

DEPARTMENT OF POWER ELECTRICAL SYSTEMS

General Information

Department of Power Electrical Systems was founded in the academic year 1955/56 as the Department of Electric Traction and Energetics at the Railway University in Prague. Since 1992 the department has been a part of the Faculty of Electrical Engineering.

The department had originally an accreditation in a field of "Electric Traction and Energetics". Graduates of the department were formerly trained mainly for 24 and 12 FMD, for industrial plants producing electric traction equipment (Škoda Pilsen, ČKD Trakce Prague, ŽOS Nymburk, ZOS Vrútky), for both urban and industrial transport and for the scientific and research laboratories in the electro-technical industry.

The highly important period for the department was during years 1991 – 1994. In those years, a TEMPUS project JEP-1939/91-94 was accepted and realized. The project titled "Improvement of Educational Activities in Power Electronics and its Applications" considerably affected the next heading of the department. The aims of the project were: a creation of a new curriculum for Power Electronics, Electric Drives and Electrical Machines, setting up new laboratories, purchase of computing and measuring hardware, mobility of students and staff. The universities in Catania, Roma, London and Helsinki co-operated and guaranteed this project. The results of the project set the department forward in its effort to become a modern department with a high-level educational programme. In 1996 the department finished a TEMPUS project JEN-01939SQ-94 representing a continuity of the project mentioned above.

In 2005, the Faculty of Electrical Engineering underwent a vast reconstruction. A section of Power Electronics was secluded from the Department of Power Electrical Systems together with a part of Department of Electronics and Electrotechnology and formed a new Department of Mechatronics and Electronics.

Change of the labour market enforced the department, besides its own traditional educational and research activities, to look for other possibilities of employability of its graduates. Nowadays the department is divided into the section of Electric Power Systems and section of Electric Drives and Electric Traction. Educational and research activities of these sections guarantee a wide professional orientation which covers almost whole power electrical engineering branch.

In the academic year 2005/2006, a three-degree study has been put to an effect at all universities in Slovakia. Department of Power Electrical Systems has been granted an accreditation for a bachelor degree in a programme of studies of Electrical Engineering; for master degree in programme of Electric Power Systems, Electric Drives and Electric Traction. For PhD degree, third study degree, the department was accredited in a study programme of Power Electrical Engineering.

Within the complex accreditation in 2009, University of Žilina confirmed its position as university. Department of Power Electrical Systems gained right to bestow the Bachelor degree in study program of Electrical Engineering, academic master degree in study programs of Electric Power Systems, Electric Drives and Electric Traction.

Within the latest complex accreditation in 2015, all the study programs have been accredited except of Electric Traction, which became a part of the Electric Drives program.

Since 1997 the department has had an accreditation for PhD degree study in a field of "Power Electrical Engineering", with the following branches: Electric Drives, Electric Machines and Apparatus, Power Electronics and Electric Traction.

Department is equipped with high quality computer and measuring technology in the area of technical infrastructure. The substantial improvement of department was achieved mainly by the help of EU Structural Funds, which enabled reconstruction of rooms of department as well as the departments' instrumentation. This was possible mainly by the project: Centre of excellence of power electronics systems and materials for their components I., II.

NXP Semiconductor (former Freescale Semiconductor) from the Czech Republic provided a big support for the department by generalizing latest technologies in the area of digital signal controllers. Department was able to apply for grant research projects on this basis. Department solved several VEGA, KEGA and SRDA projects recently, which have identified students, graduates and staff of the department.

Department intensively cooperates with significant companies from Slovakia. These are mainly Slovenské elektrárne, Slovenská elektrizačná prenosová sústava, Stredoslovenská energetika, EVPÚ Nová Dubnica, NXP Semiconductor, SIEMENS, ŽSR, SEZ Krompachy and others.

