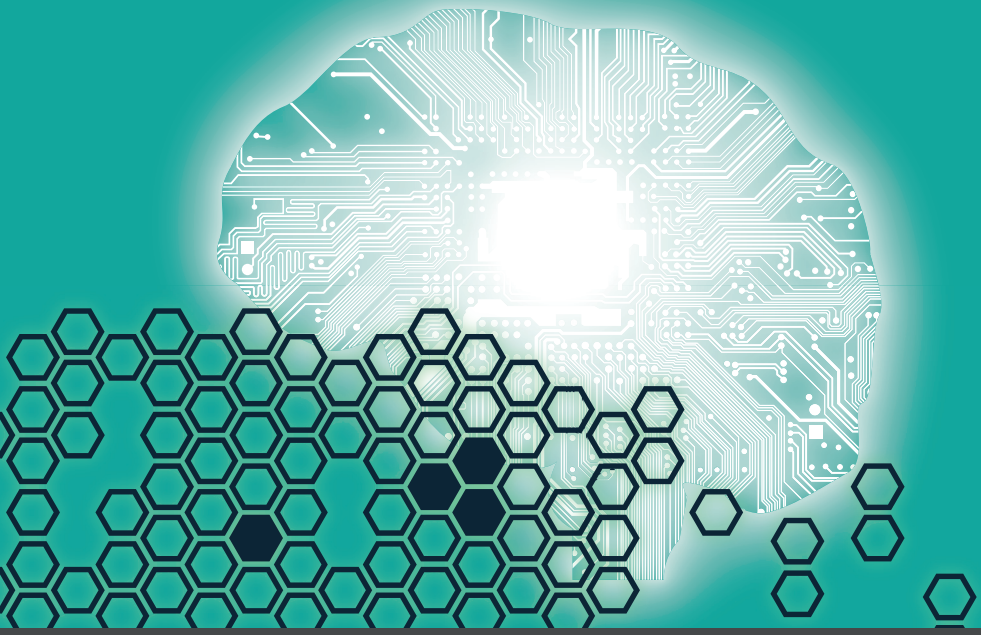
University of Žilina

FACULTY OF ELECTRICAL ENGINEERING



Annual Report 2013

Faculty of Electrical Engineering

University of Žilina

Annual Report 2013

Faculty of Electrical Engineering

2014

Graphical design - Jozef Dubovan

ISBN 978-80-554-0864-4

Contents


ŽILINSKÁ UNIVERZITA
ELEKTROTECHNICKÁ FAKULTA
UNIVERSITY OF ŽILINA

Faculty of Electrical Engineering

Foreword

The Faculty of Electrical Engineering is an essential part of the University of Žilina – a modern university providing a full range of technological, economic, management, and a limited range of humanistic and natural science education at under-graduate, graduate and post-graduate levels.

During its 60-year existence the University has become a reputable institution with the firm position in the system of the Slovak higher education institutions. It was originally established in 1953 as the College of Railways in Prague. In 1959 the College changed its name to the University of Transport and in 1962 it was moved to Žilina. Afterwards, as a result of the increasing role of communications, the title was amended to the University of Transport and Communications. A series of transformation steps that brought essential changes into the academic life of the University and its Faculties and Institutes started in 1989. They proved effectiveness on the way towards a modern institution, featuring a character of a full-value university, named the University of Žilina since November 1996.

Nowadays, the University of Žilina consists of 7 Faculties (important dates of their establishing and/or transformation are indicated in parentheses):

Faculty of Electrical Engineering (1953; 1992)
Faculty of Mechanical Engineering (1953; 1992)
Faculty of Operation and Economics of Transport (1953)
Faculty of Civil Engineering (1990)
Faculty of Management Science and Informatics (1996), the former Faculty of Management Science (1990)
Faculty of Special Engineering (1998), transformed from the former Military Faculty (1952)
Faculty of Humanities (2010), transformed from the former Faculty of Natural Science (1998)

In addition to the Faculties, the University also involves the following 13 Institutes:

- Institute of Physical Education,
- Institute of Continuing Education,
- The Institute of Foreign Languages,
- Institute of Information and Communication Technologies,
- Institute of Forensic Engineering of the University of Žilina,
- CETRA – Centre for Transportation Research,
- University Library,
- Editorial Centre of University of Žilina,
- Flight Training Organization – Air School of the University of Žilina,
- National Training Centre of Security in Civil Aviation,
- Institute of Competitiveness and Innovations,
- Centre for Further Education of Teachers,
- Institute of High Mountain Biology.

Profile and structure of the Faculty of Electrical Engineering

As mentioned above, history of the Faculty of Electrical Engineering goes back to the year 1953. In 1959 it was merged with the Faculty of Mechanical Engineering and that symbiosis took 33 years. In 1992, after the split, the Faculty returned to its previous original name. It became the first technically oriented Faculty and generally the second Faculty in the Slovak Republic awarded the Quality Certificate for quality control system according to ISO 9001 (in 2003). Since that time further three successful re-certifications occurred (2007; 2010, and 2013).

Structure of the Faculty

From a structure point of view, the Faculty of Electrical Engineering (FEE) consists of eight Departments (seven Departments are located directly in Žilina and one Institute established at the satellite work place in Liptovský Mikuláš), the Service centre and the Dean's office. Scientific and research activities, properly projected to educational activities, are dynamically developing as a response to floating markets seen within both national and pan-European context. At the very beginning, the activities of original departments were mainly oriented on technical aspects of classical transport, its safety and problems of technical operation of telecommunications. At present, the scientific and research activities addresses the latest problems of information and communication technologies, safety-related control of transport and industry processes, telecommunication engineering, power electronic systems, modern control of electric networks and others. Additionally, such interdisciplinary fields as mechatronic and biomedical engineering are also developed.

Table 1 shows the distribution of the pedagogical and the research positions at particular FEE's departments as of 31.12.2013.

Number of employees at the FEE according to the categories within past five years can be seen in Table 2.

Highlights

The most important events in 2013 can be summarized as follows:

- Application for the the 7th Framework Programme project under the pilot call FP7-ERAChairs-PilotCall-2013, which received a high score and the Grant Agreement will be signed in the first decade of 2014;
- Acceptance of 10 international experts:
  - Ing. Václav Mentlík, CSc., University of West Bohemia, Czech Republic
  - Assoc. Prof. Ing. Pavel Trnka, PhD., University of West Bohemia, Czech Republic

The FEE's Departments are listed below:

Department of Physics (DPh)
Department of Measurement and Applied Electrical Engineering (DMAEE)
Department of Electromagnetic and Biomedical Engineering (DEBE)
Department of Mechatronics and Electronics (DME)
Department of Power Electrical Systems (DPES)
Department of Control and Information Systems (DCIS)
Department of Telecommunications and Multimedia (DTM)
Institute of Aurel Stodola (IAS) situated in Liptovský Mikuláš

Tab. 1: Number of pedagogical and research employees at the departments of the FEE up to 31.12.2013

Department	Pedagogical staff		Research staff	
	Full-time	Part-time	Full-time	Part-time
DPh	13	0	4	1
DMAEE	9	1	0	1
DEBE	9	0	3	0
DME	10	3	6	2
DPES	15	1	2	0
DCIS	13	2	0	0
DTM	24	1	6	1
IAS LM	10	0	0	0
Total	**103**	**8**	**21**	**5**

- Prof. Ivan Glesk, University of Strathclyde, UK
- Prof. Hans Arwin, Linköping University, Sweden
- Francisco Muñoz Fraile, PhD., Instituto Cerámica y Vidrio, Spain
- Assoc. Prof. Mark Wuilpart, Université de Mons, Belgium
- Prof. Marian Marciniak, National Institute of Telecommunications, Poland
- Prof. Tomasz Szoplik, University of Warsaw, Poland
- Prof. Pavel Cheben, National Research Council Canada, Canada
- Prof. Dr.-Ing. Dr.h.c. Vladimir Blazek, RWTH Aachen University, Germany

on lecture mobility within the project "Improving the competitiveness of technical curricula reflecting the current needs of business practice", ITMS 26110230052;

- Acceptance of an international expert:
  - prof. Sergey Ryvkin, Russian Academy of Sciences, Trapeznikov Institute of Control Sciences, Russian Federation

  on lecture mobility within the project "Systematization of transfer of advanced technology and knowledge between industrial sector and the university environment", ITMS 26110230004;
- In the area of personal policy, continuing graduation growth of the Faculty staff - 2 new associate professors were appointed and three new procedures for full professors are open;
- Hardware and software upgrading of research and teaching facilities at the FEE financed from the faculty resources and from the Structural funds;
- Successful realization of several national and international research projects (SRDA, VEGA, KEGA, ERASMUS, COST, CEEPUS II);
- Sustain of the 4th position between the Slovak technically oriented faculties based on the assessments made by the Academic Rating and Ranking Agency (ARRA) (2013:4, 2012:4, 2011:5, 2010:7, 2009:13, 2008:17);
- Organization or co-organization of several scientific events, e.g. ENDE 2013, ADEPT 2013, EURO-ŽEL 2013, ALER 2013, SSSI 2013, Matter APCOM 2013, 9th International particle Physics Masterclasses 2013);
- Successful re-certification of quality management system according to ISO 9001;
- Signing of international cooperation "Agreement on International Cooperation in Double Degree Doctoral Programme" between the Faculty of Electrical Engineering and the Faculty of Management Science and Informatics of the University of Žilina and the Faculty of Computer Science and Automation, Technische Universitaet Ilmenau;

- Enhancing cooperation between the departments and industrial partners in preparing and increasing quality of graduates.

Tab. 2: Number of employees at the FEE according to the categories 2009-2013

	2009		2010		2011		2012		2013	
	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT
Prof.	15	-	16	-	17	1	17	2	18	-
Guest Prof.	-	1	-	1	-	1	-	1	-	1
Assoc. Prof.	31	-	28	-	28	-	25	1	28	1
Guest Assoc. Prof.	-	-	-	-	-	-	-	-	-	-
Senior Lecturer	56	8	57	13	58	8	55	6	54	6
Lecturer	-	-	-	-	-	-	-	-	-	-
Lector	1	-	1	1	1	2	2	-	3	-
Techn. Adm. Staff	37	1	38	1	37	1	32	1	32	3
Research Staff	17	9	20	5	22	2	26	3	21	5
Total	**157**	**19**	**160**	**21**	**163**	**15**	**157**	**14**	**156**	**16**

FT - Full-Time, PT - Part-Time

Educational activities

The Faculty of Electrical Engineering provides education in the framework of the 3-degree study system in the following accredited study programmes according to the Law about Universities No. 131/2002 of the Slovak legal system:

Study programmes of the 1st study degree – Bachelor study

- Control Engineering
- Biomedical Engineering
- Digital Technologies
- Electrical Engineering
- Multimedia Technologies
- Telecommunications

Study programmes of the 2nd study degree – Master study

- Biomedical Engineering
- Electric Power Systems
- Electric Drives
  (rights suspended from 31. 8. 2013)
- Multimedia Engineering
- Process Control
- Telecommunication and Radio-communication Engineering
- Power Electronic Systems

Tab. 3: Number of Bachelor students

Study programme	Number of students as of 31 October 2013			
	Full-time study			Part-time study
	1st year	2nd year	3rd year	2nd year
Control Engineering	49	29	32	
Biomedical Engineering	53	33	20	
Digital Technologies – IAS LM	41	37	17	
Electrical Engineering	119	105	106	47
Multimedia Technologies	50	34	34	
Telecommunications	89	58	73	
Total	401	296	282	47
Total	**979**			**47**

Study programmes of the 3rd study degree – Doctoral study

- Electric Power Systems
- Electrotechnologies and Materials
- Process Control
- Power Electrical Engineering
- Telecommunications
- Theory of Electrical Engineering

Students

A summary image about the number of students at the FEE according to particular study degrees and study forms are presented in Tables 3 - 6. The Faculty had in total **1 595 students** as of October 31, 2013, while:

Tab. 4: Number of Master students

Study programme	Number of students as of 31 October 2013		
	Full-time study		Part-time study
	1st year	2nd year	
Biomedical Engineering	34	26	
Electric Drives	15	12	
Electric Power Systems (Electroenergetics)	41	28	
Multimedia Engineering	32	39	
Process Control	27	51	
Telecommunication and Radiocommunication Engineering	68	72	
Power Electronic Systems	20	25	
Total	237	253	
Total	**490**		**0**

Tab. 5: Number of Doctoral students

Study programme	Number of students as of 31 October 2013							
	Full-time study			Part-time study				
	1st year	2nd year	3rd year	1st year	2nd year	3rd year	4th year	5th year
Power Electrical Engineering	2	2	2	0	0	2	0	0
Electrotechnologies and Materials	1	4	0	0	0	0	0	0
Process Control	3	1	6	1	0	1	0	4
Electric Power Systems	7	5	7	0	4	2	0	0
Telecommunications	6	1	7	0	0	0	2	2
Theory of Electrical Engineering	3	1	1	0	0	0	0	0
Total	22	14	23	3	4	5	2	6
Total	**59**			**20**				

Tab. 6: Overview of Doctoral students number since the academic year 2009/2010

Academic year	Full-time	Part-time	Total
2009/2010	81	25	106
2010/2011	73	19	92
2011/2012	76	29	105
2012/2013	60	22	82
2013/2014	59	20	79

- In full time Bc. study: 979 students,
- In full time Msc. study: 490 students,
- In full time Ph.D. study: 59 students,
- Total in FT study: 1 528 students,
- Total in PT study: 67 students.

The following numbers of students:

- 244 students in the 1st study degree,
- 194 students in the 2nd study degree,
- 19 students in the 3rd study degree,

graduated from the FEE in 2013.

Admission for study

Admission to the Faculty of Electrical Engineering is based on a selection process according to the Law about Universities No. 131/2002. When selecting and admitting new students for 1st study degree, the main emphasis is paid to the type of graduated secondary school and results achieved during study, including results from the leaving examinations. Graduates of secondary grammar schools and secondary electro-technically oriented industrial schools with average results from mathematics and physics at the year-end and/or school-leaving certificates up to 2.00 are accepted without entrance examination. The others, i.e. the graduates of other types of secondary vocational schools and the graduates of secondary grammar schools and secondary electro-technically oriented industrial schools with average results above 2.00 have to go through the selection process according to the order list created based on marks from mathematics and physics taking into account a type of secondary school.

Selection process for the 2nd study degree is based on results of previous Bachelor study of an applicant. Those applicants who completed the Bachelor degree with honours, or reached the weighted average up to 2.00 including are accepted without the selection process. The other applicants are accepted according to a ranking list established on the basis of weight-

Tab. 7: Number of applicants and students enrolled into the 1st year of Bachelor study in full-time courses in the academic year 2013/2014

Study programme	Number of applicants for study	Number of enrolled students
Control Engineering	99	49
Biomedical Engineering	96	53
Digital Technologies	72	41
Electrical Engineering	309	119
Multimedia Technologies	95	50
Telecommunications	251	89
Total	**922**	**401**

ed averages for the whole Bachelor study.

Selection procedure for the 3rd study degree takes the form of a personal interview with each applicant separately in front of an admission committee. One part of the interview is focused on finding the outline of the applicant in the professional field related to the chosen topic of the Doctoral study. The next part aims to verify the knowledge of foreign languages and the assumptions for individual scientific work. The order of applicants is drawn up by the committee in the secret voting.

Number of applicants for study and number of enrolled students can be seen in Tables 7 - 9.

The evaluation of teaching quality and the main goals of educational activities

- The FEE regularly (annually) prepares and offers to the Faculty students' anonymous inquiries realized in electronic form within e-learning system asking for feedback on quality of educational process and teachers. However, despite the co-operation with a Student Association there is still relatively small interest of students in filling in the inquiries and evaluating the educational quality. Therefore, in selected courses, the old paper-form inquiry system has been kept too. On the basis of processing

Tab. 8: Number of applicants and students enrolled into the 1st year of Master study in full-time courses in the academic year 2013/2014

Study programme	Number of applicants for study	Number of enrolled students
Biomedical Engineering	35	34
Electric Energy Systems	48	41
Electric Drives	13	15
Multimedia Engineering	36	32
Process Control	37	27
Telecommunication and Radiocommunication Engineering	75	68
Power Electronic Systems	29	20
Total	**273**	**237**

Tab. 9: Number of applicants and students enrolled into the 1st year of Doctoral full-time study in the academic year 2013/2014

Study programme	Number of applicants for study	Number of enrolled students
Electric Power Systems	3	2
Electro-technologies and Materials	2	1
Process Control	4	3
Power Electrical Engineering	8	7
Telecommunications	7	6
Theory of Electrical Electrical Engineering	5	3
Total	**29**	**22**

of the questionnaires results, the heads of departments in the presence of competent teachers have carried out an evaluation of the teaching quality and defined next progress for the improvement of teaching in complex annual evaluation of the staff.

- The FEE has been a holder of the Quality Certificate for quality control system according to STN ISO 9001. The Certificate evaluates all processes at the Faculty, mainly the education. It was renewed in 2010 and again on 30. 9. 2013. The certification body has confirmed that FEE has built a quality management system in educational and research activities, and services and activities to the public in accordance with the requirements of standard STN EN 9001: 2009. The validity of the certificate is until 4. 10. 2016.
- The courses in social sciences, psychology, economics and law are offered to the students in all study programs at Bachelor and Master degree study.
- The FEE increases the attention given to the adaptation of new 1st degree students to university environment (information sessions, detailed monitoring of study results, support of mutual communication between students - teachers).
- Considerable attention is paid to students of 3rd degree study. The FEE supports them mainly in preparing a quality publication outputs, fulfilment of curricula, defending the dissertation thesis, therefore conditions of doctoral study and partially curricula were modified (after approval by the Scientific Council of the FEE). Between 2012 and 2013, within the framework of the project in the EU operational program Education, lectures and consultations were held with doctoral student at the FEE with 17 professors from the world's top universities and research institutes.
- Since 2004 the FEE has used complex software system for support of e-learning, which enables access into e-learning blocks, test and examination, organizational provision of study. The FEE claims from pedagogical staff active usage of e-learning system and at the same time it makes conditions for e-learning development.
- The FEE participates in a student mobility system. Number of outgoing students is currently higher than number of incoming students. However, the interest of departing students is declining. The faculty management regularly deals with these issues and takes measures to support student mobility.
- The FEE supports the development of interdisciplinary, multidisciplinary, distance and lifelong learning; and education of foreign languages mainly by young employees and Doctoral students.
- Since 1994 the FEE has had the credit system for Bachelor and Master study degrees. Since 2005 it has had the credit study system for all study degrees at the FEE. System enables uniform evaluation of study results in the frame of EU and markedly makes simpler the realization of mobility and acceptation of achieved results. According to the Regulations of the Ministry of Education of the Slovak Republic, the Faculty came in the academic year 2008/2009 to the evaluation system of students load during the semester without "pre-credits".
- At the FEE there is a contact person responsible for help and life coordination of disabled students.
- The FEE has elaborated a system for provision of courses with suitable study literature (textbooks, lecture notes), for creation of e-books and e-materials, and for providing courses with quality teaching staff.
- The FEE has elaborated practises and principles of recognition of study results

achieved by study mobility at other higher education institutions. These principles are oriented so as to promote interest and mobility for students and not to create an excessive burden and possible delays in the study.

