836-4, ISSN 2336-1662*
- [33] VALCO, M., SEDO, J., PASKALA, M.: *Simulation Analysis of DC/AC Inverter Under Nonlinear Load*, In: *International Conference Technical Computing Prague 2013, 13.11.2013 Prague, pp. 63, Collection of abstracts + Full paper CD-ROM, ISBN 978-80-7080-836-4, ISSN 2336-1662*
- [34] KOSCELNIK, J., DOBRUCKY, B., FRIVALDSKY, M.: *Resonant Components Designer for The Power Supplies*, In: *International Conference Technical Computing Prague 2013, 13.11.2013 Prague, pp. 37, Collection of abstracts + Full paper CD-ROM, ISBN 978-80-7080-836-4, ISSN 2336-1662*
- [35] GALAD, M., VITTEK, J., SPANIK, P.: *Verification of Observer Algorithms Using Measured Data Files*, In: *International Conference Technical Computing Prague 2013, 13.11.2013 Prague, pp. 20, Collection of abstracts + Full paper CD-ROM, ISBN 978-80-7080-836-4, ISSN 2336-1662*
- [36] CUNTALA, J., SPANIK, P., FRIVALDSKY, M., KONDELOVA, A.: *Replacement of Multilayer PCB for Equivalent Composite Board at Temperature Simulation in Comsol Environment*, In: *International Conference Technical Computing Prague 2013, 13.11.2013 Prague, pp. 15, Collection of abstracts + Full paper CD-ROM, ISBN 978-80-7080-836-4, ISSN 2336-1662*
- [37] RAFAJDUS, P., VAVRUS, V., KUDELČIK, J., DOBRUCKY, B.: *Analysis Over-Voltages and Losses of Energy Transfer for Ultra Deep Wells*, In: *XX. International Symposium On Electric Machinery in Prague, ISEm 2013, Praha 2013, pp. 71-78, ISBN 978-80-01-05377-5*

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- [41] KAPUSTA, T., KOSCELNIK, J.: *Electromagnetic Interference of LLC Resonant Converter in Different Modes of Operation*, In: *TRANSCOM 2013*, 10-th European Conference of Young Researchers and Scientists, pp. 55-58, ISBN 978-80-554-0693-0
- [42] JOSKOVA, M., SADLONOVA, V., KONIAR, D., HARGAS, L., HRIANKA, M., FRANOVA, S.: Regulation mechanisms for respiratory tract cilia motion, In: *New trends in pharmacotherapy V, Proceedings, 2013*, pp. 12 - 16, ISBN 978-80-89544-50-9, (in Slovak)
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- [44] GALAD, M., VITTEK, J., SPANIK, P.: Observer design of algorithms for flexible coupling drive, In: *VVÚK 2013 – Research of high saving components of electrical driven systems for driving railways and MHD vehicles, 2013*, pp. 19-27, ISBN 978-80-554-0779-1, (in Slovak)
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