Staff of the Department

Head of the Department:	Juraj Altus
Vice-head of the Department:	Alena Otčenášová
Secretary:	Darina Rufusová

Sections of the Department

Section of Electric Power Systems

Head of the Section:	Alena Otčenášová
Professors:	Juraj Altus
Associate Professors:	Peter Bracínik, Alena Otčenášová, Marek Roch
Senior Lecturers (with PhD):	Josef Beran, Miloslav Bůžek, Marek Höger, Ivan Litvaj, Michal Reguľa

Section of Electric Drives and Electric Traction

Head of the Section:	Pavol Makyš
Professors:	Valéria Hrabovcová, Ján Vittek, Pavol Rafajdus
Associate Professors:	Milan Pospíšil
Research Fellows:	Pavel Lehocký, Vladimír Vavrúš, Juraj Makarovič, Lukáš Gorel
Senior Lecturers (with PhD):	Pavol Makyš, Matěj Pácha (from November 2015), Marek Štulrajter

Postgraduate Students

Internal (full-time):	Roman Bodnár (until August 2016), Michal Baherník, Peter Butko, Tomáš Fedor, Adrián Peniak, Martina Látková, Filip Suško, Ľuboš Struharňanský, Michal Repák, Andrej Bolf (from September 2016), Pavol Belány (from September 2016), Pavel Sovička (from September 2016)
External (part-time):	Dávid Kaprál, Marek Bañas, Milan Diko

Education

Courses in Bachelor and Master Degree Programmes

Bachelor Degree Programmes

Code	Title	Sem.	Hours/Week
			L-S-LE*
Courses at the Faculty of Electrical Engineering			
3B0104	Basics of Electrical Engineering	1	1 – 2 – 0
3B0111	Project Learning 1: Solar Team Slovakia	1	1 – 3 – 0
3B5100	Professional Practice (60 hours)	1	0 – 0 – 0
3B0207	Enterprise Management and Economics	2	2 – 1 – 0
3B0214	Project Learning 2: Solar Team Slovakia	2	1 – 3 – 0
3B5200	Professional Practice (60 hours)	2	0 – 0 – 0
3B0203	Programming Languages	3	1 – 0 – 2
3B0311	Normalization, Metrology, Testing	3	1 – 1 – 0
3B0318	Project Learning 3: Solar Team Slovakia	3	1 – 3 – 0
3B5301	Professional Practice (60 hours)	3	0 – 0 – 0
3B0405	Electric Machines	4	4 – 1 – 2
3B0413	Work Safety in Electrical Engineering	4	2 – 0 – 1
3B0415	Electricity Distribution	4	2 – 1 – 1
3B5404	Electric Machines in English 1	4	1 – 1 – 0
3B5402	Introduction to Electric Drives	4	2 – 0 – 1
3B5401	Materials and Technologies in Electrical Engineering	4	2 – 1 – 1
3B0416	Project Learning 4: Solar Team Slovakia	4	1 – 3 – 0
3B5405	Professional Practice (60 hours)	4	0 – 0 – 0
31500	Electrical Apparatus	5	2 – 0 – 2
31501	Electric Traction 1	5	3 – 2 – 0
31507	Electric Power Systems 1	5	3 – 0 – 2
31509	Selected Sections of Electric Machines	5	2 – 0 – 2
31512	Electric Drives 1	5	3 – 1 – 1
31514	Electric Machines in English 2	5	1 – 1 – 0
31517	Electrical Standards and Metrology	5	2 – 0 – 1
31525	Mechanics of Power Lines	5	2 – 2 – 0
31559	Application of Digital Signal Processors 1	5	0 – 0 – 2
31600	Bachelor Thesis	6	0 – 2 – 0
31602	Bachelor Project Electric Traction	6	0 – 0 – 6
31607	Electric Traction	6	6 – 0 – 4
31608	Electric Drives 2	6	6 – 2 – 2
31610	Electric Power Systems 2	6	6 – 2 – 2
31615	Quality Management	6	4 – 2 – 0
31632	Application of Digital Signal Processors 2	6	0 – 0 – 4
31633	Bachelor Project Electric Power Systems	6	0 – 0 – 6
31637	Bachelor Project Electric Drives	6	0 – 0 – 6

32413	Fundamental Design in Electric Power Systems	6	0 – 0 – 2
Courses at the Faculty of Mechanical Engineering			
211062	Electric Power Systems	5	2 - 2 - 0