- The FEE has elaborated practises of active propagation of offered study programs at selected grammar-schools and secondary schools. Traditionally in the beginning of the calendar year (in the year 2013 it was on January 25), the FEE regularly organizes so called "Open Door Day at the FEE". Other instruments promoting the study are significantly upgraded (in collaboration with students) materials on the Faculty website and on the social network.
- The FEE supports realization of pedagogical training, especially for young and new teachers of the University of Žilina and PhD students.
- The FEE motivates talented students for independent and creative activities in forms of student scientific technical competition (ŠVOS), scientific assistants by participating in solving of research projects and projects associated with development of pedagogical and research activities of departments.
- The FEE provides to students benefit scholarships for excellent study results. In 2013, these scholarships were awarded to 126 students, on the basis of their weighted averages. Further, the extra scholarship receives students for work and exemplary representation of the Faculty and the University in the field of science, education, culture and sport. In 2013 were rewarded 38 students with the extra scholarship.
- Excellent results of the employees and students of the Faculty are continuously published on the Faculty website.
- The FEE publishes for students and graduates job offers from companies (including the Faculty web site) and organizes company presentations at the Faculty premises.
- The FEE within the frame of the Alumni Club (KAP EF) helps graduates to integrate into the work process and keeps in touch with them.

Scientific research activities

In addition to education, the scientific research activity is the primary mission at the Faculty and its further growth is a necessary assumption of the future development since it is closely related to the quality of education. Scientific research activities are at the FEE realized especially in the form of projects and are mainly based on individual activities at departments and their co-operation. One of the major outputs of scientific research activities are scientific publications indexed in major international databases such as Web of Science and SCOPUS and international conferences supported by major professional organizations, in particular the IEEE, SPIE, IFAC, IFIP, ACM, and the IET.

The most important types of projects are international ones together with projects financed from the Structural Funds as well as projects supported from national resources through the Slovak Research and Development Agency (SRDA), the Scientific Grant Agency of the Slovak Ministry of Education, Science, Research and Sport and the Slovak Academy of Sciences (VEGA) and the Cultural and Educational Grant Agency of the Ministry (KEGA). Cooperation with industrial partners in the field of applied research is also of high importance.

In total 20 projects of international cooperation, 39 projects financed from national sources, 31 projects of Structural Funds and 3 other national projects have been realized at the FEE in 2013. The most important information about the projects is summarized in the following subsections. The contract-based expertise activities are also listed.

Projects of International Programmes

7th Framework Programme projects

244749: European Science and Technology in Action Building Links with Industry, Schools and Home "ESTABLISH"

Summary:	Development of new tools for education of technically oriented subjects connected with utilisation of cooperation among schools, industrial sphere and home environment.
Realization:	01/2010 – 12/2013
Coordinator:	Eilish McLoughlin, Dublin City University
Co-operators:	Ivo Čáp (DEBE)

EUREKA projects

E! 6752 R&D For Integrated Artificial Intelligent System For Detecting The Wildlife Migration "DETECTGAME"

Summary:	Integrated artificial intelligent system for detecting the wildlife migration that will utilise video surveillance technology with computer vision technology, that will provide gov. structural and eco. organisations with accurate data about wildlife migration for optimising road network.
Realization:	09/2013 - 06/2016
Coordinator:	Róbert Hudec (DTM)

COST projects

Action TD1001: Novel and Reliable Optical Fibre Sensor Systems for Future Security and Safety Applications (OFSeSa)

Summary:	Optical fibre sensors offer finite solution for monitoring of extreme parameters associated with safety and safety applications. While advantages of these sensors are well known, there is the whole list of problems which need to be addressed.
Realization:	11/2010 – 11/2014
Coordinator:	Daniel Káčik (DPh)

COST IC 1003: European Network on Quality of Experience in Multimedia Systems and Services (QUALINET)

Summary:	The goal of this Action is to establish a strong network on Quality of Experience (QoE) with participation from both academia and industry. Its main objective will be to develop and to promote methodologies to subjectively and objectively measure the impact in terms of quality of future multimedia products and services. This network will leverage on QoMEX, an already established international conference on Quality of Multimedia Experience. Observing that there are currently no European networks focusing on the concept of QoE, this Action also aims at bringing a substantial scientific impact on fragmented efforts carried out in this field, by coordinating the research under the catalytic COST umbrella, and at setting up a European network of experts facilitating transfer of technology and know-how to industry, coordination in standardization, and certification of products and services.
Realization:	11/2010 – 11/2014
Coordinator:	Peter Počta (DTM)

Action IC 1106: Integrating Biometrics and Forensics for the Digital Age

Summary:	Goal of the Action is networking of European institutions focused on research of process for biometrics and forensics analysis with utilization of new progressive analysis technologies and processing of multimodal data. DTM research team is oriented in research of algorithms for persons identification and recognition their emotive status from acoustic data. They are also focused on detection and recognition of specific audio events from digital content.
Realization:	03/2013 – 03/2016
Coordinator:	Roman Jarina (DTM)

Action IC 1304: Autonomous Control for a Reliable Internet of Services (ACROSS)

Summary:	Currently, we are witnessing a paradigm shift from the traditional information-oriented Internet into an Internet of Services (IoS). This transition opens up virtually unbounded possibilities for creating and deploying new services. Eventually, the ICT landscape will migrate into a global system where new services are essentially large-scale service chains, combining and integrating the functionality of (possibly huge) numbers of other services offered by third parties, including cloud services. At the same time, as our modern society is becoming more and more dependent on ICT, these developments raise the need for effective means to ensure quality and reliability of the services running in such a complex environment.

	Motivated by this, the aim of this Action is to create a European network of experts, from both academia and industry, aiming at the development of autonomous control methods and algorithms for a reliable and quality-aware IoS
Realization:	11/2013 – 11/2017
Coordinator:	Roman Jarina (DTM)

Action TU 1302: Satellite Positioning Performance Assessment for Road Transport (SaPPART)

Summary:	Global Navigation Satellite Systems (GNSS) have a significant potential in the development of ITS and mobility services, expected to deliver many benefits including reducing congestion, increasing capacity and improving safety. The road sector is estimated to represent more than 50% of the GNSS market and 75% when we consider the mobility services on smartphones. However, the current lack of a pan-European certification process underpinned by agreed standards is impeding the realisation of the expected benefits. The main reason for this is the complexity of defining and assessing GNSS performance which is highly influenced by the environment and operational scenario. Although standardisation activities have been initiated in Europe on this topic, many scientific issues are still open and require a common agreement. This Action brings together experts in GNSS, ITS and mobility to address the open issues and guarantee the success of the standardisation for underpinning certification initiatives. The Action will provide 4 deliverables and will propose a unified framework for definition and assessment of performance for the GNSS-based positioning terminals. This framework is expected to pave the way for certified terminals, which is expected to result in a significantly accelerated use of GNSS-based ITS and mobility applications.
Realization:	11/2013 – 11/2017
Coordinator:	Peter Brída (DTM)

TEMPUS Projects

530632-TEMPUS-1-2012-1-SE-TEMPUS-JPCR: EU-EG-JO Joint Master Programme in Intelligent Transport Systems

Summary:	The project focuses on establishing a new study programme and equipment of ITS laboratories on target universities in Egypt and Jordan. The project will enable to organise a joint conference on the ITS area, realise a mutual exchange of students and teachers and deepen the bonds between universities and business.
Realization:	11/2012 – 10/2015
Coordinator:	Ghazwan Al-Haji, Linköping University, Finland
Subcoo. from FEE:	Aleš Janota (DCIS)
Co-operator:	Peter Brída (DTM)

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 (DME)

Other international 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 – 12/2012
Customer:	Panasonic Electronic Devices Europe GmbH
Coordinator:	Pavol Špánik (DME)

ETSI STF 436 on Adaptation of the ETSI QoS Model to Better Consider Results from Field Testing

Summary:	This work dealt with an adaptation of the ETSI QoS Model to better consider results from field testing. Initially a study addressing a development of an approach to Estimated Communication Quality based on existing standards and also including selection of additional typical impairment scenarios has been done. Afterwards, a subjective test plan was developed and subjective tests were conducted. On the basis of the results obtained in the subjective test, the MCQP model has been developed and its accuracy has been verified and compared to E-model.
Realization:	12/2011 – 02/2013
Coordinator:	Peter Počta (DTM)

ETSI STF 437 on QoS of Connections from Current Technologies to LTE

Summary:	This work looks at QoS of connections from current technologies to LTE. Initially a study addressing LTE related end-to-end QoS problems for connections from existing technologies for delay sensitive applications has been done. Afterwards, shortcomings of standards and implementations have been identified. On the basis of the shortcomings identified in the first phase of the project, the possible solutions envisioned by the STF experts have been outlined and some actions have been already initiated.
Realization:	01/2012 – 11/2013
Coordinator:	Peter Počta (DTM)

2/2012: Actualisation and extension of NEXUS system product portfolio	
Summary:	Agreement of research activity cooperation between the companies První Signalní, a.s., Ostrava (CR) and University of Žilina in Žilina. The goal is to modernise the existing HW and SW components of the NEXUS system and to extend the product portfolio of its modules by new modules in respect to expected system applications.
Realization:	10/2012 – 06/2013
Coordinator:	Karol Rástočný (DCIS)

1/2013: Safety appraisal of track interlocking device VEAH-11	
Summary:	Agreement of research activity cooperation between the companies SignalBau a.s., Přerov (CR) and University of Žilina in Žilina. The goal is to appraise the delivered documentation for VEAH-11 track interlocking system with defined interfaces to joint interlocking devices and elaboration of safety appraisal report of the VEAH-11.
Realization:	11/2013 – 08/2014
Coordinator:	Karol Rástočný (DCIS)

Safety appraisal of railway-crossing interlocking system RLC23	
Summary:	Agreement of research activity cooperation between the companies Altpro d.o.o., Zagreb (Croatia) and University of Žilina in Žilina. The goal is to elaborate a Safety appraisal report of the RLC23 railway crossing system (generic application for the Slovak Railways).
Realization:	03/2013 – 12/2013
Coordinator:	Karol Rástočný (DCIS)

02-1-1097-2010/2015: Study of spin effects in few nucleon systems	
Summary:	The project aim is to study the spin structure of the deuteron and three nucleon systems at short distances by measuring the polarization observables of reactions induced by deuterons at intermediate energies. The reason for such research is the lack of experimental data which aren't in good agreement with the theoretical calculations. Energy and angular distributions of the polarization observables can give us information about two and three nucleon correlations and effects associated with non-nucleonic degrees of freedom.
Realization:	03/2013 – 12/2013
Coordinator:	Marián Janek (DPh)

Z-14-101/0001-1404 00: ChemLog T&T Tracking and Tracing - Chemical Logistic Cooperation in Central and Eastern Europe

Summary:	Design and verification of system for monitoring of intermodal transport of dangerous goods in CEE within the project Nr. 4CE492P2 Chemical Logistic Cooperation in Central and Eastern Europe - ChemLog T&T - Tracking and Tracing solutions for improvement of intermodal transport of dangerous goods in CEE. The financial support has been provided by the Slovak chemical and pharmaceutical industry association, project Nr. 4CE492P2 ChemLog T&T, ERDF, INTERREG IV B.
Project period:	12/2013 – 12/2014
Coordinator:	Jozef Gnap

OP VK CZ.1.07/2.2.00/15.0113: Innovation of subject „Measurement and control technology" at the FEI, VŠB-TU Ostrava

Summary:	This project is aimed at modernizing the education of "Measurement and control technology" subject taught at the department of measurement and control technology, VŠB-TU Ostrava.
Realization:	01/2010 – 12/2013
Coordinator:	Jiří Koziorek, (Faculty of Electrical Engineering and Information Technology, VŠB-TU Ostrava)
Co-operators:	Michal Gála, Branko Babušiak (DEBE)

RRC/05/2013: Support of science and research in the Moravian-Silesian region 2013 DT 1 - International research teams

Summary:	Project goals include the development of application for telemedicine.
Realization:	01/2013 – 12/2014
Coordinator:	Marek Penhaker (Faculty of Electrical Engineering and Information Technology, VŠB-TU Ostrava)
Co-operators:	Michal Gála, Branko Babušiak (DEBE)

Project of European Physical Society International Physics Masterclasses

Summary:	High school students spend one day with physicists of elementary particles during which they learn to evaluate real experimental data from LHC accelerator.
Realization:	annually
National coordinator:	Ivan Melo (DPh)

Projects of National Programmes

Slovak Research and Development Agency (SDRA)

APVV-0025-12: Mitigation of stochastic effects in high-bitrate all-optical networks

Summary:	The project is focused on the investigation in the area of linear and non-linear influences of the transmitted optical signals in the multichannel all-optical systems and networks. Main goal is to investigate origin of these effects and their impact on the transmission of various types of the high-order modulated

optical signals and on mitigation of degradation mechanisms using switching and routing in all-optical multi-channel networks.
The project has been solved in three phases. In the first phase the physical layer has been investigated considering different mainly stochastic effects. In the second phase also protocols for switching and routing in high-speed all-optical multichannel networks have been investigated. The third phase has been focused on the integration of the influences in the physical layer with the protocol design for switching and routing into one platform. It will be the main precognition for creation of the new properties of the reservation protocols which will meet basic requirements for achieving most effective data transmission with the high-level quality of service through the nodes of the high-speed multichannel all-optical networks based on the OBS with next targeting into all-optical IP networks.
Within this project the IAS researchers cooperate with the Department of Telecommunications and Multimedia, Faculty of Electrical Engineering, University of Žilina, and the Department of Electronics and Multimedia Communications, Faculty of Electrical Engineering and Informatics, Technical University in Košice.

Realization: 10/2013 – 09/2016
Coordinator: Jarmila Müllerová (IAS)

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 (DME)

APVV-395-12: Photonic structures for integrated optoelectronics

Summary: Project focuses on research and realization of active and passive elements with implemented photonic structures for integrated optoelectronics and optics. In the area of active elements the project focuses on research and realization of semiconductor LEDs and photodetectors with photonic structures. For passive elements, the project aims to the research of optical waveguides with integrated photonic structures inside the waveguide.

Realization: 01/2013-12/2016
Coordinator: Dušan Pudiš (DPh)

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 (DME)

APVV–0050–11: Strongly interacting matter in extreme conditions (SIMEX)

Summary: Project deals with open problems of behaviour of strongly interacting matter in extreme conditions i.e. at high temperatures and/or high densities of nuclear matter.
Realization: 07/2012 – 12/2015
Coordinator: Štefan Olejník, Institute of Physics, Slovak Academy of Sciences, Bratislava
Sub-coordinator: Ivan Melo (DPh)

APVV-0096-11: Defects role in organic semiconductors for solar cells

Summary: The project is focused on the study of electrically active defects in organic semiconductors. Defects which act as traps and recombination states of charge carriers essentially influence the charge transport and recombination-generation mechanisms. The knowledge of the origin of defects and their control is therefore an important issue of organic electronics. The aim of the project is to obtain new knowledge on defects origin in thin films of selected organic semiconductors and its correlation with the structure and morphology of the films. This knowledge will be used in the study of the influence of intentionally introduced defects and degradation processes on the function of solar cells which will be prepared within the project. New knowledge will be obtained by the combination of standard experimental techniques suitable for electrical, optical and structural thin film characterization with transient techniques based on the charge measurement, developed by our research group.
Realization: 06/2012 – 12/2015
Coordinator: Vojtech Nádaždy, Institute of Physics, Slovak Academy of Sciences, Bratislava
Sub-coordinator: Jarmila Müllerová (IAS)

APVV-0888-11: Research of new passivation processes of Si-based structures

Summary: Project is concerned with comprehensive investigation of two new, very effective passivation processes that enable to passivate surface defects and defect states of interfaces as well as volume defects in structures of the following Si-based semiconductors: crystalline Si, poly-crystalline Si and a-Si:H. Investigated processes are: i) formation of ultrathin atomically high-dense SiO_2 layer (thickness of approx. 1.5 nm) on corresponding surface or at interface, and ii) passivation of structures by low-concentration solutions of HCN and KCH at low, or slightly increased temperatures. The second passivation process leads to the formation of structures or separately, applied to structures of three types of solar cells prepared on the basis of the three mentioned types of Si semiconductors, at which the relative increase of their conversion efficiency in the interval of 15 to 25 % in respect to the reference sample is expected. Next application is related to investigation of "high-k" structures of 4 nm HfO_2/1.5 nm SiO_2/Si where the interlayer is made of atomically dense layer. The atomic density of defect states will be below 5×10^{10} $eV^{-1}cm^{-2}$. Proposal of its application will be offered to a specific subject of interest in the frame of the project.
Realization: 06/2012 – 06/2015

Coordinator: Emil Pinčík, Institute of Physics, Slovak Academy of Sciences, Bratislava
Sub-coordinator: Jarmila Müllerová (IAS)

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, Technical University of Košice
Sub-Coordinator: Branislav Dobrucký (DME)

APVV-0349-10: Towards Electromagnetic Induction Based Methods to Meet their True Potential in Non-destructive Monitoring of Conductive Structures

Summary: The project focuses on enhancing the potential of electromagnetic induction based methods in non-destructive monitoring of conductive materials. The aim is to increase rate of relevant information about an inspected structure and to effectively process the obtained information. Activities of the project are therefore oriented on research and development of new hardware and software means of non-destructive evaluation. The intention is to identify profile of a detected defect as well as its basic dimensional parameters with high preciseness and thus to decrease degree of uncertainty in evaluation.
Realization: 05/2011 – 10/2014
Coordinator: Ladislav Janoušek (DEBE)

APVV-0703-10: Analysis and Diagnostic Measurements of Power Transformers using by Sweep Frequency Response Analysis

Summary: The project focuses on diagnostics of power transformers using the method SFRA to determine the mechanical condition of the windings and core transformers. Application of diagnostic methods is appropriate for designation the aging of insulation system of transformers.
Realization: 05/2011 – 10/2014
Coordinator: Ján Michalík

SK–RO-0008-12: Resonant ultrasound spectroscopy - application for non-destructive testing of biomedical refunds

Summary: The project aims is examine the possibilities of the use of resonant ultrasound spectroscopy for non-destructive testing of biomedical compensation and biocompatible materials
Realization: 01/2013 – 11/2014
Coordinator: František Nový, Faculty of Mechanical Engineering, University of Žilina
Co-operators: Dagmar Faktorová (DMAEE)

SK-RO-0011-12 Enhancing diagnosis of partially conductive cracks in eddy-current non-destructive evaluation

Summary: The project focuses on enhancing the potential of electromagnetic induction based methods in the non-destructive diagnosis of metallic materials. The aim is to increase rate of relevant information about an inspected structure and to effectively process the obtained information for reliable diagnosis. Especially, the diagnosis of partially conductive cracks, such as stress corrosion cracking, is addressed in the project. Activities of the project are therefore oriented on research and development of novel hardware and software means for the eddy current non-destructive evaluation.
Realization: 01/2013 - 12/2014
Coordinator: Ladislav Janoušek (DEBE)

SK-RO-0028-12: Switched reluctance machine analysis in automotive applications

Summary: Project deals with scientific analysis of switched reluctance machines for automotive applications. It's focused on three main applications of drives for automotive, where conventional machines in motor or generator mode could be replaced, such as power steering, starter-generator, active damping. Analytic design of such machines will be introduced using modern design methods (e.g. Finite elements method). Static and dynamic elements of equivalent circuit will be designed to support the dynamic simulation model. The simulation model will represent a behaviour of such machine in real operation. Based on simulation results, a set of measurements on real machines will be established.
Realization: 01/2013 – 12/2014
Coordinator: Pavol Rafajdus (DPES)

Scientific Grant Agency of the Slovak Ministry of Education, Science, Research and Sport and the Slovak Academy of Sciences (VEGA)

VEGA 2/0045/13: Sensitivity of liquid crystals with nanoparticles to external magnetic field

Summary: Some processes in systems with nanoparticles are studied, in particular in magnetic fluids and magneto-optic films with significant Faraday effect. First part of the project is devoted to studies of the structure and dielectric properties, heat conduction, ageing process, partial discharges and both d.c. and a.c. hopping in new magnetic fluids based on transformer oils. The purpose is to prepare transformer oils with better dielectric and thermal properties as in the case of clean transformer oil, so they could be used as more effective cooling medium as a result of the magneto-convention. The purpose is to utilize them in various areas of high-power electronic. The second part of project is oriented towards the preparation of magneto-optical films in the form of polymeric, in magnetic field structuralized nanoparticles of various shape and to the study of their magneto-optic properties.
Realization: 2013 – 2016
Coordinator: Peter Kopčanský, Institute of Experimental Physics, Academy of Sciences, Košice
Sub-Coordinator: Peter Bury (DPh)

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 postprocesing

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 (DME)

VEGA 1/0394/13: Research of mobile terminals localization by means of modular localization systems

Summary: At present time, many services provided by various operators need geographical position information about mobile terminals for its operation. Goal of providers is to provide these services regardless the environment around the user. This relatively difficult task is currently not feasible using one positioning system. For example, GNSS systems do not work well in indoor environment and on the other hand parameters of indoor positioning systems are not as good as GNSS parameters in outdoor environment. Goal of the project is to develop solution of localization system, which will utilize localization systems based on different wireless technologies to estimate position of mobile device. Solution should lie in proposal of modular positioning system, which will choose optimal positioning system to estimate position, based on actual conditions in the environment. Modular positioning system should consist of partial positioning systems based on GNSS, cell networks and Wi-Fi networks.
Realization: 01/2013 – 12/2015
Coordinator: Peter Brída (DTM)

VEGA 1/0624/13: Analyze of insulation state of oil distribution transformers with respect to investigation of adverse effects

Summary: The project is devoted to analysis of insulation state of oil distribution transformers with respect to investigation of adverse effects of operations and environment. The main attention is devoted to diagnostics of transformer insulation parameters. We will analyze the effect of short circuit, overvoltages, effect of environments and further operation factors for the effect on degradation insulation of transformer. Another aim will be devoted to the detailed study of the characteristics of partial discharges in transformer oil, which have direct effect on the degradation of insulating state. We will describe the process of their creation, development and impact on transformer insulation degradation. We will prepare new measurement techniques and diagnostic method for determination of the insulation state degradation of oil distribution transformers (oil, paper, bushings, winding insulation).
Realization: 01/2013 – 12/2015
Coordinator: Jozef Kúdelčík (DPh)

VEGA 1/0705/13: Image elements classification for semantic image description

Summary: The submitted scientific project deals with research of semantic image data analysis. It is extension of project "Research of algorithms for automatic multimedia analysis" (VEGA 1/0570/10). By using those information, the algorithms for semantic image-data description will be researched in submitted project. However the area of semantic image data description is huge, two basic areas were specified in this project. The first is area of intelligent transport and second area is classification of common images with specialization in animal class. The appropriate use of low-level features for the effective classification based on critical analysis for each area will be researched. The classification algorithms based on SVM (Support Vector Machine) will be proposed and optimized. For the image elements classification, the appropriate ontology and hierarchy will be proposed.
Realization: 01/2013 – 12/2015
Coordinator: Róbert Hudec (DTM)

VEGA 1/0846/13: Design and optimization of methods and materials for treatment of tumour diseases by applying electromagnetic field

Summary: The project is aimed at problem solving related to design of new approaches, methods and materials used for the treatment of tumour diseases by applying electromagnetic fields.
Realization: 01/2013 – 12/2015
Coordinator: Dagmar Faktorová (DMAEE)

VEGA 1/0853/13: Research of the microstructural, electrical and optical properties of the semiconductor/dielectric systems

Summary: In the project the influence of the microstructure of the semiconductor-dielectric system with thin oxide films onto the electrical and optical properties are solved. The sample microstructure changes during the technological operations and influences all physical properties of the structure. This is very remarkable in systems with ultrathin oxide layers. The theoretical models for the microstructure development, quantum charge states and optical properties are solved by the parallel algorithms in computer grid in connection with the experimental data.
Realization: 01/2013 – 12/2015
Coordinator: Stanislav Jurečka (IAS)

VEGA 1/0940/13: Research and development of switched reluctance machines for automotive applications

Summary: Project deals with scientific analysis of switched reluctance machines for automotive applications. It's focused on three main applications of drives for automotive, where conventional machines in motor or generator mode could be replaced, such as power steering, starter-generator, active damping. Analytic design of such machines will be introduced using modern design methods (e.g. Finite elements method). Static and dynamic elements of equivalent circuit will be designed to support the dynamic simulation model. The simulation model will represent a behaviour of such machine in real operation. Based on simulation results, a set of measurements on real machines will be established.
Realization: 01/2013 – 12/2015
Coordinator: Pavol Rafajdus (DPES)

VEGA 2/0076/12: Investigation of interaction of aqueous HCN solution with more types of Si-based structures

Summary: Project deals with interaction of 0.01M aqueous HCN solution with Si-based structures covered with ultrathin and very thin atomically high-dense SiO_2 layer. The first group of investigated semiconductors consists of c-Si, poly-Si and a-Si:H. The second one is composed of porous Si, hexagonal SiC (6H-SiC and/or 4H-SiC) and porous SiC. Investigation of properties of structures of the second group should help to explain results obtained on the first one which is more known exactly. Passivation of surfaces, interfaces and volumes of structures is dominant goal. Research should give response on more questions, e.g. which types of defect states in porous semiconductors can be passivated, how volume structural properties of a-Si:H, porous Si and porous SiC will be changed etc. The process of interaction is very important for photovoltaics. During the last phase of the project, the results will be applied on one type of MOS pn Si solar cell.
Realization: 01/2012 – 12/2014
Coordinator: Emil Pinčík, Institute of Physics, Slovak Academy of Sciences, Bratislava
Sub-Coordinator: Jarmila Müllerová (IAS)

VEGA 1/0388/12: Quantitative safety integrity appraisal of control systems for railway applications

Summary: Safety functions and the related intensity of tolerable dangers are defined based on risk analysis as technical measures for decreasing of risk related with the particular dangers. To achieve an acceptable safety related control system it is not sufficient to state that the safety measures have been adopted, but it is necessary to approve that the adopted measures decreased the risk at least to the tolerable level. The risk beard by an individual while utilising railway transport for example, should be the same independently on current country location. The objectivisation of risk analysis and the related definition of safety requirements on control system is currently highly problematic.
Realization: 01/2012 – 12/2014
Coordinator: Karol Rástočný (DCIS)

VEGA 1/0453/12: Study of interactions between motor vehicle, traffic flow and roadway

Summary: The project is focused on examination of new methods for measuring dynamic properties of motor vehicle and its interaction with roadway and its surrounding based on step-monitoring. A part of the project is design of new and/or modification of existing measurement methods of chosen roadway parameters and its surrounding, design and implementation of new algorithms for experimental data processing, comparison of diverse approaches, identification of possible future applications.
Realization: 01/2012 – 12/2014
Coordinator: Aleš Janota (DCIS)

VEGA 1/0457/12: Strongly interacting matter in nuclear collisions and compact stars

Summary:	Project deals with selected topics from physics of nuclear collisions and compact stars.
Realization:	01/2012 – 12/ 2014
Coordinator:	Boris Tomášik, Matej Bell University, Banská Bystrica
Sub-Coordinator:	Ivan Melo (DPh)

VEGA 1/0528/12: Research and development of optofluidic fibers for sensor and photonic applications

Summary:	The aim of the project is to acquire theoretical knowledge about optofluidic fibers based on optical glasses in combination with appropriate fluids and their implementation into practical application for design, preparation and characterization of this kind of fibers. The subject of the project is the design of optofluidic fiber structures composed of optical glass and fluid in order to the application in sensorial, photonic and optoelectronic application, as well as preparation and characterization of these optofluidic fibers with designed structures. Static and dynamic optical properties of optofluidic fibers will be examined in visible and near infrared region of electromagnetic spectrum. Gained knowledge will be employed for design of photonic devices based on optofluidic fiber properties, as tunable optical sensor attenuators, optical power limiters, optical fiber switches and sensors.
Realization:	01/2012 – 12/2014
Coordinator:	Ivan Martinček (DPh)

VEGA 1/0704/12: Radio Resources Management Improvement in Wireless Ad hoc and Mesh Networks

Summary:	Mobile communication networks Ad-hoc (communication among mobile nodes without infrastructure and without central control), or mesh networks (Ad hoc networks with access points connected together) are rapidly developing today. The quality of service (QoS) requirements increasing in these networks is very close connected to necessity for minimizing the mutual interference among network's nodes. One of methods how to minimize this parameter is to improve the efficiency of radio resources assignment by such a way, to ensure the fulfilment of requested transport parameters (throughput, delay, packet error rate). The project represents the graduation of finishing grant VEGA 1/0336/10 (QoS parameters enhancement in MANET and mesh networks) and is focused on development of algorithms for distributed channel selection by means of radio channel impulse response knowledge.
Realization:	01/2012 – 12/2014
Coordinator:	Vladimír Wieser (DTM)

VEGA 1/0743/12: Gigacycle Fatigue Properties of Nanostructured Materials

Summary:	The project is aimed at addressing the problems associated with the investigation of fatigue properties of new nanostructured materials in the process of periodic strain.
Realization:	01/2012 – 12/2014
Coordinator:	Otakar Bokůvka, Faculty of Mechanical Engineering, University of Žilina
Co-operators:	Dagmar Faktorová (DMAEE)

VEGA 1/1159/12: Numerical Modelling of Multiphase Flow and Transport in Porous Area

Summary:	The project is aimed at addressing the problems associated with the creation of physical and mathematical model of multiphase flow and transport in porous area, the numerical solution and identifying possible conditions associated with different types of porous area.
Realization:	01/2012 – 12/2014
Coordinator:	Mahmood Mohammed, Faculty of Mechanical Engineering, University of Žilina
Co-operators:	Dagmar Faktorová (DMAEE)

VEGA 2/1271/12: Study of the influence of the degradation effects in the physical layer of the high-speed optical networks on the transport mechanisms

Summary:	The project aims at the numerical study of the transmission and the switching of optical signals and the creation of the comprehensive virtual environment for the different degradation impacts of linear and nonlinear optical phenomena in the physical layer of the optical backbone network with wavelength division multiplexing under different modulation formats in a coherent transmission system. Simulations of impairments (chromatic and polarization mode dispersion, nonlinear 2nd and 3rd order effects) on signal transmission are performed by computer modelling. The possible stochastic behaviour will also be taken into account. Results will be applied for the design of appropriate compensatory measures, such as the channel separation, location, payload and performance. Channel switching is modelled on a modular system of virtual optically-switched optical network with optical burst switching. Fast optical switching between channels unimpaired by wavelength-dependent degradation is numerically tested.
Realization:	01/2012 – 12/2014
Coordinator:	Jarmila Müllerová (IAS)

VEGA 1/0355/11: Optimal control techniques for lowering of alternating electric drives losses

Summary:	Project is focused on the research and development of modern methods of energy-optimal positional control of AC electric drives. The research deals with methods for optimizing energy and time limit of nonlinear control systems with asynchronous and synchronous motors, as well as their comparison.
Realization:	01/2011 – 12/2013
Coordinator:	Ján Vittek (DPES)

VEGA 1/0765/11: Research on Application Possibilities of Eddy Currents Non-Harmonic Excitation in Quantitative Non-destructive Evaluation of Conductive Materials

Summary:	The project is focused on research of application possibilities of eddy currents non-harmonic excitation in quantitative non-destructive evaluation of conductive materials' structures. The main purpose of the evaluation is the reliable detection of non-homogeneities in presence and precise identification of their relevant parameters.
Realization:	01/2011 – 12/2013
Coordinator:	Ladislav Janoušek (DEBE)

VEGA 1/0927/11: Research of the New Approaches to Monitoring and Evaluation of Biomaterials by Electromagnetic Methods	
Summary:	Research and realization of effective approaches to monitoring of biomaterials and to evaluation of their properties. The research is aimed to the proposal and realization of the suitable way of the signal detection with the possibility to identify the real defects. The optimum way of electromagnetic detection of implants failures using various sorts of detecting sensors will be evaluated according to the given evaluated properties (sensitivity, biocompatibility, non-invasive method, etc.).
Realization:	01/2011 – 12/2013
Coordinator:	Klára Čápová (DEBE)

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 (DME)

VEGA 1/1058/11: NSOM lithography and interference lithography as an advanced method for the preparation of the photonic structures and optoelectronic devices with photonic structures	
Summary:	Project is focused on the preparation of the photonic structures for the optoelectronic devices by employment of the lithographic methods as the NSOM and the interference lithography. These lithographic techniques and their combination allow prepare the photonic structures for optoelectronic devices with the period of order of few hundreds nanometers. In combination with the optimisation of the optical properties in the program FDTD the unique laboratory of the photonic structures will be established with possibilities of the complex photonic device design, optimisation and diagnostics in the area of photonic structures.
Realization:	01/201 – 12/2013
Coordinator:	Dušan Pudiš (DPh)

Cultural & Education Grant Agency of the Slovak Ministry of Education, Science, Research and Sport (KEGA)

KEGA 010ŽU-4/2013: Modernisation of education technologies and methods with focus on the area of robotics	
Summary:	The project aims on finishing the building of robotics laboratory by software and hardware means, which enables extension of practical knowledge in the area of robotic systems for final degrees students in the Automation branch.
Project period:	01/2013 – 12/2015
Coordinator:	Aleš Janota (DCIS)

KEGA 022ŽU-4/2013: Discovering the world of particles

Summary: The goal is to mobilize high energy physics community in the area of outreach and informal education, to make a step towards a community formed by physicists, teachers, students and high school students. Another goal is to raise interest of the young generation in science using enquiry based learning and the creation of the web portal „The world of particles" - communication platform of the new community.
Realization: 01/2013 – 12/2015
Coordinator: Ivan Melo (DPh)

KEGA 024 ŽU 4-2012: Modernisation of education technologies and methods with focus on the area of cryptology for safety critical applications

Summary: An inseparable part of security-oriented education is the area of secure communication including cryptography. The need of developing subjects with this scope in the Automation branch emerges from praxis requirements experiencing growth of applications demanding safety-relevant communication system (industrial applications, control systems in railway and road transport). The teachers of study programme Process control have sufficient theoretical and practical knowledge in the area of security principles which they will utilise in project for modernisation of laboratory education methods with the use of new cryptographic HW and SW means. This approach enables students to extend their theoretical knowledge and experiences by real applications of confidential and authenticated transmission and by cryptanalysis methods in standard applications. Moreover they gain skills in application of methods and tools for security evaluation of cryptographic modules in safety critical applications. It is a new perspective area of cryptography utilisation in applications with increased safety integrity level requiring knowledge transfer in the educational process using the latest e-learning technologies in Slovakia and on partner universities abroad.
Realization: 01/2012 – 12/2014
Coordinator: Mária Franeková (DCIS)

KEGA 035ŽU-4/2012: Forming of physical concepts using videoanalysis and videomeasurements with the aim to popularize physics and make it more attractive

Summary: The project is focused on the preparation of supplementary study materials for the subject physics that are intended for the grammar and high school students and could be also used for both one-term and two-term basic physics courses. By preparing video-experiments and through the realization of video-measurements we want to build in students the correct conception about processes and phenomena around us. The prepared set of video-experiments will be placed at the World Wide Web so that it will be accessible to all teachers and students at all levels of the educational process as an aid serving whether for a visual demonstration, explanation or a mathematical or a physical analysis of the given process.
Realization: 01/2012 – 12/2014
Coordinator: Peter Hockicko (DPh)

KEGA 002KU-4/2011: Development of Scientific Literacy in University Preparation of Students of Pre-school and Elementary School Pedagogy

Summary:	The project is focused on the preparation of the concept of education (with using the activation methods) for students in the field of Pre-school and elementary pedagogy and to prove experimentally efficiency of teaching according to the proposed concept of natural science education in the university preparation of students.
Realization:	01/2011 – 12/2013
Coordinator:	Ivana Rochovská, the Catholic University in Ružomberok
Co-operators:	Peter Hockicko (DPh)

Structural Funds

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

Summary:	Strategic objective of the project is support of innovative forms of education at universities and development of human resources in research and development together with transfer of advanced technology and knowledge between the industrial sector and the university environment through conferences, seminars, workshops, excursions and foreign internships.
Realization:	05/2010 – 04/2013
Coordinator:	Milan Saga, Faculty of Mechanical Engineering, University of Žilina

ITMS 26220220153: Competence Centre for Research and Development in Diagnosis and Therapy of Carcinoma

Summary:	The project is based on cooperation of partners fulfilling their partial goals by activities: Establishment of Competence centre at the Jessenius Medical Faculty in Martin, establishment of basic research and development strategies, elaboration of diagnostic procedures related with RIMPT – Range Intensity Modulated Proton Therapy, research of advanced information processing methods acquired using gene analysis for the needs of treatment effectiveness for carcinoma diseases and their software support, elaboration of support algorithms and methods in the area of image analysis and processing, proteomic and biochemical analysis of blood and tissues of animals and patients, research and development of positional devices for patient stabilisation.
Realization:	09/2011 – 12/2014
Coordinator:	Dušan Mištuna, Jessenius Medical Faculty of the Comenius University in Martin
Sub-Coordinator:	Róbert Hudec (DTM)

ITMS 26220120028: Centre of excellence for intelligent transport systems and services I.