*(L) lessons - (S) seminars - (LE) laboratory exercises

Master Degree Programmes

Code	Title	Sem.	Hours/Week
			L-S-LE*
Courses at the Faculty of Electrical Engineering			
3I4101	Transients in Power Systems	1	2 – 1 – 1
3I4102	Power Plants	1	2 – 2 – 0
3I4103	Electric Substations	1	3 – 1 – 1
3I4106	Professional Practice (60 hours)	1	0 – 0 – 0
3I0117	Project Learning 1: Solar Team Slovakia	1	1 – 3 – 0
3I3100	Analysis of Electric Machines	1	2 – 0 – 2
3I3101	Control of Electric Drives 1	1	3 – 2 – 0
3I3102	Dynamics and Energetics of Electric Traction	1	2 – 2 – 0
3I3103	Electric Traction Vehicles	1	3 – 0 – 1
3I4200	Control of Electric Power Systems	2	2 – 1 – 1
3I4201	Renewable Energy Sources	2	2 – 1 – 1
3I4202	Protective Relaying	2	2 – 1 – 1
3I4203	Electric Drives in Electric Power Systems	2	2 – 1 – 1
3I4204	Power Supply of Electric Railways	2	2 – 2 – 0
3I4205	Electric Power Systems in English	2	0 – 2 – 0
3I3200	Control of Electric Drives 2	2	3 – 2 – 0
3I3201	Sensors, Actuators and Interfaces	2	2 – 0 – 2
3I3203	Electric Traction	2	2 – 1 – 2
3I3204	Professional practice (60 hours)	2	0 – 0 – 0
3I0211	Electrical Machines for Special Purposes	2	2 – 0 – 2
3I0213	Simulation Languages in Electric Power Systems	2	2 – 0 – 2
3I0220	Project Education 2: Solar Team Slovakia	2	1 – 3 – 0
3I4300	Negative Influences on Power System	3	2 – 2 – 1
3I4301	Feasibility Calculations for Power Networks Development	3	2 – 2 – 0
3I4302	Information Systems for Power System Control and Monitoring	3	2 – 0 – 2
3I4303	Diploma Project of Electric Power Systems	3	0 – 2 – 2
3I4304	Reliability of Electric Power Systems	3	2 – 2 – 0
3I4305	Application of Numerical Calculations in Electric Power Systems Operation	3	0 – 0 – 4
3I4307	Professional Practice (60 hours)	3	0 – 0 – 0
3I0306	Programmable Logic Controllers	3	2 – 0 – 2
3I0316	Methods for Systematic Design	3	2 – 2 – 0
3I0319	Electric Energy Utilization	3	2 – 2 – 0
3I0320	Project Learning 3: Solar Team Slovakia	3	1 – 3 – 0

3I3300	Sensorless Control of Electric Drives	3	3 – 1 – 1
3I3301	Discreet Control of Electric Drives	3	3 – 0 – 3
3I3302	Diploma Project of Electric Drives	3	0 – 2 – 0
3I9301	Control of Electric Drives 1	3	3 – 1 – 1
3I4400	High Voltage Engineering	4	0 – 2 – 0
3I4401	Diploma Project of Electric Power Systems 2	4	0 – 2 – 1
3I4402	Elaboration and Defense of the MSc Thesis	4	0 – 10 – 0
3I4403	Course of State Examination	4	0 – 2 – 0
3I4404	Economy of Electric Power Systems Operation	4	2 – 2 – 0
3I4405	Professional Practice (60 hours)	4	0 – 0 – 0
3I0403	Corporate Quality Management	4	2 – 2 – 0
3I0408	CAD/CAE Systems	4	0 – 0 – 2
3I0412	Project Learning 4: Solar Team Slovakia	4	1 – 3 – 0
3I3400	Diploma Project of Electric Drives 2	4	0 – 2 – 0
Courses at the Faculty of Mechanical Engineering			
221197	Electrical Traction Equipment	2	2 – 2 – 0

*(L) lessons - (S) seminars - (LE) laboratory exercises

Research & Development

Research and development activities of the **Electric Power System** section are focused on issues concerning electricity generation, transmission and distribution. The research activities oriented on electricity generation are mainly focused on a modelling of the operation of renewable energy sources. Acquired knowledge and results are used to design simulation models, which are thereafter applied in power system analyses as well as in an optimization of renewable energy sources' deployment within virtual power plants.