Summary:	The aim of the project is to create excellent research centre for R&D of systems and services of intelligent transport. Technical infrastructure will be implemented as tool for knowledge background stabilization of the new centre.
Realization:	05/2010 – 10/2014
Coordinator:	Karol Matiaško, Faculty of Management Science and Informatics, University of Žilina

ITMS 26220220134: Research on technologies and products for intelligent clothing and technical textiles

Summary:	This project is aimed at research of nanotechnologies and their application using low temperature plasma. Furthermore, textile human ecology and research of technologies used in the process of manufacturing intelligent textiles to transfer biomedical data are also considered.
Realization:	01/2011 – 12/2014
Coordinator:	Ján Šesták, VÚTCH-CHEMITEX, Žilina

ITMS 26250120046: Infrastructure support to improve the conditions of the educational process

Summary:	Reconstruction of the education areas at detached workplace in Liptovský Mikuláš and in the airport Dolný Hričov is the aim of the project. Moreover, reconstruction of laboratories and modernisation of ICT infrastructure at University of Zilina is planned as well. Reconstruction of the dormitories will be implemented.
Realization:	06/2010 – 05/2013
Coordinator:	Milan Malcho, Faculty of Mechanical Engineering, University of Žilina

ITMS 26220220156: Brokerage Aviation Centre for Technology and Expertise Transfer into Transport and Transport Infrastructure

Summary:	Objective of the project is to establish competent centre of aviation technology. It will integrate research and development in field of aviation technology of particular Slovak regions. The centre will be equipped with the most modern technology. It will create assumption for joining of the partners to international research activities.
Realization:	09/2011 – 08/2014
Coordinator:	Andrej Novák, Faculty of Operation and Economics of Transport and Communications, University of Žilina

ITMS 26220120046 Centre of Excellence of Power Electronics Systems and Materials for their Components II.

Summary:	Completion and updating of workplaces of power electronic systems and materials for their components.
Duration:	09/2010 – 08/2013
Coordinator:	Pavol Špánik (DME)

ITMS 26110230005: Flexible and Attractive Study at the University of Žilina for the Labour Market's Requirements and for the Knowledge Society

Summary:	Goal of the project is to improve of education at University of Žilina by creation of new study programs and innovation of existing study programs according to employment market requirements. Creation of the tools for support of study interest at the university and graduate employability monitoring as means for quality of study improving. Innovation and modernisation of content and form of academic education from knowledge society needs point of view.
Realization:	07/2010 – 04/2013
Coordinator:	Renáta Švarcová, rector's office, University of Žilina

ITMS 26110230060: Development of quality culture at the University of Žilina based on European standards for higher education

Summary:	To create the strategy of permanent quality improvement at university including the system of the work with information towards in and out of university.
Realization:	02/2012 – 12/2013
Coordinator:	Renáta Švarcová, rector's office, University of Žilina

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 – 11/2013
Coordinator:	Martin Brandt (DMAEE)

ITMS 26110230052: Increasing the Competitiveness of Technical Study Programs Reflecting the Current Needs of Business Practice

Summary:	The aim of project is the involvement of internationally recognized experts in the modernization of university educational process reflecting the needs of business practice.
Realization:	01/2012 – 12/2013
Coordinator:	Eva Tillová, Faculty of Mechanical Engineering, University of Žilina

ITMS 26220220088: Applied Research and Development of Innovative Energy Sources for Ultra High Pressure Pulses

Summary:	The project deals with the design and analysis of electrical part of plasmabit for deep drilling. The project solves electricity transmission in normal operating conditions and critical operating conditions.
Realization:	09/2010 – 08/2013
Coordinator:	EcoLand

ITMS 26220120050: Centre of Excellence for Intelligent Transport Systems and Services II.

Summary:	The strategic objective of project is to complete the excellent centre of intelligent transport systems and services as a precondition of advancement of companies' infrastructure utilising knowledge technologies. Using of new technologies is a crucial requirement for implementation of progressive applications for current traffic problems examination. Intelligent transportation systems are sophisticated multimodal tools integrating advanced technologies and implement them in transportation with the goal to develop solutions improving quality of living.
Realization:	04/2011 – 08/2013
Coordinator:	Karol Matiaško, Faculty of Management Science and Informatics, University of Žilina

ITMS 26220220118: Development of Optimal Technology for Analysis of Limiting States of Construction Elements in Contact

Realization: 01/2010 – 10/2013
Coordinator: Milan Žmindák, Faculty of Mechanical Engineering, University of Žilina

ITMS 2622010034: Centre for Experimental and Clinical Respirology II

Summary: Workstation updating of experimental and clinical respirology.
Realization: 01/2010 – 03/2013
Coordinator: Miroslav Hrianka (DME)

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

ITMS 26220220089: New Measurement Methods for Physical Dynamical Parameters and Interactions of Traffic Stream Motor Vehicles and Roadway

Summary: The objective of project is conception design and consequent realisation of proprietary laboratory mobile measurement platform intended for collection and pre-processing of sensoric and georeference data (portable and analysable within virtual reality) enabling integration and examination of distinct methods for measurement of chosen static and dynamic parameters of vehicle and roadway.
Realization: 06/2010-05/2014
Coordinator: Aleš Janota (DCIS)

ITMS 26220220169: Transport Telematic Systems Research Centre

Summary: Within the Activity 1.3 the establishment of telematic systems research at the University of Žilina is concerned utilising proper human resources and technical equipment within a specific goal of NFP Call „Support of existing and building of new common top-level centres of applied research and development of business/consumer sphere and academic sphere, i.e. research-development centres and also qualified activity „3." support of companies cooperation (MSP and enterprise companies) with academic sphere.
Realization: 06/2012 – 08/2013
Coordinator: Rastislav Pirník (DCIS)

ITMS 22420320001: Interregional Mobile Television DVB–H

Summary:	Pilot implementation of the whole DVB-H chain between transmitter and receiver is main goal of the project. Proposal and creation of the broadcasted content is included in the project. According to achieved results, the effectiveness of the DVB-H implementation will be evaluated.
Realization:	08/2009 – 03/2013
Coordinator:	Mária Bátorová-Prekopová, ext.

ITMS 26220220022: Design of new diagnostic algorithm for selected tumour affections

Summary:	Creation of new diagnostic algorithm usable in monitoring of tumour disease progress mainly tumours of central neural system (CNS). Introduction of new diagnostic algorithm for tumour disease CNS significantly affect options for therapies and followed care for patients with this type of disease.
Realization:	09/2009 – 05/2013
Coordinator:	Peter Račay, Jessenius Medical Faculty of the Comenius University in Martin

ITMS 26110230063: Human resources development with support of integrated information system for evaluation of scientific research results

Summary:	Current state analysis of evaluation of science and research results at University of Žilina. Next goal is to create new models for process evaluation.
Realization:	02/2012 – 06/2014
Coordinator:	Ján Čelko, Faculty of Civil Engineering, University of Žilina

ITMS 26220220121: Modifications and verification of surgical tools

Summary:	Biocompatibility evaluation of materials and resistance to degradation in a physiological medium. Verification of materials for the construction of a prototype endoscopic tools that will work in the physiological environment of different aggressiveness in terms of surface resistance and shape integrity. To evaluate the possible physiological effects of environment degradation on material prototype endoscopic instruments. The evaluation examined the impact ofchanges in volume and surface microstructure of the material degradation tools.
Realization:	12/2010 – 12/2013
Coordinator:	Radomila Konečná, Faculty of Mechanical Engineering, University of Žilina

ITMS 26110230107: Modern teaching methods of control and diagnostic systems of motor vehicles

Summary:	Reconciliation of the needs of the knowledge society and the labor market with higher education in automotive technology.
Realization:	09/2013 – 08/2015
Coordinator:	Róbert Labuda, Faculty of Mechanical Engineering, University of Zilina

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

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 (DME)

ITMS 26110230079: Innovation and internationalization of education – instruments to enhance quality of the University of Zilina in European Education Area

Summary:	The project focuses on innovations of international motilities of university teachers and students on the basis of identification of weak points of the current processes. Accordingly, new internal legislative documents, recommendations and instruments will be carried out in order to enhance the motilities and to increase competences of the teachers and students for effective engagement into mobility programmes.
Realization:	02/2013 – 06/2015
Coordinator:	Renáta Švarcová, rector's office, University of Žilina

ITMS 26220220184: Science park of the University of Zilina

Summary:	Aim of the project is to build up a unique excellent research infrastructure on the international level with emphasis on regional growth and development. The purpose of the science park is to increase competitiveness of Slovakia through application of innovations into praxis.
Realization:	06/2013 – 06/2015
Coordinator:	Michal Zábovský (UVP)

ITMS 26110230090: Quality educations with support of innovation forms, excellent research and international cooperation – successful graduates for needs of praxis

Summary:	Strategic aim of the project is development of quality of the University of Zilina through innovations of education and research processes in correspondence with needs of knowledge society and global labour market.
Realization:	11/2013 – 09/2015
Coordinator:	Renáta Švarcová, rector's office, University of Žilina

ITMS 2622020183: Research center of University of Zilina	
Summary:	Building Research center of University of Zilina and improving the infrastructure of the university. Completion of the research infrastructure departments of applied R&D, build of a multipurpose building Research center as a regional center of applied research and development. Maximizing the potential of R&D and innovation culture at university through the incubator. Implementation of cutting-edge R&D in selected areas, expansion of innovation activities with the application results into practice and development of activities towards international R&D competitiveness of Slovakia by using transfer of research and innovation into practice.
Realization:	08/2013 – 07/2015
Coordinator:	Branislav Hadzima, Faculty of Mechanical Engineering, University of Žilina

ITMS 2621120021: Modernization of research infrastructure in the fields of electrical engineering, electrical materials and ICT	
Summary:	Modernization of research infrastructure at the FEE.
Realization:	11/2012 – 2/2015
Coordinator:	Ivana Brídová, dean's office

ITMS 22410320029: Cooperation between the University of Žilina and VSB-TU Ostrava on improving the quality of education and training of researchers in area of electrical engineering	
Summary:	Developing human potential in research and innovation, in particular through post-graduate studies and training of researchers and cooperation activities of universities, research centers and businesses in the area of power quality and voltage supplied.
Realization:	11/ 2012 – 04/2014
Coordinator:	Alena Otcenasova (DPES)

Other National Projects

052/12 Foundation Volkswagen Slovakia „Know the braking distance of your car"	
Summary:	We recorded braking processes at different initial velocities and obtained videos from which braking distances of various automobiles at different conditions (snow and summer tyres, drought, rain, snow) and average decelarations were determined. Prepared materials are on the web to help in teaching.
Realization:	02/2013 – 10/2013
Coordinator:	Peter Hockicko (DPh)

005ŽU-2/2013 Enhancing quality of key competences of graduates by internationalization of education based on common study programs

Summary:	The project is aimed on preparation of legislative and technical frames for providing double degree study programmes. It is focused on cooperation between the Faculty of Electrical Engineering, University of Zilina and Lappeenranta University of Technology in master and doctoral study programmes in this content. Impacts of the project realization are foreseen in increasing quality of the education process on international level and higher competitiveness of graduates at national and international labour market.
Realization:	12/2013 – 12/2014
Co-operators:	Ladislav Janoušek (DEBE)

343/100/2013 Research of toll-system data utilisation

Annotation:	The objective of the project was an analysis of data structures acquired within the Electronic toll service in the SR, analysis of data utilisation within road transport or others and proposal of utilisation of this data from the economic and transportation point of view (realised based on Transport research institute (VÚD, a.s.) Žilina specification).
Project period:	02/2013 – 05/2013
Coordinator:	Aleš Janota (DCIS)

Contract-based research activities for 2013

Valid from	Number of contract	Customer	Coordinator	Title
4/12	P-103-0004/12	VÚD Žilina	Peter Vestenický, DCIS	Proposal of the implementation of system for oversight of transportation of excessive, oversized and hazardous cargo
3/12	P-103-0002/12	AŽD Prague, CZ	Karol Rástočný, DCIS	Report on appraisal of functional behavioural model of RBCC -2nd stage
8/12	P-103-0006/12	SIEMENS AG, Östereich	Karol Rástočný, DCIS	Overall appraisal of the Simis W SK system – point version phase 4.3 V10.3.11 – stage 2
7/12	P-103-0009/12	Power-en Bratislava	Juraj Altus, DPES	Connectivity in the energy market in the Slovak Republic
7/11	P-103-0007/11	Implementers	Juraj Altus, DPES	Studies of the connectivity of photovoltaic power to the distribution system
1/13	P-103-0001/13	Power-en Bratislava	Juraj Altus, DPES	Analysis and the possibility of use of unplanned power flow in the power system in Slovak Republic
1/13	P-103-0002/13	Euroenergy s.r.o. Prague	Juraj Altus, DPES	Potential of the existing resource base in the electricity and heat in Slovak republic

Valid from	Number of contract	Customer	Coordinator	Title
5/13	P-103-0003/13	Scheidt & Bachmann Slovensko, s.o., BETAMONT, s.r.o. SIEMENS, s.r.o. ELTODO EG, a.s. AŽD PRAHA, s.r.o.	Juraj Spalek, DCIS	Promotion of companies during the meeting of departments of power systems, cybernetics and informatics (advertising contracts)
11/13	P-103-0005/13	SEPS Bratislava	Juraj Altus, DPES	Calculation of connection capacities of sampling sites in the TS SR
7/13	P-103-0006/13	Thales Austria Wien	Peter Nagy, DCIS	Assessment of the system parts according to the national requirements
12/13	P-103-0007/13	SEPS Bratislava	Juraj Altus, DPES	Reconfiguration in ES SR
11/13	P-103-0008/13	SEPS Bratislava	Juraj Altus, DPES	Processing of input data and analysis of photovoltaic power plants in the EC SR
9/13	P-103-0008/12	BEZ transformators Bratislava	Martin Brandt, DMAEE	Analysis of Transformers
5/13	P-103-0010/06	ŽU	Ing. Jurošková, FEE	Re-invoicing of electrical outlet from LM

Contract-based non-research activities for 2013

Number of contract	Customer	Coordinator	Title
P-103-0004/13		Robert Hudec, DTM	Multimedia outputs according to the orders
P-103-0021/06	BEZ transformators Bratislava	Martin Brandt, DMAEE	Loan of the measuring equipment DOBLE
P-103-0010/07		Ing. Brunová, IAS LM	Rental of premises in LM - dormitory building
P-103-0007/12		Ing. Brunová, IAS LM	Rental of premises in LM - school building

Conferences and seminars

The Faculty of Electrical Engineering organized, or participated in the preparation of the following scientific events in 2013:

- 18th International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), 25 - 28 June 2013, Park Inn Danube, Bratislava, Slovakia, Chair of Organizing Committee: Klára Čápová (DEBE);
- 9th Scientific Conference ALER 2013 Alternative Energy Resources, 2 – 4 October, 2013 Liptovský Ján, Chair of Organizing Committee : Zdeněk Dostál (IAS);
- Co-organization: 8th International Scientific Conference on Solid State Surfaces and Interfaces, SSSI 2013, 24 – 28 November, 2013, Smolenice. Main organizer: Institute of Physics, Slovak Academy of Sciences, Bratislava;
- Co-organization: 19th International Conference on Applied Physics of Condensed Matter APCOM, 19 – 21 June, 2013, Štrbské Pleso. Main organizer: Institute of Nuclear and Physical Engineering, Faculty

of Electrical Engineering and Information Technology, Slovak University of Technology in Bratislava;

- Advances in Electronics and Photonics (ADEPT) 2013 - 1st International Conference, Nový Smokovec, 2 – 5 June 2013, Chair of Organizing Committee: Dušan Pudiš (DPh);
- Seminar – introduction of the Section Optic design from the Dept. of research and development of the company OMS s r.o., 1 February 2013 Dept. of Physics, Organizer: Norbert Tarjányi (DPh);
- 9th International Particle Physics Masterclasses 2013, University of Žilina, 6 March 2013, National coordinator: Ivan Melo (DPh);
- National High School Competition Cascade, http://fyzika.uniza.sk/cascade/, March – June 2013. Organizer: Ivan Melo (DPh);
- Meeting of automation, cybernetics and informatics departments (SKAKaI 2013) of technical universities in SR and CR, 11 – 13 September 2013, Rajecké Teplice, Chair of Organizing Committee: Aleš Janota (DCIS);
- 21st International symposium EURO-ŽEL 2013 - Recent Challenges for European Railways, Žilina: 4 – 5 June 2013, Members of the programme committee: Karol Rástočný, Aleš Janota (DCIS);
- Meeting of employees, pensioners and friends KRIS 60 (STREPPP KRIS 60), 6 December 2013, Central Park, Žilina, Chair of organisational board: Mária Franeková (DCIS);
- 9th International workshop Digital Technologies 2013, 29 – 31 May 2013, University of Žilina, Daša Tichá (DTM);
- ELEKTROTECHNOLÓGIA 2013, 5 – 7 June 2013, Terchová, Miloslav Buzek (DPES).

Publication activities

The permanent task of the Faculty is to increase the publication activity in quality journals which are indexed in international professional databases.

Tab.10: Publication activities at the FEE (based on registration at the University Library up to 28 January 2014)

Year	Monographs and university textbooks	Scientific works in journals	Scientific publications in Conference	Patents, Utility Models	Others (Scripts, etc.)
2008	8	126 (8*)	196	0	69
2009	4	89 (11*)	231	1	29
2010	4	76 (12*)	246	3	49
2011	4	86 (13*)	219	2	70
2012	4	76 (12*)	223	8	65
2013	12	107 (18*/36)	198	1	94

* out of which also indexed in Current Contents Connect database
** out of which indexed in SCOPUS/ Thomson Scientific Master Journal List database

Monographs

[1] RÁSTOČNÝ, K. - ŽDÁNSKY, J.: Control systems with safety PLCs, EDIS UNIZA, 2013, ISBN 978-80-554-0681-7, 203 pp. (in Slovak)

[2] POČTA, P.: Synthesized speech and its quality in telephonic condition, University of Žilina, 2013, ISBN 978-80-554-0710-4, 85 pp. (in Slovak)

[3] PYRHÖNEN, J. - JOKINEN, T. - HRABOVCOVÁ, V.: Design of Rotating Electrical Machines, 2nd Edition, John WILEY and Sons, Ltd, United Kingdom, 2013, ISBN 978-1-118-58157-5, 584 pp. (in English)

University Textbooks

[4] MÜLLEROVÁ, J.: Application of Matrix Methods in Optics. Žilina: EDIS UNIZA, 2013, ISBN 978-80-554-0765-4, 172 pp. (in Slovak)

[5] KUČERA, M. - ŠEBÖK, M.: Diagnostics of electrical equipment in the car, Žilina: EDIS UNIZA, 2013, ISBN 978-80-554-0796-8, 222 pp. (in Slovak)

[6] ŠEBÖK, M. - KUČERA, M.: Electrical engineering for road vehicles, Žilina: EDIS UNIZA, 2013, ISBN 978-80-554-0753-1, 269 pp. (in Slovak)

[7] HRIANKA, M. - HARGAŠ, L. - KONIAR, D.: Electronics - Logic circuits, Žilina: EDIS UNIZA, CD-ROM, 2013, ISBN 978-80-554-0662-6, 149 pp. (in Slovak)

[8] ŠPÁNIK, P. - ČUNTALA, J. - FRIVALDSKÝ, M. - DRGOŇA, P. - RADVAŇ, R.: Electronics, Principles of semiconductor elements and circuits, Žilina: EDIS UNIZA, CD-ROM, 2013, ISBN 978-80-554-0724-1, 274 pp. (in Slovak)

[9] KORTIŠ, P.: Signalization Protocol SIP, University of Žilina, 2013, ISBN 978-80-554-0750-0, 178 pp. (in Slovak)

[10] POČTA, P.: Speech quality assessment, University of Žilina, 2013, ISBN 978-80-554-0706-7, 49 pp. (in Slovak)

[11] HOTTMAR, V. - ADAMEC, B.: Introduction to theory of electromagnetic waves propagation, antennas and radio receivers, University of Žilina, 2013, ISBN 978-80554-0821-7, 295 pp. (in Slovak)

[12] ČÁP, I. - ČÁPOVÁ, K. - GOMBÁRSKA, D.: Theory of Electrical Engineering – Electric Circuits II, Žilina: EDIS UNIZA, 2013, ISBN 978-80-554-0738-8, 242 pp. (in Slovak)

Journals indexed in Current Contents Connect

[1] KÚDELČÍK, J. - BURY, P. - DRGA, J. - KOPČANSKÝ, P. - ZÁVIŠOVÁ, V. - TIMKO, M.: Structure of transformer oil-based magnetic fluids studied using acoustic spectroscopy, In: Journal of Magnetism and Magnetic Materials, Vol. 326 Iss. 1, 2013, ISSN 0304-8853, p. 75-80.

[2] HOCKICKO, P. - BURY, P. - MUNOZ F.: Investigation of relaxation and transport processes in LIPO(N) glasses, In: Journal of Non-Crystalline Solids, Vol. 363, 2013, ISSN 0022-3093, p. 140-146.

[3] BURY, P. - MATSUMOTO, T. - BELLAN, I. - JANEK, M. - KOBAYASHI, H.: Acoustic spectroscopy and electrical characterization of Si/NaO-SiO2/HfO2 structures, In: Applied Surface Science, Vol. 269, 2013, ISSN 0169-4332, p. 50-54.

[4] KUBICOVÁ, I. - PUDIŠ, D. - ŠKRINIAROVÁ, J. - KOVÁČ, J. - KOVÁČ, J. Jr. - JAKABOVIČ, J. - ŠUŠLIK, Ľ. - NOVÁK, J. - KUZMA, A.: 2D irregular structure in the LED surface patterned by NSOM lithography, In: Applied Surface Science, Vol. 269, 2013, ISSN 0169-4332, p. 16-119.

[5] PUDIŠ, D. - ŠUŠLIK, Ľ. - ŠKINIAROVÁ, J. - KOVÁČ, J., KOVÁČ, J., Jr. - KUBICOVÁ, I., MARTINČEK, I. - HŠČÍK, Š. - SACHAAF, P.: Effect of 2D photonic structure patterned in the LED surface on emission properties, In: Applied Surface Science, Vol. 269, 2013, ISSN 0169-4332, p. 161-165.

[6] KUBICOVÁ, I. - PUDIŠ, D. - ŠUŠLIK, Ľ. - ŠKRINIAROVÁ, J.: Spatial resolution of apertureless metal-coated fiber tip for NSOM lithography determined by tip-to-tip scan, In: Optik 124, 2013, ISSN 0030-4026, p. 1971-1973.

[7] HALANDA, J. - ZÁHORANOVÁ, A. - KÚDELČÍK, J. - ČERNÁK, M.: Chemical aspects of streamer mechanism for negative corona discharges, In: Chemické listy 106, 2012, ISSN 0009-2770, p. 1447-1449.

[8] TATAR, P. - KÁČIK, D.: Modelling of two core photonic crystal fiber modal interferometer for refractive index measurement by equalization wavelength, In: Optical Fiber Technology 19, 2013, ISSN 1068-5200, p. 330-334.

[9] GINTNER, M. - JURÁŇ, J.: The vector resonance triplet with the direct coupling to the third quark generation, In: The European Physical Journal C, Vol 73, Iss. 10, 2013, ISSN 1434-6044 (print), 1434-6052 (online), 17 pp.

[10] MARTINČEK, I. - PUDIŠ, D. - GAŠO, P.: Fabrication and Optical Characterization of Strain Variable PDMS Biconal Optical Fiber Taper, In: IEEE Photonics technology letters, Vol. 25, No. 21, 2013, ISSN 1041-1135, p. 2066-2069.

[11] JANEK, M. - et.al: Angular distributions of the vector Ay and tensor Ayy, Axxx,Axz analyzing powers int the dd—►^{3}Hp reaction at 200 MeV, In: Physical Review C 87, 051001®, 2013, ISSN 0556-2813, p. 1001-1-1001-5.

[12] POČTA, P. - HOLUB, J.: Effect of speech activity parameter on PESQ's predictions in presence of independent and dependent losses, In: Computer Standards & Interfaces, Vol. 36, No.1, ISSN 0920-5489, p.143-153.

[13] BRÍDA, P. - MACHAJ, J.: A Novel Enhanced Positioning Trilateration Algorithm Implemented for Medical Implant In-Body Localization, In: International Journal of Antennas and Propagation, Vol. 2013, Article ID 819695, ISSN 1687-5877, p. 10.

[14] JARINOVÁ, D.: On Autoregressive Model Order for Long-range Prediction of Fast Fading Wireless Channel, In: Telecommunication Systems, March 2013, Vol. 52, Iss. 3, ISSN 1018-4864, p. 1533-1539.

[15] VITTEK, J. - RYVKIN, S.: Decomposed Sliding Mode Control of the Drive with Interior Permanent Magnet Synchronous Motor and Flexible Coupling, In: Mathematical Problems in Engineering, 2013, ISSN: 1563-5147, 17 pp.

[16] SEKERÁK, P. - HRABOVCOVÁ, V. - PYRHÖNEN, J. - KALAMEN, L. - RAFAJDUS, P. - ONUFER, M.: Comparison of synchronous motors with different permanent magnet and winding types, IEEE, In: Transaction on Magnetics, Vol. 49, No. 3 (2013), 2013, ISSN 0018-9464, p. 1256-1263.

[17] KÁČIK, D. - TUREK, I. - WUILPART, M. - GRONDŽÁK, K.: Addressing fiber Bragg grating sensors using all-fiber low coherence interferometry, In: Optical Fiber Technology, Vol. 19, Iss. 6 (2013), ISSN 1068-5200, p. 598-603.

[18] FRIVALDSKÝ, M. - DRGOŇA, P. - ŠPÁNIK, 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, 2013/47, ISSN 0142-0615, p. 448-456.

Journals indexed in Thomson Scientific Master Journal List or SCOPUS

[1] JURISOVÁ, E. - LADÁNYI, L. - MÜLLEROVÁ, J.: Investigation of the thermal sensitive spectral response of chalcogenide fiber Bragg grating, In: Communications – Scientific Letters of the University of Žilina, Vol. 2a, 2013, ISSN 1335-4205, p. 78-83.

[2] KÚDELČÍK, J. - BURY, P. - KOPČANSKÝ, P. - TIMKO, M. - ZÁVIŠOVÁ, V.: Acoustic properties of magnetic fluids based on transformer oil under magnetic field, In: Journal of Electrical Engineering, Vol. 64, No. 6, 2013, ISSN 1335-3632, p. 381-385.

[3] HOCKICKO, P. - BURY, P. - MUÑOZ, F.: Analysis of dielectric properties of lithium phosphate glasses, In: Communications Communications 2A – Scientific Letters of the University of Žilina, 2013, ISBN 1335-4205, p. 33-39.

[4] HOCKICKO, P.: Investigation of conductive glasses by means of modeling of acoustic attenuation spectra, In: Akustika. Vol. 20, Iss. 1, 2013, ISSN 1801-9064, p. 10 – 15.

[5] BARTLOMIEJCZYK, M. - GUTTEN, M. - HAMACEK, Š.: A Combined TOPSIS and FA Based Strategic Analysis of Technical Condition of High Power Transformers, In: Advances in Electrical and Electronic Engineering, Vol. 11, No. 4, 2013, ISSN 1804-3119, p. 251-259.

[6] GUTTEN, M. - BARTLOMIEJCZYK, M. - ŠEBÖK, M.: Mathematical analysis of transformer insulation state by means of composite indicator, In: Przegląd Elektrotechniczny= Electrical Review, Vol. 89, No. 3a, 2013, ISSN 0033-2097, p. 132-135.

[7] JURČÍK, J. - GUTTEN, M.: Analysis transformer insulation by PDC method, In: Przegląd Elektrotechniczny= Electrical Review, Vol. 89, No. 1a, 2013, ISSN 0033-2097, p. 169-171.

[8] ŠEBÖK, M. - GUTTEN, M. - KORENČIAK, D. - BARTLOMIEJCZYK, M.: Analysis of pressure ratio in the intake in dependence on high-voltage behaviours, In: Przegląd Elektrotechniczny= Electrical Review, Vol. 89, No. 2a, 2013, ISSN 0033-2097, p. 126-129.

[9] ŠEBÖK, M. - GUTTEN, M. - OSTRICA, Ľ. - KUČERA, M. - MAKYDA, M.: Analysis of Distributorless Ignition Systems, In: Przegląd Elektrotechniczny= Electrical Review, Vol. 89, No. 7, 2013, ISSN 0033-2097, p. 25-29.

[10] DOBRUCKY, B. - KAŠČÁK, S. - PRAŽENICA, 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, p. 557-582, ISSN 1662-9779.

[11] ŠPÁNIK, P. - ŠEDO, J. - DRGOŇA, P. - FRIVALDSKÝ, 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, ISSN 1392-1215, p. 33 – 38.

[12] KAŠČÁK, S. - DOBRUCKÝ, B. – PRAŽENICA, 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, ISSN 1827-6660, p. 1156-1161.

[13] PRAŽENICA, M. - KABAŠTA, M. - KAŠČÁK, S. - KOSCELNÍK, 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, ISSN 1335-4205, p. 63-67.

[14] FRIVALDSKÝ, M. - DOBRUCKÝ, B. - SCELBA, G., ŠPÁNIK, P. - DRGOŇA, 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, ISSN 1335-4205, p. 21-25.

[15] JANOUŠ, S. - SEDLÁK, J. - PRAŽENICA, M. - KUCHTA, 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, ISSN 1335-4205, p. 39-42.

[16] VESTENICKÝ, P. - VESTENICKÝ, M. - PALEČEK, J.: Calculation and Measurement of RFID Tag Critical Frequency. In: Communications, scientific letters of the University of Žilina, vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 96-101.

[17] KAMENCAY, P., ZACHARIÁŠOVÁ, M., HUDEC, R., JARINA, R., BENČO, M., HLUBÍK, J.: A Novel Approach to Face Recognition using Image Segmentation based on SPCA-KNN Method, In: Radioengineering Journal, Vol. 22, No. 1, 2013, ISSN 1210-2512, p. 92-99.

[18] KAMENCAY, P. - ZACHARIÁŠOVÁ, M. - HUDEC, R. - BENČO, M. - HLUBÍK - J. MATUSKA, S.: Image segmentation and feature extraction using SIFT-SAD algorithm for disparity map generation, In: Communications - Scientific Letters of the University of Žilina, Vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 185-190.

[19] BENČO, M. - HUDEC, R. - ZACHARIÁŠOVÁ, M. - KAMENCAY, P. - MATUŠKA, S.: Novel approach to color texture retrieval based on GLCM, In: Communications - Scientific Letters of the University of Zilina, Vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 55-59.

[20] PÁCHA, M. – ŠTEPÁNEK, J.: Performance and fuel consumption optimizations of shunting hybrid locomotives. In: Communications - scientific letters of the University of Žilina, Vol. 15, No. 2A, 2013, ISSN 1335-4205, p.107-112.

[21] BENEDIKOVIČ, D. - LITVÍK, J. - KUBA, M. - DADO, M.: Spectral transmission characteristics of advanced amplitude modulation formats, In: Communications -Scientific Letters of the University of Žilina, vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 67-70.

[22] CHERNOYAROV, O. V. – BREZŇAN, M. – TEREKHOV, A. V.: Restoration of deterministic and interference distorted signals and images with use of the generalized spectra based on orthogonal polynomials and functions, In: Communications - Scientific Letters of the University of Žilina, vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 71-77.

[23] JANOUŠEK, L.: Influence of selected parameters on eddy currents attenuation in non-destructive inspection, In: Communications -Scientific Letters of the University of Žilina, Vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 102-106.

[24] RADIL, R. - JANOUŠEK, L.: Yeast growth influenced by parallel combination of time-varying and static LF EMF, In: Communications - Scientific Letters of the University of Žilina, Vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 28-32.

[25] JANOUŠEK, L. - REBICAN, M. I. - SMETANA, M. - STRAPÁČOVÁ, T. - DUCA, A. - PERNIŠOVÁ, V.: Recent innovative solutions in eddy current non-destructive diagnosis, In: Communications - Scientific Letters of the University of Žilina, Vol. 15, No. 2, 2013, ISSN 1335-4205, p. 102-108.

[26] HUDEC, R. - JANOUŠEK, L. - BENČO, M. - MAKYŠ, P. - WIESER, V. - ZACHARIÁŠOVÁ, M. - PÁCHA, M. - VAVRÚŠ, V. - VESTENICKÝ, M.: Structural health monitoring of helicopter fuselage, In: Communications - Scientific Letters of the University of Žilina, Vol. 15, No. 2, 2013, ISSN 1335-4205, p. 95-101.

[27] JANOUŠEK, L.: Effect of exciting system configuration on eddy currents distribution in non-

destructive evaluation of materials, In: Przeglad Elektrotechniczny (Electrical Review), Vol. 89, No. 3a, 2013, ISSN 0033-2097, p. 256-258.

[28] DOBRUCKÝ, B. - BEŇOVÁ, M. - FRÍVALDSKÝ, M. - RADVAN, R., GOMBÁRSKA, D.: Comparative analysis of (HF) non-linear circuits modelled by different environments, In: Elektronika ir Elektrotechnika, Vol. 19, No. 4, 2013, ISSN 1392-1215, p. 25-28.

[29] BEŇOVÁ, M. - GOMBÁRSKA, D. - DOBRUCKÝ, B.: Using Euler's and Taylor's expansion method for solution of non-linear differential equation system in pharmacokinetics, In: Przeglad Elektrotechniczny, Vo. 89, No. 2a, 2013, ISSN 0033-2097, p. 259-261.

[30] GOMBÁRSKA, D. - BEŇOVÁ, M.: Computer model of anticoagulation treatment, In: Przeglad Elektrotechniczny, Vo. 89, No. 2a, 2013, ISSN 0033-2097, p. 262-263.

[31] DOBRUCKÝ, B. - POKORNÝ, M. - BEŇOVÁ, M. - ABDAMULA, M. A.R.: Modelling of power converters using Z-transform, In: Communications - Scientific Letters of the University of Žilina, Vol. 15 , No.3, 2013, ISSN 1335-4205, p. 43-47.

[32] HRABOVCOVÁ, V. - RAFAJDUS, P. - LIPTÁK, M. - SZABÓ, L.: Performances of converters suitable for switched reluctance generator (SRG) operation, In: Journal of Electrical Engineering , ISSN 1335-3632 ,Vol. 64, Iss. 4, 2013, p. 201-211.

[33] FABER, J. - ŠTULRAJTER, M. - VITTEK, J.: Self-calibration of the resolver sensor in servo drive application, In: Communications - Scientific letters of the University of Žilina, Vol. 15, 2A/2013, Žilina, 2013, ISSN 1335-4205, p. 17-22.

[34] SEKERÁK, P. - HRABOVCOVÁ, V. - ONUFER, M. - RAFAJDUS, P. - KALAMEN, L.: Losses, efficiency and thermal behavior of the synchronous motors with different PM materials, In: Communications - Scientific letters of the University of Žilina, Vol. 15, 2A/2013, Žilina, 2013, ISSN 1335-4205, p. 46-54.

[35] DÚBRAVKA, P. - RAFAJDUS, P. - MAKYŠ, P. - HRABOVCOVÁ, V. - SZABO, L.: Analysis of switched reluctance motor behavior under electrical fault conditions, In: Communications - Scientific letters of the University of Žilina, Vol. 15, 2A/2013, Žilina, 2013, ISSN 1335-4205, p. 60-66.

[36] KÁČIK, D. – TATAR, P.: Photonic crystal fiber modal interferometer for refractive index sensing. In: Communications - scientific letters of the University of Žilina, Vol. 15, No. 2A, 2013, ISSN 1335-4205, p. 84-88.

Papers in proceedings of the world congress/conference published in prestigious foreign publisher such as Springer, Kluwer, Elsevier, John Wiley etc., or published by world-wide reputable scientific institutions such as IFAC, IFIP, IEEE, ACM, IET, SPIE, or listed in Web of Science

[1] KORČEK, D. - MÜLLEROVÁ, J.: Wavelength protection within coexistence of current and next-generation PON networks. In: IEEEXplore Conference Publications, 15th International Conference on Transparent Optical Networks ICTON 2013, Invited Paper, 2013, ISBN 978-1-4799-0683, p. We.C3.3, 1-5.

[2] LADÁNYI, L. - MENKYNA, R. - MÜLLEROVÁ, J.: Numerical investigation of Gaussian pulses propagating in optical fibers with refractive indices stochastically changed due to environmental conditions. In: Nonlinear Optics and Application VII, Proc. SPIE, Vol. 8772, 2013, ISBN 9780819495747, ISSN 0277-786X, p. 877213-1 - 8.

[3] LADÁNYI, L. - ĎULÍK, M. - MÜLLEROVÁ, J.: Effects of Random Temperature and Pressure

Influence on the Single-channel Optical Transmission System. In: IEEEXplore Conference Publications, 14th International Symposium on Computational Intelligence and Informatics CINTI 2013, ISBN 978-1-4799-0195-1, p. 261-266.

[4] PUDIŠ, D. - HRONEC, P., KOVÁČ, J. - LETTRICHOVÁ, I. - ŠKRINIAROVÁ, J. - JANDURA, D. - SLABEYCIUSOVÁ, S. - ŠUŠLIK, Ľ. - NOVÁK, J. - KUZMA, A.: Emission properties of surface patterned LEDs, Proc. Of SPIE Optics + Photonics, Vol. 8816, 2013, ISBN 978-0-8194-9666-9, p. 8816 1A.

[5] LETTRICHOVÁ, I. - PUDIŠ, D. - LAURENČIKOVÁ, A. - HASENOHRL, S. - NOVÁK, J. - ŠKRINIAROVÁ, J. - KOVÁČ, J.: Predefined planar structures in semiconductor surfaces patterned by NSOM lithography, In: Proc. Of SPIE Optics + Photonics, Vol. 8816, 2013, ISBN 978-0-8194-9666-9, p. 8816 19.

[6] MARTINČEK, I. - PUDIŠ, D. - GAŠO P.: Polydimthelsiloxane fibers for optical fiber sensor of displacement, Proc. Of SPIE Optics + Photonics, Vol. 8816, 2013, ISBN 978-0-8194-9666-9, p. 8816 1D.

[7] FAKTOROVÁ, D. - ISTENÍKOVÁ, K.: Increasing of microwave energy focusing effectiveness by using metamaterial structures, In: Digital Technologies, Proceedings of the 9th International Conference, Žilina, 2013, ISBN 978-80-554-0682-4, p. 109-111.