Scientific and research activities in the field of electricity transmission and distribution are focused on a modelling of electric power system operation, especially on an application of the concept of intelligent networks (Smart Grids) to the control of both power transmission and distribution networks. A use of different artificial intelligence approaches (expert systems, multi-agent systems) and an application of intelligent electronic devices are the key topics of the research in this field.

An integral part of the research activities of the department is solving the issue of power quality in the distribution or transmission system. The issue is solved comprehensively. Attention is given to the causes of poor quality of supply, EMC, statistics in different locations of the system and of course, possibilities for improvement through the application of the proposed device or other feasible measures.

The section of Electric Drives and Electric Traction mainly focuses on control of all electrical drives types such as DC motors, AC motors and special drives with different type of rotors (SRM, BLDC, Stepping Motor). Research focus can be divided into the following areas:

Sensorless control of electrical machines – this problematic allows increasing the overall drive reliability, reduce the drive size and therefore it is still very popular. It includes research of estimation algorithms and control techniques for DC and AC drives (IM, PMSM, BLDC). Traditional methods are usually applied for the higher speed range drive. For the low, even zero speed there are methods and algorithms which require high frequency signal injection. Currently, the sensorless techniques form the basis of some control systems, characterized as fault tolerance system, which means ensuring at least partial operation under any circumstances. The research results have been presented on significant international conferences.

Design of progressive control methods – in this area the research has been focused on methods which used forced dynamic control or sliding mode control. New method which has been designed is called Hyper sliding mode control. This scheme does not need any PI controllers what means more easy implementation to industrial application.

Design and application of control algorithms for linear motors drives – linear motors are very progressive especially for high dynamic applications. Research activities cover designing of new control methods which have capability to avoid all complaints of linear motors such as non-linear friction, cogging torque and other problems related with high precise positioning algorithms.

Design of energy flow control in hybrid railway vehicles – hybrid vehicles are considered as a very progressive type of railway vehicles. The most needed issues involve a primary source operation optimization (catenary or a diesel engine) or braking energy storage. Conventional vehicles use friction brake and the braking energy is lost as a heat, while in hybrid vehicles the energy can be stored e.g. in supercapacitors or modern electro-chemical cells (Lithium based systems). Research results have been published at several scientific conferences and implemented in an international commercial project

Within the department, the research is oriented also to electrical machines, mainly modern design and optimization method of any types of electrical machines with capability of identifying the parameters and

characteristics of these machines and their possible uses in industry, advanced propulsion or in electric traction.

Project „Solar Team Slovakia“ - the project is aimed at cooperation between students, companies, University and Academy of Fine Arts in the development of solar car for competition the Bridgestone World Solar Challenge in Australia. This cooperation shall develop scientific and technological potential of Slovakia (clever young students, the automotive industry, knowledge and experiences of educational institution). The project aim is to build the first Slovak solar car using new technologies and innovation. The project has, however, mainly to improve education, strengthen active cooperation with practice, popularizing the study of science and technology and create a development environment aimed at the automotive industry. The project now involves more than 50 students from various disciplines.

Laboratory of high voltage

The Laboratory is equipped with measuring and testing equipment for testing electrical strength as well as other parameters of insulation materials and elements used in high voltage engineering up to 300 kV.

The laboratory is operated in the cooperation with SSE, a.s. in the analyses of materials' characteristics, reasons of the faults of high voltage devices and the testing of protective means. It is also used for teaching activities.

Laboratory of power electrical systems

The Laboratory of power electrical systems is used for the research oriented on the application of Smart Grid concept in medium voltage networks. The research is mainly focused on the application of artificial intelligence (expert systems, multi agent systems) and intelligent electronic devices for a fault location and network reconfiguration with the goal to minimize the number of customers without electricity supply, as well as on the control of virtual power plants consisting of renewable energy sources, which are connected to the medium voltage network.

The laboratory is equipped with a 3-phase model of a medium voltage power line. The model is monitored and controlled by the computer and it consists of modules representing cable as well as overhead power line sections, remote controlled devices, protection relays and adjustable loads.