[8] FAKTOROVÁ, D. - HADZIMA, B. - PASTOREK, Filip: A new approach to the comparison of microwave methods used at dielectric constant assessment, In: TSP 2013, 36th International Conference on Telecommunications and Signal Processing, Rome, 2013, ISBN 978-1-4799-0403-7, p. 344-247.

[9] ČERŇAN, P. - DOBRUCKÝ, 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), 2013, Banff, Canada, 802-054, ISBN 978-0-88986-956-1, p. 185-189.

[10] HARGAŠ, L. - KONIAR, D. - HRIANKA, M. - JOSKOVÁ, M. - DURDÍK, P. - BANOVČIN, P.: Contactless Parameters Measurement of Motion Object by Virtual Instrumentation, In: International Conference on Applied Electronics 2013, 10-12 September, Pilsen, IEEE CFP1369A-PRT, ISSN 1803-7232, p. 93-96.

[11] FRIVALDSKÝ, M. - DOBRUCKÝ, B. - KOSCELNÍK, J. – PRAŽENICA, M. - HAVRILA, R.: Multiresonant Tank Converter with LC2L2C2 Elements, In: International Conference on Applied Electronics 2013, 10-12 September, Pilsen, IEEE CFP1369A-PRT, ISSN 1803-7232, p. 75-79.

[12] 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, ISSN 1803-7232, p. 97-100.

[13] ŠPÁNIK, P. - DRGOŇA, P. - FRIVALDSKÝ, M. - KUCHTA, J.: Elimination of Current Sensing in Digital Control System for Resonant Converter, In: International Conference on Applied Electronics 2013, 10-12 September, Pilsen, IEEE CFP1369A-PRT, ISSN 1803-7232, p. 269-273.

[14] BUBENÍKOVÁ, E. - FRANEKOVÁ, M. - HOLEČKO, P.: Secure Solution of Collision Warning System Integration with Use of Vehicular Communications within Intelligent Transportation Systems, In: Proc. of 12th IFAC/IEEE International conference on programmable Devices and Embedded Systems, Veľké Karlovice, September 25-27 2013, ISSN 14746670, ISBN 978-390282353-3, p. 78-83.

[15] BUBENÍKOVÁ, E. - FRANEKOVÁ, M. - HOLEČKO, P.: Security increasing trends in Intelligent Transportation Systems utilising modern image processing methods. In: Proc. of 13th international scientific conference of transport systems telematics, October 23-25, 2013, Katowice, Ustroń, Poland, ISBN, selected papers. - Berlin Heidelberg: Springer-Verlag, 2013. ISBN 978-3-642-16471-2, (Communications in computer and information science, 239. - ISSN 1865-0929). Proceedings electronic version ISBN 978-3-642-24660-9, 978-3-642-24659-3, p. 353-360.

[16] FRANEKOVÁ, M. - LÜLEY, P.: Security of Digital Signature Schemes for Car-to-Car Communications within Intelligent Transportation Systems In: TST 2013, CCIS 395 (Communications in Computer and Information Science) 395, Springer-Verlag, Berlin Heidelberg 2013, ISSN 1865-0929, e-ISSN 1865-0937, p. 256-267.

[17] BUBENÍKOVÁ, E. - FRANEKOVÁ, M. - HOLEČKO, P.: Trends of Security Increasing of Intelligent Transportation Systems Utilising Modern Image Processing Methods. In: TST 2013, CCIS 395 Communications in Computer and Information Science) 395, Springer-Verlag, Berlin Heidelberg 2013, ISSN 1865-0929, e-ISSN 1865-0937, p. 353-359.

[18] HRUBOŠ, M. - JANOTA, A.: Algorithm for Surface Creation from a Cloud of Points. In: TST 2013, CCIS 395 Communications in Computer and Information Science) 395, Springer, Heidelberg, 2013, DOI: 10.1007/978-3-642-41647-7_6, ISBN 978-3-642-41646-0, ISSN 1865-0929, p. 42-49.

[19] HRBČEK, J. - ŠIMÁK, V. - SPALEK, J. – NEMEC, D.: Comparison of different approaches to predict air pollution inside the tunnel tube. In: Archives of Transport System Telematics, Vol. 6, Iss. 4, November 2013, ISSN 1899-8208, p. 8-12. Published also as an abstract in Transport Systems Telematics - TST'13 proceedings, Katowice: Silesian University of Technology, 2013. ISBN 978-83-927504-5-1, p. 40.

[20] ŠIMÁK, V. - NEMEC, D. - HRBČEK, J. - JANOTA, A.: Inertial navigation: Improving precision and speed of Euler angles computing from MEMS gyroscope data. In: TST 2013, CCIS 395 Communications in Computer and Information Science) 395, Springer, Heidelberg, 2013, DOI: 10.1007/978-3-642-41647-7_6, ISBN 978-3-642-41646-0, ISSN 1865-0929, p. 163-170.

[21] ŽDÁNSKY, J. - RÁSTOČNÝ, K.: Influence of safety PLC parameters to response time of safety functions. In: Proc. of International conference Applied Electronics (AE), 2013, IEEE Catalog Number CFP1369A-PRT, ISBN 978-80-261-0166-6, ISSN 1803 - 7232, p. 327-330.

[22] PALEČEK, J. - VESTENICKÝ, M. - VESTENICKÝ, P. - SPALEK, J.: Frequency Dependence Examination of PCB Material FR4 Relative Permittivity. In: Proc. of 12th IFAC conference on Programmable devices and embedded systems, September 25 - 27, 2013, Velke Karlovice, Czech Republic, ISSN 1474-6670, ISBN 978-3-902823-53-3, p. 90-94.

[23] RÁSTOČNÝ, K. - PEKÁR, Ľ. - ŽDÁNSKY, J.: Safety of Signalling Systems - Opinions and Reality. In: Proc. of 13th international scientific conference of transport systems telematics, TST 2013; Katowice - Ustroń, Poland, October 23-26, 2013, Activities of Transport Telematics - selected papers - Berlin: Springer-Verlag, 2013, ISBN 978-3-642-41646-0, p. 155-162.

[24] GREGOR, M. - SPALEK, J.: Using Context Blocks to Implement Node-attached Modules in Genetic Programming, In: Proc. of IEEE 17th International Conference on Intelligent Engineering Systems, COSTA RICA, June 19-21, 2013, http://www.ines-conf.org/ines-conf/2013.html, IEEE Catalog Number CFP13IES-PRT, ISBN 978-1-4799-0828-8, p. 307-322.

[25] GREGOR, M. - GROUMPOS, P. P.: Training Fuzzy Cognitive Maps using Gradient-based Su-

pervised Learning. In: Artificial Intelligence Applications and Innovations (9th IFIP WG 12.5 International Conference, AIAI 2013, Paphos, Cyprus, September 30 - October 2, 2013, Proceedings), IFIP Advances in Information and Communication Technology, Cyprus: Springer Berlin Heidelberg, 2013, ISBN 978-3-642-41142-7, p. 547-556.

[26] MRVOVÁ, M. - POČTA, P.: Novel Parameter-based models estimating quality of synthesized speech transmitted over IP network based on genetic programming approach, In: 23th International Conference Radioelektronika 2013, Pardubice, Czech Republic, April 2013, ISBN 978-1-4673-5517-9, p.361-366.

[27] GUBKA, R. - KUBA, M.: Elementary sound based audio pattern searching, In: 23th International Conference Radioelektronika 2013, Pardubice, Czech Republic, April 2013, ISBN 978-1-4673-5517-9.

[28] HINES, A. - POČTA, P. - MELVIN, H.: Detailed comparative analysis of PESQ and VISQOL behaviour in the context of playout delay adjustments introduced by VOIP jitter buffer algorithms, In: Fifth International Workshop on Quality of Multimedia Experience (QoMEX), July 2013, Klagenfurt, Austria, ISBN 978-1-4799-0738-6, p. 18-23.

[29] MRVOVÁ, M. - POČTA, P.: Quality estimation of synthesized speech transmitted over IP channel using genetic programming approach, In: 9th International workshop Digital Technologies 2013, May 29 – 31, 2013, Žilina, Slovak Republic, ISBN 978-80-554-0682-4, p. 55-59.

[30] GUBKA, R. - KUBA, M.: A comparison of audio features for elementary sound based audio classification, In: 9th International workshop Digital Technologies 2013, May 29 – 31, 2013, Žilina, Slovak Republic, ISBN 978-80-554-0682-4, p. 31-34.

[31] BRÍDA, P. - MLYNKA, M. - MACHAJ, J.: How to Solve GNSS Problem in Critical Environment?, In: IEEE 17th International Conference on Intelligent Engineering Systems, INES2013, Costa Rica, 2013, ISBN 978-1-4799-0830-1, p. 27-31.

[32] MACHAJ, J. - BRÍDA, P. - BENIKOVSKÝ J.: Optimization of the RBF Localization Algorithm Using Kalman Filter, In: 36th International Conference on Telecommunications and Signal Processing, TSP 2013, Rome, Italy, 2013, ISBN 978-1-4799-0403-7, p. 1-5.

[33] KAMENCAY, P. - HUDEC, R. - BENČO, M. - ZACHARIÁŠOVÁ, M.: Feature extraction for object recognition using PCA-KNN with application to medical image analysis, In: 36th International Conference on Telecommunications and Signal Processing, TSP 2013, Rome, Italy, ISBN 978-1-4799-0403-7, p. 830-834.

[34] ZACHARIÁŠOVÁ, M. - KAMENCAY, P. - HUDEC, R. - BENČO, M. - MATUŠKA, S: A new approach to short web document creation based on textual and visual information, In: 36th International Conference on Telecommunications and Signal Processing, TSP 2013, Rome, Italy, 2013, ISBN 978-1-4799-0403-7, p. 788-792.

[35] MLYNKA, M. - BRÍDA, P. - MACHAJ, J.: Modular Positioning System for Intelligent Transport, In: 5th International Conference on Computational Collective Intelligence Technologies and Applications, Craiova, Romania, in Recent Developments in Computational Collective Intelligence, Studies in Computational Intelligence 513, A. Badica et al. (eds.), DOI: 10.1007/978-3-319-01787-7_11, Springer International Publishing Switzerland 2014, vol. 513, ISSN 1860-949X, ISBN 978-3-319-01786-0. p. 115-124.

[36] LITVÍK, J. - BENEDIKOVIČ, D. - WUILPART, M. - DADO, M. - KUBA, M.: Numerical model for DGD estimation in optical transmission systems, In: SPIE Optic and Optoelectronics 2013, ISBN 978081949584-6.

[37] LITVÍK, J. - KUBA, M. - BENEDIKOVIČ, D. - DADO, M.: Numerical representation of optical sources for coherent lightwave systems, In: 36th International Conference on Telecommunications and Signal Processing, TSP 2013, ISBN 978-1-4799-0403-7, p. 331-334.

[38] KORTIŠ, P. - GRONDŽÁK, K.: Cluster load balancing algorithms comparison, In: ICETA 2013, ISBN 978-1-4799-2161-4, p. 225-228.

[39] TICHÁ, D. - MARTÍNEK, P.: Improved algorithm for filter approximation problem, In: 9th International workshop Digital Technologies 2013, May 29 – 31, 2013, Žilina, Slovak Republic, ISBN 978-80-554-0682-4, p. 93-96.

[40] PALEČEK, J. - VESTENICKÝ, M. - VESTENICKÝ, P. - SPALEK, J.: Frequency dependence examination of PCB material FR4 relative permittivity, In: 12th IFAC conference on Programmable devices and embedded systems, 2013, ISBN 978-3-902823-53-3, p. 90-94.

[41] DUCA, A. - REBICAN, M. I. - JANOUŠEK, L. - YILMAZ, A. E.: Enhancement of particle swarm optimization algorithms for the 3D crack reconstruction from ECT signals, In: 8th International Symposium on Advanced Topics in Electrical Engineering: CD proceedings. Bucharest: University Politehnica of Bucharest, 2013, ISBN 978-1-4673-5978-8, IEEE Catalog Number: CFP1314P-CDR, p. 4.

[42] BABUŠIAK, B. - BORIK, Š.: Bio-amplifier with Programmable Gain and Adjustable Leads, In: Proc. of 36th International Conference on Telecommunications and Signal Processing 2013 (TSP 2013), July 2-4, 2013, Rome, Italy, IEEE Catalog numb. CFP 1388P-ART, ISBN 978-1-4799-0404-4, p. 616-619.

[43] BARABÁŠ, J. - RADIL, R. - GOMBÁRSKA, D.: Image processing and feature extraction of circular objects from biological images, In: Proc. of 36th International Conference on Telecommunications and Signal Processing 2013 (TSP 2013), July 2-4, 2013, Rome, Italy, IEEE Catalog numb. CFP 1388P-ART, ISBN 978-1-4799-0404-4, p. 612-615.

[44] BABUŠIAK, B. - GÁLA, M. - PENHAKER, M. - ČERNÝ, M. - KRAUS, J.: Indirect-Contact Surface Electrocardiography Measurements by Capacitive Electrodes. In. IFMBE Proceedings, the 15th International Conference on Biomedical Engineering, 2013, Vol. 2014, No. 43, ISSN 1680-0737, p. 663-666.

[45] VITTEK, J. - BRIŠ, P.: Energy Saving Position Control Algorithms for PMSM Drives with Coulomb and Viscous Friction, 10th IEEE International Conference on Control and Automation, ICCA 2013, Hangzhou, China, 2013, ISBN 978-1-4673-4708-2, p. 1485-1490.

[46] VITTEK, J. - BRIŠ, P. - BIEL, Z. - HRKEĽ, M.: Energy Saving Position Control Algorithms for PMSM Drives with Quadratic Friction, IEEE AFRICON 2013, Mauritius, 2013, ISBN 978-1-4673-5940-5, ISSN 2153-0025, p. 1001-1006.

[47] REGUĽA, M. - OTČENÁŠOVÁ, A. - SZABÓ, D. - HÖGER, M.: Design of electronic protection relays for the power line model 22kV, In: Electric power engineering 2013 = EPE 2013 : proceedings of the 14th international scientific conference, Included in CPCI Thomson Reuters database, Kouty nad Desnou, Czech Republic, 2013, ISBN 978-80-248-2988-3, p. 417-422.

[48] SZABÓ, D. - REGUĽA, M. - ALTUS, J.: Voltage sags detection algorithm based on DQ transformation for a DVR, In: Electric power engineering 2013 = EPE 2013, proceedings of the 14th international scientific conference, included in CPCI Tomson Reuters database, Kouty nad Desnou, Czech Republic, 2013, ISBN 978-80-248-2988-3, p. 97-101.

Patents, Utility Models, Designs, Trade Marks

[1] SCHWARTZ, L., HOTTMAR, V.: Scheme of digital TV receiver for interactive cable digital television with internet, 2013, ÚV 6588.

Habilitation and Inauguration

Tab. 11: Number of habilitations and inaugurations within last six years

Year	Habilitation		Inauguration	
	Internal	External	Internal	External
2008	2	5	0	3
2009	0	0	1	1
2010	0	0	2	0
2011	3	0	2	0
2012	5	0	0	0
2013	2	0	0	1

Foreign activities

Foreign activities at the FEE in 2013 include realization of international projects summarized in the previous section, active participation in foreign scientific and technical forums, and mutual mobility of teachers, researchers and students at foreign institutions.

Dean's office gets information from various agencies and institutions about offered study stays, government scholarships, summer schools, excursions, work offers, foundations and so on. The information is effectively disseminated using modern communication means to the Faculty staff as well as students.

Programmes supporting educational activities

Program LLP/ERASMUS

Within the frame of LLP/Erasmus programme 42 bilateral agreements were approved for students / teachers / other staff exchanges for the academic year 2012/2013, as follows:

TU Wien (AT), Faculté Polytechnique de Mons (BE), College of Telecommunications and Post (BG), Todor Kableshkov Higher School of Transport (BG), Brno University of Technology (CZ), Technical University of Liberec (CZ), VŠB-Technical University in Ostrava (CZ), Czech Technical University in Prague (CZ), University of West Bohemia (CZ), University of Hradec Králové (CZ), RWTH Aachen (DE), TU Dresden (DE), Hochschule für Technik und Wirtschaft Dresden (DE), TU Darmstadt (DE), TU Braunschweig (DE), RUHR Bochum (DE); Hochschule Mittweida (DE), Aalborg University, Institute of Energy Technology (DK), Aalto University (FIN), Lappeenranta University of Technology (FIN), Tampere University of Technology (FIN), Université de Technologie de Compiègne (FR), Université de Picardie "JulesVerne" (FR), Universite Bordeaux I (FR), University of Patras (GR), Universita´degli studi di Catania (IT), Transport and Telecommunication Institute (LV), Universidade do Porto (PT), Universidade da Beira Interior (PT), Politechnika Lubelska (PL), Politechnika Radomska (PL), West Pomeranian University of Technology (PL), Politechnika Gdanska (PL), Politechnika Slaska (PL), Transilvania University of Brasov (RO), Universitatea Technica din Cluj-Napoca (RO), University of Maribor (SI), Universitat Autonoma de Barcelona (ES), Universidad de Cantabria (ES), Uludağ University (TR), Istanbul Arel University (TR), University of Nottingham (UK).

For the academic year 2013/2014 45 bilateral agreements have been approved with the following universities:

TU Wien (AT), Faculté Polytechnique de Mons (BE), College of Telecommunications and Post (BG), Todor Kableshkov Higher School of Transport (BG), Brno University of Technology (CZ), Technical University of Liberec (CZ), Czech Technical University in Prague (CZ), VŠB-Technical University in Ostrava (CZ), University of West Bohemia (CZ), University of Hradec Králové (CZ), Silesian University in Opava (CZ), University of Zagreb (HR), RWTH Aachen (DE), TU Dresden (DE), Hochschule für Technik und Wirtschaft Dresden (DE), TU Darmstadt (DE), TU Braunschweig (DE), RUHR Bochum (DE); Hochschule Mittweida (DE), Aalborg University, Institute of Energy Technology (DK), Aalto University (FIN), Lappeenranta University of Technology (FIN), University of Vaasa (FIN), Tampere University of Technology (FIN), Université de Picardie "JulesVerne" (FR), Universite Bordeaux I (FR), University of Patras (GR), Universita´degli studi di Catania (IT), Transport and Telecommunication Institute (LV), Universidade do Porto (PT), Universidade da Beira Interior (PT), Instituto Superior Técnico (PT), Politechnika Lubelska (PL), Politechnika Radomska (PL), West Pomera-

nian University of Technology (PL), Politechnika Gdanska (PL), Politechnika Slaska (PL), Transilvania University of Brasov (RO), Universitatea Technica din Cluj-Napoca (RO), Universitatea "Politecnica" din Bucuresti (RO), University of Maribor (SI), Universitat Autonoma de Barcelona (ES), Universidad de Cantabria (ES), Uludağ University (TR), Karabük University (TR).

LLP/Erasmus stays

In the academic year 2012/2013 13 Master students (thence 3 for Erasmus practical placement), 4 Doctoral students, 20 teachers and 2 administrative staff participated in the LLP/Erasmus programme. The Faculty accepted 15 students and 11 teachers and 2 administrative staff from the partner universities.

For the academic year 2013/2014 in total 23 study stays of students and 20 exchanges of teachers are planned. The Faculty accepted 9 foreign students in the winter semester and 4 foreign students in the summer semester of the academic year 2013/2014.

National Scholarship Programme of the Slovak Republic (NSP SR)

One Doctoral student of the Faculty was awarded the scholarship for study stay abroad from the NSP SR in the academic year 2012/2013.

In the winter semester of the academic year 2013/2014 the Faculty accepted 2 people within the NSP SR, namely:

- Doctoral student from the Moscow Power Engineering Institute, RU;
- University teacher from the Institute of technical and Experimental Physics, Czech Technical University in Prague, CZ.

Other scholarship programmes

Within the programme CEEPUS, one Doctoral student participated in the study stay at the University of Maribor, Slovenia (as a Freemover);

Within the programme IPID - International Promovieren in Deutchland, 2 Doctoral students participated in the study stay at the TU Ilmenau, Germany;

Within the SPP Foundation, one Doctoral student participated in the study stay at the University of Malaga, Higher Technical School of Telecommunications Engineering, Spain.

Other activities

The Faculty of Electrical Engineering cooperates in the frame of bilateral agreements with the following institutions:

- Russian Academy of Sciences, Trapeznikov Institute of Control Sciences (RU),
- Universidad National Autonoma de Mexico (MX),
- Faculty of Transportation Sciences, Czech Technical University in Prague (CZ),
- ELTODO EG, a.s., Prague (CZ),
- ELTODO dopravní systémy s.r.o.., (CZ),
- University of Pardubice (CZ),
- Railway Research Institute, j.s.c., (CZ),
- VÚKV, a.s., Prague (CZ),
- Technický a zkušební ústav stavební Prague, s.p. (CZ),
- Universita degli Studi di Catania (IT)
- West Pomeranian University of technology Szczecin, Faculty of Electrical Engineering and Faculty of Computer Science and Information Technology, (PL)
- Yeungjin College, Korea.

Purpose of these agreements is to enhance academic exchange and co-operation in the field of education and research. The co-operation programme involves especially the following activities:

- exchange of students,
- exchange of faculty members and staff,
- exchange of scientific materials, publications and information,
- joint research and research meetings,
- co-operation within the Doctoral study (mainly with Catania).

Foreign stays, visits and conferences

Employees and Doctoral students of the Faculty performed in 2013 several short or long stays in foreign countries at partner universities or institutions, and on the contrary, the FEE and its departments accepted students and teachers from abroad.

Picture of mobility at the FEE within foreign stays, conferences and visits can be seen in Ta-

Tab. 12: Foreign stays, conferences and visits in 2013

IN/OUT	DPh	DMAEE	DEBE	DME	DPES	DCIS	DTM	IAS LM
Belgium	1 / 2		0 / 1			0 / 2	0 / 3	
Belarus		0 / 1						
Bulgaria						1 / 0		
Czech Repub.	1 / 2	3 / 8	3 / 7	3 / 8	8 / 8	2 / 9	4 / 6	3 / 1
Denkmark			0 / 2				0 / 1	
Finland					0 / 1	0 / 1		
France					0 / 1		3 / 1	
Greece			0 / 1				1 / 1	
Croatia						1 / 3	0 / 1	
Ireland							1 / 2	
Japan				2 / 0				
Jordan							0 / 1	
Canada		0 / 1		0 / 1			2 / 0	0 / 1
Libya				1 / 0				
Luxemburg			0 / 1					
Macedonia		0 / 1					0 / 1	
Hungary	0 / 1					0 / 1		
Germany			1 / 1	3 / 0			4 / 0	
Poland	2 / 2	1 / 6		0 / 3	0 / 2	0 / 9	1 / 1	
Portugal							0 / 2	
Austria	0 / 1		0 / 1		0 / 1	0 / 1	1 / 0	
Romania		2 / 1	2 / 3		3 / 1		0 / 1	
Russia	0 / 1			1 / 0			2 / 0	
Slovenia					1 / 0			
Spain	1 / 1			0 / 1				0 / 2
Switzerland	0 / 4						1 / 0	
Sweden	1 / 0							
Italy		0 / 1		0 / 6				
Tunis				0 / 6				
UK							1 / 0	1 / 1
USA							2 / 1	
Total	6 / 14	6 / 19	6 / 17	10 / 20	12 / 14	4 / 24	23 / 21	4 / 3
Total all				**71 / 132**				

ble 12. The data are summarized according to countries and departments.

Table 12 contains also long stays of employees and Doctoral students abroad, and long stay visits of foreign participants at the departments of the FEE.

Employees of the FEE published and/or took part in many international conferences, workshops and symposiums. Detailed information about particular names of employees, titles of papers and conferences, activities performed during the study stays and purposes of foreign visits are presented in annual reports of the departments of the FEE for 2013.

Main Tasks of the Faculty for the year 2014

The development of the FEE will be realized in accordance with the framework program of the Faculty for the period 2014-2020, which will be updated and specified at the meeting of the Scientific Board of the FEE on 12th May 2014. The basic strategic aim is permanent developing of the Faculty as a prestigious educational and research institution with a prominent place among Slovak faculties, which has a significant international recognition in the most offered study programmes and fields of research and development.

Quantifiable main tasks for the year 2014

1. Development of tools for more efficient engagement of research groups in the EU Framework Programme for Science and Innovation HORIZON 2020;
2. Organization of the International Conference ELEKTRO 2014, which is indexed in international databases SCOPUS, IEEE Xplore;
3. To participate in the organization of at least 5 other conferences/seminars/events;
4. In accordance with the plans of qualification growth to realize the habilitations of at least 3 and the inaugurations of at least 2 faculty members;
5. To organize and promote Student Scientific Competitions for all 3 study degrees and to focus attention on the possibility of participation of the Faculty students at the organized national and international students' competitions;
6. To monitor and at least twice a year evaluate the ongoing evaluation of accreditation criteria;
7. To participate in annual meetings of the faculties of electrical engineering and related orientations (FELAPO 2013);
8. To evaluate the submitted project proposals to national and international funding agencies two times per year;
9. To convene a meeting of the Faculty management with Doctoral students and their supervisors and meeting with academic community of the Faculty once a year;
10. To prepare the re-accreditation of existing curricula, accreditation of new study programs and other materials for complex accreditation in 2014;
11. To prepare internal documents and promotional materials for the new mobility program ERASMUS+;
12. Within the marketing activities to implement at least 1 action directed towards primary schools and 10 actions directed towards secondary schools in order to

inform students of secondary schools about study possibilities at the FEE.

Contacts and Address

Academic Officials

Dean of the Faculty

Prof. Milan Dado, PhD.
Phone: +421 41 513 2050
E-mail: dean@fel.uniza.sk

Vice-dean for Development and International Co-operation:

Assoc. Prof. Ladislav Janoušek, PhD.
Phone: +421 41 513 2066
E-mail: international.vicedean@fel.uniza.sk

(from 1 October 2012)

Vice-dean for Education

Prof. Michal Pokorný, PhD.
Phone: +421 41 513 2057
E-mail: education.vicedean@fel.uniza.sk

Vice-dean for Research

Assoc. Prof. Pavol Rafajdus, PhD.
Phone: +421 41 513 2058
E-mail: research.vicedean@fel.uniza.sk

Secretary

MSc. Katarína Jurošková (from 1st November 2013)
Bc. Daniela Piovarčiová (to 31st October 2013)
Phone: +421 41 513 20 52
E-mail: secretary@fel.uniza.sk

Address

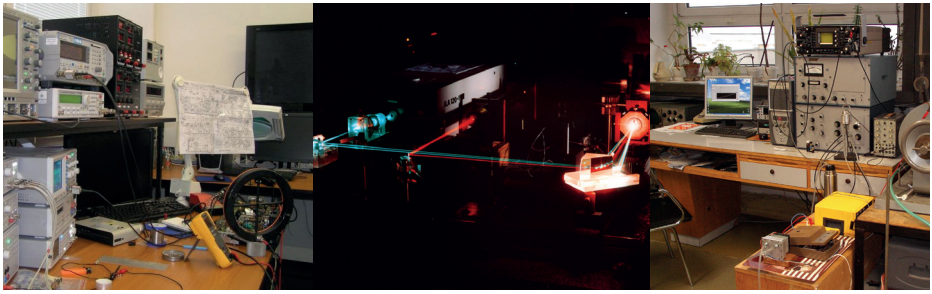
Faculty of Electrical Engineering
University of Žilina
Univerzitná 1
010 26 Žilina
Slovak Republic

Contact

Phone:	+421 41 513 2051
Fax:	+421 41 513 1515
E-mail:	dean.office@fel.uniza.sk for dean's office

For more information please visit our Internet site on http://fel.uniza.sk/.

Department of Physics



General Information

Advances in technical fields have always relied to a large degree on know-how and methods originating in Physics. Many phenomena and principles studied in Physics today become the basis of applications tomorrow, e.g. in quantum information science. It is therefore very important to provide the students of the technical fields with good basics of Mathematics and Physics.

The Department of Physics teaches General Physics to students of all faculties of the University and Advanced Physics for some special courses. The Department provides the students with the basic understanding of physics, trains them in applying the principles of physics to various engineering problems as well as gives the students a review of modern physics.

The Department is divided into three sections according to their research and educational specialisation. The staff consists of 1 Professor, 2 Associate Professors at the position of a Professor, 5 Associate Professors, 12 senior lecturers, 5 internal Ph.D. students, 4 research fellows and 3 technical/administrative workers who support the research and teaching activities of the Department.

The research carried out at the Department is mostly concerned with the utilization of acoustic and optical wave processes for the investigation of condensed matter. Acoustic Group exploits a wide range of acoustic methods and techniques as well as acoustoelectric and acoustooptic phenomena to investigate semiconductors, metals, ion glasses and magnetic liquids. New acoustic techniques are also developed.

Optical group studies physical properties of the conventional telecommunications optic fibres and special fibres such as capillary fibres and photonic fibres. The group has extended its activities to include technologies of preparation and analysis of photonic structures for integrated optics and optoelectronics. The latest results are from the area of optofluidic waveguides where sensors and optic elements are being developed. Self-diffraction of light in magnetic fluids and photorefractive phenomenon in selected condensed matter materials are also studied within the group.

The theoretical high-energy physics group works in the area of strong electroweak symmetry breaking and quark-gluon plasma.

The research groups of the Department are also well known abroad. The scientific activities of the Department are regularly presented at the international conferences and are published in significant physical journals. The members of the staff also participate in various educational and scientific activities outside the Department and the University, especially as members of various scientific boards at both domestic and

international institutions. There are also many activities focused on further education of high school and elementary school Physics teachers and their pupils and students, which is an important outreach work.

Staff of the Department

Head of the Department:	**Peter Bury**
Vice-head of the Department:	Dušan Pudiš
Secretary for Education:	Gabriela Tarjányiová
Administrative Support:	Anna Chasníková
Technical Support:	Nadežda Remencová, František Černobila, Juraj Remenec (1/3)

Sections of the Department

Section of Acoustics and Materials

Head of the Section:	Peter Bury
Professor:	Peter Bury
Associate Professors:	Peter Hockicko, Igor Jamnický, Jozef Kúdelčík, Sofia Slabeyciusová
Senior Lecturers (with PhD):	Marián Janek (1/2), Peter Sidor (until 30.6.2013)
Senior Lecturers (without PhD):	Ivan Bellan

Section of Optics and Photonics

Head of the Section:	Dušan Pudiš
Associate Professors:	Daniel Káčik, Ivan Martinček, Dušan Pudiš
Senior Lecturers (with PhD):	Jana Ďurišová (maternity leave), Ivana Lettrichová, Ľuboš Šušlik, Norbert Tarjányi

Section of General Physics and Elementary Particles

Head of the Section:	Ivan Melo
Research Fellows:	Mikuláš Gintner, Ivan Melo
Senior Lecturers (with PhD):	Marián Janek (1/2), Beáta Trpišová, Gabriela Tarjányiová

Postgraduate Students

Internal:	Jozef Drga (until Aug 31, 2013), Peter Gašo, Štefan Hardoň, Daniel Jandura, Peter Tatár, Lukáš Varačka (since 1.9.2013)

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			*(L) lessons - (S) seminars - (LE) lab. exercises
31110	Introduction to Physics	1	1 - 2 - 0
31201	Physics I	2	3 - 2 - 1
31303	Physics II	3	3 - 2 - 1
31307	Computer Simulation of Real Processes	4	1 - 0 - 2
31450	Basics of Optoelectronics	4	2 - 1 - 0
31315	Chapters of Physics	2	2 - 1 - 0
Courses at the Faculty of Mechanical Engineering			
2B010	Seminar on Physics	1	0 - 2 - 0
2B018	Physics I	2	3 - 2 - 0
2B033	Physics II	3	2 - 0 - 2
2B018	Physics I (External studies)	2	20 - 6 - 0
2B033	Physics II (External studies)	3	20 - 6 - 0
Courses at the Faculty of Management Science and Informatics			
5BF005	Fundamentals of Physics	1	3 - 1 - 1
Courses at the Faculty of Civil Engineering			
4B113	Physics	1	2 - 1 - 1
4B117	Seminar on Physics	1	0 - 2 - 0
4B203	Physics - optics	2	2 - 1 - 0
4B202	Physics I	2	2 - 1 - 1
4B211	Chapters of Physics	2	0 - 2 - 0
4E202	Physics – (External studies)	2	12 - 8 - 0
4E211	Chapters of Physics - (External studies)	2	10 - 0 - 0
Courses at the Faculty of Operation and Economics of Transport and Communication			
11P101	Physics	1	2 - 1 - 1
11P102	Physics	1	2 - 1 - 1
12P101	Physics (External studies)	1	8 - 4 - 4
12P102	Physics (External studies)	1	12 - 0 - 4
12P103	Physics (External studies)	1	16 - 0 - 0
Courses at the Faculty of Humanities			
8BT151	Computer Physics II	6	1 - 0 - 2
Courses at the Faculty of Special Engineering			
92026	Physics	2	2 - 1 - 1
97026	Physics (External studies)	2	18 - 0 - 0

Master Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Humanities		*(L) lessons - (S) seminars - (LE) lab. exercises	
8BT235	Applications of wave processes	3	2 - 0 - 2
8BT221	Statistical methods in physics	2	2 - 1 - 0
8BT248	Physical acoustics	4	2 - 1 - 0

Engineering Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
32109	Physics III	1	2 - 1 - 0
32321	Measurements in telecommunications 4	3	0 - 0 - 2
32410	Physics of accelerators	2	2 - 2 - 0

Science, research and development

The research carried out at the Department is mostly concerned with the utilization of acoustic and optical wave processes for the investigation of condensed matter. Acoustic Group exploits a wide range of acoustic methods and techniques as well as acoustoelectric and acoustooptic phenomena to investigate semiconductors, metals, ion glasses and magnetic liquids. New acoustic techniques are also developed. Acoustic group has reached important results during investigation of semiconductor MOS layers with so-called high-K dielectric layers (Si-SiO_2-HfO_2), during studies of magnetic fluids on the basis of the transformer oil, as well as studies of LiPON type ion glasses, published in 2013 in 3 current contents journals and two WOS journals.

Optical group studies physical properties of the conventional telecommunications optic fibres and special fibres such as capillary fibres and photonic fibres. The group has extended its activities to include technologies of preparation and analysis of photonic structures for integrated optics and optoelectronics. The latest results are from the area of optofluidic waveguides where sensors and optic elements are being developed. Self-diffraction of light in magnetic fluids and photorefractive phenomenon in selected condensed matter materials are also studied within the group. Most important results were achieved in the special optical fibers and fiber devices for sensor applications. In the field of active devices, the new types of light emitting diodes with patterned surface using photonic structures and polymeric membranes were prepared. Such types of optic and optoelectronic devices show unique properties especially light extraction and light guiding.

The theoretical high-energy physics group works in the area of strong electroweak symmetry breaking and quark-gluon plasma. Understanding of electroweak symmetry breaking (EWSB) is one of the most important problems of particle physics. In spite of recent discovery of 125 GeV scalar particle at the LHC accelerator at CERN there remain questions about the true nature of EWSB mechanism and hence about physics behind the Standard Model (SM). Properties of the discovered boson are compatible with the SM Higgs boson hypothesis, nevertheless they are also compatible with many extensions of SM. In collaboration with Dr. Juráň from Silesian University in Opava we constructed and keep studying so-called

top-BESS model with SU(2) isospin triplet of vector resonances as effective description of spontaneous EWSB. Results were published in the most important scientific journals Physical Review D and the European Physical Journal C and contacts were established with S. Pokorsky from Warsaw university, C. Grojean from Theory Division at CERNe and F. Riva from ITF EPF in Lausanne.

Acoustic Laboratory

Laboratory is oriented towards studies of physical properties of materials and structures with acoustic methods. Three acoustic spectrometers serve for this purpose, each equipped with unique technology for the generation, detection as well as processing of acoustic signals. The laboratory also features two magnets for investigation of magnetic and acoustomagnetic properties of condensed matter and facilities for investigation of dielectric properties of materials.

Technology Laboratory

Laboratory serves for the preparation of samples for either optical or acoustic investigation. It has facilities for cutting and grinding the samples and facilities for evaporation or deposition of solid metal layers and resistors.

Optics Laboratory

Laboratory is focused on research and development of optical fibres, optical fibre sensors, optical fibre elements and optical materials. During the research we use and develop various types of interferometry methods and interferometers, methods of measurement of optical radiation absorption in fibres and optical materials, and methods of refractive index measurement. Laboratory has different types of semiconductor and gas lasers, light sources in the visible and near infrared region, spectrometers operating in the wavelength range 350 – 2200 nanometers and elements for imaging and fibre optics.

Acoustic Laboratory

Laboratory of fibre technologies is oriented towards preparation of optical fibres and fibre structures from different types of optic materials. Laboratory features optical fibre pulling tower, which can be used to prepare optical fibres from fused quartz and other types of optical glasses. In the laboratory we develop technologies of preparation of optical fibres, optical fibre elements and microfluid optical elements from siloxane polymers, such as polydimethylsiloxane LS 6941, LS 6943, LS 6946 and Sylgard 184.

Laboratory of laser technologies

Laboratory features cutting edge laser technologies for preparation of planar photonic structures. The basic technology is interference lithography where one can achieve photonic structures with various 2-dimensional symmetries and a resolution at the level of hundreds of nanometers. Another technology offers a possibility to create planar structures with arbitrary arrangement using tapered optic fiber probes in the near field scanning. This is known as the near field lithography. The final on the list is the technology of direct inscription with laser beam, which enables to create structures of arbitrary arrangement in surfaces of different materials with sub-micrometer resolution. Laboratory is prepared for implementation of photonic and arbitrary structures with a resolution of a few hundred nanometers into surfaces of optic and optoelectronic elements.