Laboratory of power quality

The Laboratory of power quality is equipped with measuring devices obtained due to the international project SK-CZ "Cooperation between the University of Žilina and the VŠB-TU Ostrava on the improvement of the quality of education and preparation of researchers in the field of electrical power engineering", which was funded by EU funds. Purchased measuring system is both used in the laboratory as well as in the field measurements. It consists of power quality analysers designed according to the standard STN EN 50160, measuring accessories, an appropriate software and a SCADA system, which enables online data acquisition of all variables and parameters measured by power quality analysers, their analysis and graphical presentation through personal computers.

Experiments are made on models of 110 kV and 22 kV power lines. The measuring system enables to study different sources of disturbance, the influence of their mutual operation as well as disturbance propagation along modelled power lines for different operation conditions.

Both models are equipped with remote controlled 4Q electronic meters enabling remote data acquisition and evaluation.

Laboratory of electric drive control

The Laboratory of electric drive control has been created in cooperation with NXP Semiconductor, Inc. in order to familiarize students with practical applications of electric drives and all the problems of real applications.

The electric drives laboratory stands consist of NXP 56F8346 DSC Controller Board or NXP MPC 5567 Controller Board, a low voltage power stage Freescale 16 V / 120 W and a selectable electric machine – asynchronous machine (Siemens, voltage 21/12 V power 90W) or permanent magnet synchronous machine (TG-Drives, voltage 21/12 V, 90W). Each electric drive stand is supplied by a low-voltage source and equipped with the debugging tools Freescale USB-TAP.

Students can use other NXP development tools as TOWER system, SLK (Student learning kits), etc. The Laboratory also serves as a base for competitions like Students' Freescale Technology Day and Freescale Cup – smart car race. The laboratory is Freescale certified and registered in the Freescale University Program.

Lab is also equipped with three research stands. The first one consists of two permanent magnet synchronous machines connected with a flexible coupling designed for parameters' investigation and control algorithms for such drives.

The second stand covers a linear engine with permanent magnet synchronous machine of 4 kW. Its track is 2640 mm long and the machine is able to develop a torque of 200 Nm at speeds of 4.2 m/s. The drive load is simulated by an induction machine. Linear motor is supplied from three-phase inverter by VONSCH and controlled by a digital signal controller NXP MC56F8346.

Third stand consists of 3-axis milling machine with linear motors in X and Y axes. Vertical displacement is handled by a step-machine. Horizontal motors have a special construction of the windings with non-ferrous core on the moving part, thus with no cogging torque. This structure brings ability for a high accuracy positioning, practically limited by the accuracy of the position sensor only. These machines have been developed in collaboration with the company EVPU, a.s., Nová Dubnica and supported by the Slovak Research and Development Agency (APVV-99-031205). The control of power converters is handled by two NXP MC56F8367 units. Positioning and the cutter commands use CNC Mach3 interface and software.

Laboratory – Center of excellence of power electrical systems and materials for their components

In the Laboratory there are implemented project activities of centres of excellence (CEEX I and II CEEX), which were implemented within the Operational Programme of Research and Development, Measure 2.1 - creation and promotion of excellence in research.

Created laboratory is used for research and verification of new control structures for drive applications (rotational and linear motion). The proposed algorithms have to consider the adverse effects of the power converter (voltage ripple in the DC link, dead time, saturation power components, etc.). For achieving the highest quality of proposed drive, control is necessary to precisely know motor parameters, which can be done by off-line and on-line motor parameter identification methods. Research team also works with new motor control topologies for non-standard types of electrical machines

Laboratory of electric traction

The Laboratory is equipped with a combined system of two DC traction motors (50 kW, 600 V) for a standard set of measurements on traction machines. The system is supplied by a remote controlled DC power sources (voltage source 0-750 V, current source 0-250 A). The measurements are supported by analogue and digital equipment, high-end oscilloscope Lecroy WaveRunner 44Xi-A, high voltage probe (up to 6 kV), magnetic probe, vector power analyser Zimmer LMG-500 and two electronic power sources (0-600 VDC, 0-25 A and 0-60 VDC, 0-45 A).

The laboratory is being equipped with another combined system of two AC induction traction motors (50 kW) driven by two converters. This stand is supported by EVPÚ, a.s., Nová Dubnica and Operational Programme Research and Development, measure 2.1 Support of networks of excellence in research and development as the pillars of regional development and support to international cooperation. Such combined system allows all the tasks of modern electric traction drive.

The most attractive part of the laboratory is a locomotive simulator with its main part – the drivers cab. This project is supported by Freescale Semiconductor, Inc., Pars NOVA, a.s. Šumperk (Czech Republic) and ČD, a.s., DKV Brno (Czech Republic). The software part is supported by OpenRails Train Simulator development team. The main aim is to shed light on the real world problems in electric traction.

Laboratory of electrical machines

This Laboratory is designed for measurement and identification of the parameters of almost all of electrical machines and their operating characteristics in motoring and generating mode. The laboratory is equipped with modern measuring instruments and dynamometers. The laboratory use students from all three levels of education, and of course it is also used for other research activities at the department.

Co-operation

Co-operation Partners in Slovakia

- Power System Management, s.r.o. Košice
- VŠVU Bratislava, (P. Choma, Š. Klein)
- Volkswagen Bratislava
- TU Zvolen
- KIA Žilina
- STU Bratislava: Institute of Power and Applied Electrical Engineering
- TU Košice: Department of Electric Power Engineering
- ABB Elektro s.r.o. Žilina
- CE Qualite Slovakia Nová Dubnica
- ELTECO Žilina
- ELZA Žilina
- EVPÚ Nová Dubnica
- Bel Power Solutions, s.r.o., Dubnica nad Váhom
- GI-BON Quality systems Žilina
- MARKAB spol. s r.o. Žilina
- NES Nová Dubnica
- SÚTN Bratislava
- PPA Controls
- PV SŽKV Zvolen
- SIEMENS
- Slovak Productivity Center, the University of Žilina
- Stredoslovenská energetika, a.s. Žilina
- SEPS, a.s. Bratislava
- SEZ Krompachy
- Schneider Electric Slovakia spol. s r.o.
- Sungwoo hitech, s.r.o. Žilina
- Technický skúšobný ústav Piešťany
- Vinuta Rajec, s.r.o.
- VUKI, a.s. Bratislava
- VUVT Engineering, a.s. Žilina
- VVÚŽ Vrútky
- ZSSK Divízia ŽKV Bratislava
- ŽOS Vrútky
- ŽOS Zvolen
- ŽSR Bratislava
- CARGO Slovakia Bratislava
- IPESOFT spol. s r. o., Žilina
- Sauter Building Control Slovakia s.r.o., Bratislava

International Co-operation Partners

- Aalto University Helsinki, School of Science and Technology, Department of Electrical Engineering, Finland
- Aalto University, School of Electrical Engineering, Finland
- ABB Brno, s.r.o. PTPM Brno, Czech Republic
- ABD Prague, s.r.o. Technika, Czech Republic
- AD Developments Milton Keynes, United Kingdom
- Appraisals Services, Prague, Czech Republic
- AŽD Prague, Czech Republic
- Berner Fachhochschule, Hochschule für Technik und Architektur Burgdorf, Germany
- Cinvestav Guadalajara, Mexico
- Control Technique Dynamics, Andover, United Kingdom
- CZ Loko, a.s., Česká Třebová, Czech Republic
- Department of Physics, Nottingham, United Kingdom
- České dráhy O12 Prague, Czech Republic
- ELCOM Prague, Czech Republic
- NXP Semiconductors Rožnov pod Radhoštěm, Czech Republic
- Hochschule für Technik und Wirtschaft, Dresden, Germany
- Institut National des Telecommunications Paris/Evry, France
- Lappeenranta University of Technology, Faculty of Electric Engineering, Finland,
- Montanuniversität Leoben Austria, Insitut fur Elektrotechnik, Austria
- Politechnika Gdańska, Poland
- Politechnika Warszawa, Instytut Maszyn Elektrycznych, Poland
- Russian Academy of Sciences, Management Institute of M. Trapeznikova, Russian Federation
- ŠKODA Transportation Pilsen, Czech Republic
- ŠKODA Electric Pilsen, Czech Republic
- Technical University of Bochum, G
- Technische Universität Darmstadt, Institut für Elektrische Energiewandlung, Germany
- Technische Universität Dresden, Lehrstuhl Elektrische Antriebe und Grundlagen der Elektroenergietechnik, Germany
- Technische Universität Dresden, Institut für Energieversorgung und Hochspannungs-Technik, Germany
- Technische Universität Graz, Fakultät für Elektrotechnik, Austria
- Institut für Elektrische Machines und Antriebe, Germany
- Institut der El. Leistungssysteme, Germany
- Technical University Cluj-Napoca, Romania
- Telmining, s.r.o. / T-Machinery, s.r.o., Ratíškovice, Czech Republic
- TU Budapest, Hungary
- University of Bradford, Leeds, United Kingdom
- Università degli Studi di Catania, Dipartimento Elettrico Elettronico e Sistemistico, Italy
- University of East London, Department of Electrical and Electronic Engineering, United Kingdom
- University of Nottingham, United Kingdom
- Universidade do Porto, Portugal
- University of Maribor, Slovenia

- University of Picardie – Jules Verne, Amien, France
- VŠB-TU Ostrava, Czech Republic
- VÚT Brno, Czech Republic
- University of West Bohemia, Pilsen, Czech Republic
- Železniční zkušební okruh VÚŽ Cerhenice, Czech Republic

Visitors to the Department

Name	Institution	Length of stay
Lucie Flekalová	SUDOP Prague a. s., Czech Republic	1 day
Martin Raibr	SUDOP Prague a. s., Czech Republic	1 day
Sergej Ryvkin	Institute of Automatic Control of Trapeznikov, Russian Academy of Sciences, Moscow, Russia	7 days
Jurij Rozanov	National Research University, Moscow Power Engineering Institute, Moscow, Russia	7 days

Visits to Foreign Institutions

Name	Institution	Length of stay
Peter Braciník,.	University of Maribor, Slovenia	5 days
Ivan Litvaj	VŠB TU Ostrava, Czech Republic	4 days
Pavol Rafajdus	ZČU Pilsen, Czech Republic	2 days
Pavol Rafajdus	TU Liberec, Czech Republic	2 days

Other Activities

Invited Lectures/Papers

Simulations of BLDC and SRM electrical machines	
Customer:	ČVUT Prague, Czech Republic
Lecturer:	Pavol Rafajdus
Date:	January 2016

Simulations of BLDC and SRM electrical machines	
Customer:	ČVUT Prague, Czech Republic
Lecturer:	Pavol Rafajdus
Date:	December 2016

BLDC (Brushless DC motors)	
Customer:	ČVUT Prague, Czech Republic
Lecturer:	Valéria Hrabovcová,
Date:	30th November 2016

SRM (Switched Reluctance Motors)	
Customer:	ČVUT Prague, Czech Republic
Lecturer:	Valéria Hrabovcová
Date:	8th December 2016

New results on forced dynamics control of servodrives	
Customer:	Russian Academy of Science, Moscow, Russia
Lecturer:	Ján Vittek
Date:	13th September 2016

Membership in International Institutions/Committees

Individual membership of employees in scientific committees of international journals	
Ján Vittek	Science PG Group, New York, member of editorial group for Journal of Electrical and Electronic Engineering
	Wroclaw University of Technology, Poland, Associate Editor of Scientific Papers of the Institute Electrical Machines

Individual membership of employees in the scientific committees of international conferences	
Juraj Altus	Member of international scientific committee of EPE 2016, Prague, Czech Republic
	Member of international scientific committee of 11th International conference ELEKTRO 2016, May 16-18, 2016 Štrbské Pleso - High Tatras
Valéria Hrabovcová	Member of international scientific committee of 11th International conference ELEKTRO 2016, May 16-18, 2016 Štrbské Pleso - High Tatras
Pavol Rafajdus	Member of international scientific committee of MECHATRONIKA 2016, Prague, Czech Republic
Ján Vittek	Member of international scientific committee of 11th International conference ELEKTRO 2016, May 16-18, 2016 Štrbské Pleso - High Tatras
Alena Otčenášová	Member of international scientific committee of conference EPE 2016, Prague, Czech Republic
	International Conference on Intelligent Green Building & Smart Grid, Praha, ČR
Peter Bracíník	Member of international scientific committee of 11th International conference ELEKTRO 2016, May 16-18, 2016 Štrbské Pleso - High Tatras

Individual membership of employees of international organizations	
Alena Otčenášová	Member of IEEE
Peter Bracíník	Member of IEEE
	National delegate and member of program committee of HORIZON 2020 for "Safe, clean and effectively used energy", Belgium
Matěj Pácha	Senior Member of IEEE
	IEEE Czechoslovakia Section, Section Chair
	IEEE Industry Applications Society, Chapter and Membership Development, Senior Membership Chair
	IEEE IAS/IES Joint Chapter committee member
	Member of expert group Research and development CZ LOKO, Česká Třebová, Czech Republic
Juraj Altus	Representative of the University of Žilina, CIRED, Czech Republic
	Representative of Slovakia in International Energetic Agency IEA, Paris
	IEEE senior member
Pavol Rafajdus	IEEE senior member
Valéria Hrabovcová	IEEE Senior Member

Pavol Makyš	Member of IEEE
Vladimír Vavrúš	Member of IEEE
Marek Roch	Member of IEEE
Marek Höger	Member of IEEE
Michal Reguľa	Member of IEEE

Membership in National Institutions/Committees

Juraj Altus	Departmental Committee for PhD thesis defence in a field of Electric Power Systems in Bratislava
	Member of the commission of „Aurel Stodola Award in Power Engineering“, SE Bratislava
	Member of Working group, Accreditation committee (OV15)
Ján Vittek	Journal Editorial Board Acta Electrotechnica et Informatica, FEI TU Košice
	Faculty committee for PhD thesis defence in the field of Mechatronics, SJF TU Košice
	Member of Working group, Accreditation committee (OV15)
Valéria Hrabovcová	Member of Slovak Electro-technical Committee at SUTN
Alena Otčenášová	Chairman of the Commission for the first attestation in the category teacher and subcategory secondary school teacher for training electrical subjects – Ministry of Education, Science, Research and Sport of the Slovak Republic
	Chairman of the attestation commission for the second attestation in the category teacher and subcategory secondary school teacher for training electrical subjects – Ministry of Education, Science, Research and Sport of the Slovak Republic
Josef Beran	Executive board of Association of Electrical Specialist active in Slovakia with a nationwide competence (chairman)
	Periodical „ELEKTROREVUE“, ISSN 1336-8559, with a nationwide operation for the members of Association of Electrical Specialist (managing editor), registered at the Ministry of Culture under licence number EV 927/08,
Miloslav Bůžek	Executive board of Association of Electrical Specialist active in Slovakia
	Periodical „ELEKTROREVUE“, ISSN 1336-8559
Matěj Pácha	Contact person at the University of Žilina for cooperation with NXP Inc., the organizer of student competitions
Ivan Litvaj	Slovak Society for Quality, „Schools and Education“ work group member
Peter Bracíník	Member of scientific committee of ELEKTRO 2016, Žilina

Membership in University Boards

Juraj Altus	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at the Faculty of Electrical Engineering
	Departmental committee for PhD thesis defence in a field of Energetics at the Faculty of Electrical Engineering
	Scientific board of the Faculty of Electrical Engineering
Valéria Hrabovcová	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at the Faculty of Electrical Engineering
	Scientific board of the Faculty of Electrical Engineering
Ján Vittek	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at the Faculty of Electrical Engineering
	Scientific board of the Faculty of Electrical Engineering
Pavol Rafajdus	Scientific board of the Faculty of Electrical Engineering,
	Departmental committee for PhD thesis defence in a field of Energetics at the FEE

	Vice-dean for Research of the Faculty of Electrical Engineering,
Alena Otčenášová	Departmental committee for PhD thesis defence in a field of Energetics at the Faculty of Electrical Engineering
	Chair of Disciplinary committee for students of the Faculty of Electrical Engineering
Peter Bracíník	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at the Faculty of Electrical Engineering
	Vice-dean for Educational Activities of the Faculty of Electrical Engineering
	Scientific board of the Faculty of Electrical Engineering
Milan Pospíšil	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at the Faculty of Electrical Engineering
	Departmental committee for PhD thesis defence in a field of Motor Vehicles, Rail Vehicles, Ships and Aeroplanes, Zilina
Marek Roch	Board of Information and Communication Technology of the University of Žilina
	Board of Information and Communication Technology at the Faculty of Electrical Engineering
	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at the Faculty of Electrical Engineering
Ivan Litvaj	Quality Manager at the Faculty of Electrical Engineering
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