Co-operation

Co-operation Partners in Slovakia

- International Laser Center, Bratislava
- Institute of Electrical Engineering, Slovak Academy of Sciences
- Institute of Physics, Slovak Academy of Sciences, Bratislava
- Dept. of Microelectronics, FEI STU BA

- Institute of Experimental Physics, Slovak Academy of Sciences, Košice
- Matej Bel University, Banská Bystrica
- FMFI Comenius University, Bratislava
- University of P.J. Šafarik, Košice
- Faculty of Aeronautics - Technical University of Košice
- Volkswagen Bratislava
- Betamont Zvolen

International co-operation Partners

- Institute of Physics, Faculty of Philosophy and Natural Sciences, Silesian University in Opava, CZ
- Lublin University of Technology, Lublin, PL
- Université de Mons - Faculty Polytechnique, Belgium
- ISIR, Osaka University, Japan
- CERN, Switzerland
- International Particle Physics Outrach Group
- IPHT Jena, Germany
- Joint Institute of Nuclear Research, Dubna, Russia
- Instituto do Ceramica y Vidrio (CSIC), Madrid, Spain
- Institute of Technical and Experimental Physics, ÚTEF ČVUT Prague, CZ
- ZCU Plzen, CZ
- ITF EPF, Lausanne, Switzerland

Visitors to the Department

Name	Institution	Length of stay
Marc Wuilpart	Université de Mons Belgium	5 days
Hans Arwin	University of Linköping Sweden	4 days
Iwan Kityk	Czestochowa University of Technology, Poland	1 day
Francisco Munoz	Instituto de Ceramica y Vidrio (CSIC), Madrid, Spain	5 days
Josef Juráň	Silesian University, Opava, CZ	20 days
Tomasz Szoplik	Warsaw University, Poland	5 days

Visits to Foreign Institutions

Name	Institution	Length of stay
Ivan Melo	Madrid, Spain	2 days
	Cern, Switzerland	3 days
	Cern, Switzerland	10 days
	Budapest, Hungary	3 days
Marián Janek	JINR, Dubna, Russia	14 days
Jozef Kúdelčík	Lublin University of Technology FEECC Poland	7 days
Peter Hockicko	KU Leuven, Belgium	6 days
	University of Vienna, Austria	3 days
Mikuláš Gintner	Silesian University, Opava, CZ	17 days
	UTEF ČVUT, Prague, CZ	20 days
	CERN, Geneva, Switzerland	12 days
	ITF EPF, Lausanne, Switzerland	1 day

Other Activities

Specialised Lectures and Courses Organized by the Department

Masterclasses in Physics 2013
Customer: high school students from Žilina region
Lecturer: Mikuláš Gintner, Ivan Melo
Date: 6.3.2013

Measurement on ferromagnetic material
Customer: KF EF ŽU
Lecturer: Marián Janek
Date: 29.01.2013

Spectroscopic ellipsometry: a selection of examples from research on materials, sensors and biolayers
Customer: DPh, FEE ŽU
Lecturer: prof. Hans Arwin Linköping University, Sweden
Date: 12.03.2013

Is geometry of the Universe at large scales Euclidean?
Customer: DPh, FEE ŽU
Lecturer: Július Štelina
Date: 28.05.2013

Presentation of renewed laboratory exercises
Customer: DPh, FEE ŽU
Lecturer: Gabriela Tarjányiová, Ivan Bellan, Marián Janek
Date: 24.09.2013

Photo-induced nonlinear optical methods as effective tool for studies of condensed matter
Customer: DPh, FEE ŽU
Lecturer: prof. Iwan V. Kityk Czestochowa University Technology, Czestochowa, Poland
Date: 09.04.2013

Invited Lectures/Papers

International Masterclasses in Particle Physics
Lecturer: Ivan Melo
Where: UMB Banská Bystrica, broadcast to Košice and Bratislava
Date: 11.04.2013

Plenary lecture „IPPOG Bringing particle physics into classrooms"
Lecturer: Ivan Melo
Where: HSCI international conference
Date: 01.05.2013-05.07.2013

Breakdown in transformer oil
Lecturer: Jozef Kúdelčík
Where: Politechnika Lubelska, Wydzial Elektrotechniki i Informatyki, Lublin, Poland
Date: 25.05.2013

Wave optics
Lecturer: Norbert Tarjányi
Where: Bilingual high school, Žilina, SR
Date: 31.1.2013

Top-BESS model extended by 125 GeV scalar
Lecturer: Mikuláš Gintner
Where: UTEF CTU, Prague, CZ
Date: 14.6.2013

A CompHEP Tour
Lecturer: Mikuláš Gintner
Where: UTEF CTU, Prague, CZ
Date: 5.11.2013

Photonic structures for optoelectronic devices and integrated optoelectronics
Lecturer: Dušan Pudiš
Where: Warsaw, Poland
Date: 16-19 September, 2013

Membership in International Institutions /Committees

Ivan Melo	Slovak delegate in IPPOG (International Particle Physics Outreach Group) Slovak delegate in EPPCN (European Particle Physics Communication Network)
Peter Bury	Chairman of the National IUPAP Committee (International Union for Pure and Applied Physics) Member of Scientific Committee of NEET conference 2013, Zakopané, PL
Peter Hockicko	Member of SEFI (European Society for Engineering Edication), PWG (Working Group on Physics), Slovak delegate Member of EUCU.NET (European Children's Universities Network)
Norbert Tarjányi	EPS (European Physical Society)

Membership in National Institutions/Committees

Igor Jamnický	Member of the Organizing Committee of 19h APCOM conference 2013
Peter Bury	Member of the Slovak Physical Society Council Member of the Scientific Committee of 19th Conference APCOM 2013 Member of the Field Commission Solid State Physics and Acoustics at FEI STU Bratislava Member of the Scientific Committee of ADEPT 2013 Member of the Scientific Committee of 20th Conference of Slovak physicists, Bratislava 2013
Dušan Pudiš	Member of the Programme Committee of 19th Conf. APCOM 2013 Chair of the Organizing Committee of the 1st Conference ADEPT 2013 Member of the Programme Committee of ELEKTRO 2013
Ivan Melo	National coordinator of the 9th International Masterclasses in Particle Physics for high school students
Peter Hockicko	Member of the Scientific Committee of the 8th International Conference Material - Acoustics Place 2013, Zvolen Member of a committee of the Slovak Acoustic Society at SAS
Norbert Tarjányi	Member of the Slovak Physical Society

Membership in University Boards

Dušan Pudiš	Member of the Commission for the field 5.2.12 Electrotechnologies and materials Member of Scientific Council of EF ŽU Secretary of the Academic Senate of EF ŽU Member of the Executive Council of the KAP club (alumni and friends of University of Žilina)
Igor Jamnický	Member of the Commission for the field 5.2.12 Electrotechnologies and materials
Peter Bury	Chair of the Commission for the field 5.2.12 Electrotechnologies and materials, EF ŽU Member of Academic Senate of EF ŽU Member of Scientific Council EF ŽU

Daniel Káčik	Member of Academic Senate of EF ŽU
Marián Janek	Member of the Organizing Committee of ELEKTRO 2014

Contact Address

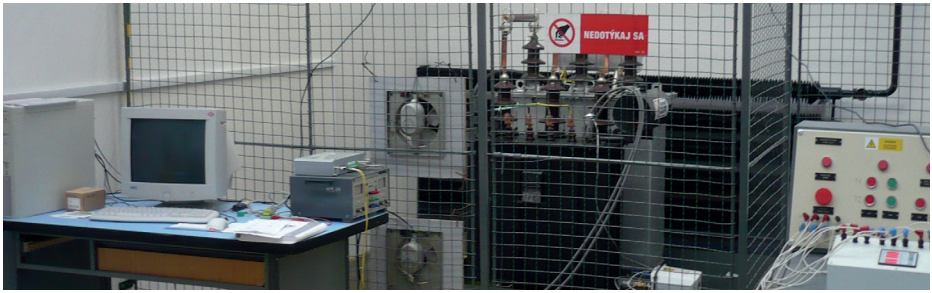
EN

Department of Physics
Faculty of Electrical Engineering
University of Žilina
Univerzitná 1, 010 26 Žilina
Slovak Republic
Phone: +421 41 513 2300
Fax: +421 41 513 1516
E-mail: ktf@fel.uniza.sk
www: http://fel.uniza.sk/katedra.fyziky

SK

Katedra fyziky
Elektrotechnická fakulta
Žilinská univerzita v Žiline
Univerzitná 1, 010 26 Žilina
Slovenská republika
Telefón: +421 41 513 2300
Fax: +421 41 513 1516
E-mail: ktf@fel.uniza.sk
www: http://fel.uniza.sk/katedra.fyziky

Department of Measurement and Applied Electrical Engineering



General Information

Department of Measurement and Applied Electrical Engineering (DMAEE) was founded by dividing of the Department of Theoretical and Applied Electrical Engineering. The history of the department however started in 1953 when at the Railway University in Prague was originated and the Department of Electrical Engineering and the Cabinet of Theoretical Engineering was its part. The independent department was originated in 1957 named Department of Theoretical Electrical Engineering and Electrical Machines (DTEEM) providing teaching electrical engineering subjects for electrical engineering studies.

The first subject taught at the Faculty of Electrical Engineering was "Foundations of electrical engineering". Successively the pedagogical process was extended by subjects as theoretical electrical engineering, electrical measurement and the department started to provide teaching of subjects of theory of electrical machines and electrical machines construction as well.

After moving the university from Prague to Žilina and changing its name to University of Transport, the department began providing teaching of electrical engineering subjects at non-electrical study branches and at the same time the Department of Electrotechnology was separated and become independent.

In 1986 the branch of electrical machines was separated from the department and the department was named Department of Electrical Engineering.

In 1993 the department was named Department of Theoretical and Applied Electrical Engineering.

In 2005 the department had two branches: Division of Theoretical Electrical Engineering and Measurement and Division of Applied Electrical Engineering and Measurement. Two independent departments: Department of Electromagnetic and Biomedical Engineering and Department of Measurement and Applied Electrical Engineering arose by their dividing from these divisions.

The staff of the DMAEE guarantees and provides the course Measurements and Measuring Systems for all students of the Faculty of Electrical Engineering of the University of Žilina, sectional courses for students in study program Electrical Engineering and course Electrical Engineering for students at other faculties of the University of Žilina.

Staff of the Department

Head of the department:	**Miroslav Gutten**
Vice head of the department:	Daniel Korenčiak
Secretary:	Milan Šebök
Administrative staff:	Jana Zlatohlavá
Associate professors:	Dagmar Faktorová, Miroslav Gutten, Milan Chupáč, Ján Poliak, Milan Šimko
Senior Lecturers (with PhD):	Martin Brandt, Daniel Korenčiak, Matej Kučera, Milan Šebök, Jozef Jurčík (from 1.11.2013)
Researcher (with PhD):	Róbert Seewald (to 30.6.2013)

Postgraduate Students

Internal (full-time):	Richard Janura (from 1.9.2013), Jozef Jurčík (to 31.10.2013), Ľubomír Ostrica, Mária Pápežová (from 1.9.2013)

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			*(L) lessons - (S) seminars - (LE) lab. exercises
31635	Bachelor Project Automotive EE	6	0 – 0 – 6
31609	Electrical Machines for Automation	6	3 – 1 – 1
31604	Bioelectronics	6	2 – 0 – 2
31306	Measurement and Measuring Systems	3	2 – 0 – 3
31416	Electrical Engineering of Road Vehicles	4	2 – 1 – 2
31519	Inf. and Com. Systems of Road Vehicles	5	2 – 0 – 1
31529	Standards for Electrical Engin. Products	5	2 – 1 – 0
31562	Diagnostics of Electrical Equipment	4	2 – 1 – 2
31513	Sensors for Technical Praxis	5	2 – 1 – 2
31401	Applied Electrical Engineering	4	2 – 1 – 2
Courses at the other Faculties			
11P103	Electronics RV and Comm. Technique	1	2 – 0 – 2
11P104	Electrical Engineering	2	2 – 0 – 2
11P105	Electrical Engineering	2	2 – 0 – 1
11P106	Electrical Engineering	2	2 – 1 – 0
12P105	Electrical Engineering	2	8 – 0 – 8
12P106	Electrical Engineering	2	16 – 0 – 0
2B047	Electrical Engineering	4	2 – 0 – 2
2B047	Electrical Engineering	4	2 – 1 – 1
2B083	Electrical Engineering HV	5	2 – 0 – 2
2B083	Electrical Engineering HV	6	2 – 2 – 0
2B047	Electrical Engineering	5	16 – 6 – 0
2B047	Electrical Engineering	5	18 – 4 – 0
2B070	Electrical Engineering	4	16 – 6 – 0

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the other Faculties		*(L) lessons - (S) seminars - (LE) lab. exercises	
2B083	Electrical Engineering HV	6	18 – 6 – 0
2B083	Electrical Engineering HV	6	10 – 6 – 0
92043	Electrical Engineering	3	2 – 0 – 1
92043	Electrical Engineering	3	2 – 0 – 1
92265	Electrical Engineering and fire safety	6	2 – 1 – 0
97043	Electrical Engineering	3	12 – 0 – 0
97265	Electrical Engineering and fire safety	6	12 – 0 – 0

Master Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
32115	Modelling of Electromagnetic Field	1	1 – 0 – 2
Courses at the other Faculties			
13P101	Electrical Engineering HV	1	2 – 1 – 0
14P101	Electrical Engineering HV	1	16 – 0 – 0

Research & Development

Research activities at the Department are aimed mainly to the following areas: diagnosis methods and systems for power transformers testing using modern measuring systems and tools, infrared analysis (thermo-diagnostics) with scanning of thermal field of power electrical and telecommunication equipment and their modelling, simulations and medical applications of thermovision, sensors for technical applications.

Recently the research programme has been extended to electromagnetic non-destructive testing and evaluation of metals and dielectric materials. Research covers also optimization of methods for materials dielectric properties investigation in high-frequency range and possibilities of microwave technique utilization in medical diagnosis and therapeutic applications and in optimization of radiocommunication equipments.

Laboratory of diagnostics for electrical machines

The research is oriented towards diagnostics and monitoring for oil power transformers. The infrastructure includes sensor of gas and moisture Hydran M2, optical system of temperature measurement NEOPTIX T-GUARD, temperature control panel ALMEMO 5690-2M for monitoring and temperature measurement of external probes and diagnostic system DOBLE M5100 for frequency measurement of transformers using SFRA method.

Laboratory of electrical materials

The activities are focused on research of magnetic properties of transformer and dynamo plates, potting of epoxy resins for prototype parts and components of electrical machines, testing of partial discharges. The equipment includes BROCKHAUS MPG100D for measurement of magnetic properties of transformer and dynamo plates, potting equipment MK

Technology System 2, testing chamber of partial discharges MPS System 20 kV.

Co-operation

Co-operation Partners in Slovakia

- Slovak University of Technology, Faculty of Electrical Engineering and Information Technology, Bratislava
- Slovak University of Technology, Faculty of Mechanical Engineering, Bratislava
- Technical University of Košice, Faculty of Electrical Engineering and Informatics, Košice
- Alexander Dubcek University, Faculty of Mechatronics, Trenčín
- Comenius University, Bratislava, Jessenius Faculty of Medicine, Martin
- Lambda Controls, s.r.o., Liptovský Hrádok
- Stredoslovenská energetika a.s. Žilina
- EVPÚ, a.s., Nová Dubnica
- ZŤS Elektronika, s.r.o., Nová Dubnica
- ŽOS Vrútky, a.s., Vrútky
- OTC, s.r.o., Hlohovec
- BEZ Transformátory, a.s., Bratislava
- Motocentrum, s.r.o. Žilina
- Slovenská teplárenská, a.s., Žilina
- Tepláreň, a.s. Považská Bystrica
- INA Kysuce, a.s. Kysucké Nové Mesto
- Slovenský vodohospodársky podnik, š.p. Banská Štiavnica
- HESIA s.r.o. Bratislava
- KIA Motors Slovakia, s.r.o. Žilina

International co-operation Partners

- VŠB - Technical University, Ostrava, CR
- University of West Bohemia, Faculty of Electrical Engineering, Plzen, CR
- Czech Technical University, Faculty of Mechanical Engineering, Prague, CR
- University of Defence, Brno, CR
- Politechnika Gliwice, Faculty of Electrical Engineering, Poland
- Politechnika Radom, Faculty of Transport, Radom, Poland
- Politechnika Lublin, Faculty of Electrical Engineering and Informatics, Lublin, Poland
- Politechnika Gdansk, Faculty of Electrical and Control Engineering, Gdansk, Poland
- West Pomeranian University of Technology Szczecin, Poland
- LMU Munich, Germany
- NIRD for Technical Physics Iasi, Romania
- EN-CENTRUM s.r.o., Praha, CR
- TMV SS, s. r.o., Praha, CR
- ETM – Ing. Pavel Hála, Brno, CR
- Školicí středisko Bosch - Automobilová technika, CR
- Nova Partner, s.r.o. Český Brod, CR
- Haefely-Tettex-Hipotronics Praha, CR
- Energo-Complex Sp. Z o.o., Poland

Visitors to the Department

Name	Institution	Length of stay
Mikołaj Bartłomiejczyk	Politechnika Gdanska, Poland	1 day
Raimond Grimberg	NIRDTP, Iasi, Romania	2 days
Adriana Savin	NIRDTP, Iasi, Romania	5 days
Pawel Zhukovski	Politechnika Lubelska, Poland	5 days
Václav Mentlík	ZČU, FEL, Plzeň, CR	6 days
Pavel Trnka	ZČU, FEL, Plzeň, CR	6 days

Visits to Foreign Institutions

Name	Institution	Length of stay
Martin Brandt	ZČU, FEL, Plzeň, CR	3 days
Dagmar Faktorová	Lublin University of Technology, Zakopane, Poland	5 days

	VUT, Brno, Rome, CR	6 days
	Laval University, Quebec City, Canada	6 days
	ZČU - Plzeň, Roztoky u Křivoklátu, CR	4 days
	Sv. Cyril and Methodius University – Skopje, Ohrid, Macedonia	5 days
	NIRDTP, Iasi, Romania	8 days
Miroslav Gutten	Lublin University of Technology, Poland	4 days
	The West Pomeranian U. of Tech.,Szczecin, Kolobrzeg, Poland	4 days
	ZČU, FEL, Plzeň, CR	3 days
	BNTU, Minsk, Belarus	3 days
	Univerzita Pardubice, Moravská Třebová, CR	3 days
Richard Janura	ZČU, FEL, Plzeň, CR	3 days
Jozef Jurčík	Lublin University of Technology, Poland	12 days
Daniel Korenčiak	Politechnika Gdanska, Poland	5 days
Matej Kučera	Politechnika Gdanska, Poland	5 days
	Univerzita Pardubice, Moravská Třebová, CR	3 days
Milan Šebök	Politechnika Gdanska, Poland	5 days
	BNTU, Minsk, Belarus	3 days
Ján Poliak	ZČU, FEL, Plzeň, CR	3 days
	Univerzita Pardubice, Moravská Třebová	3 days

Other Activities

Membership in International Institutions /Committees

Dagmar Faktorová	Program Committee of Conference EDS 2013 – Electronic Devices and Systems, Brno, CR
	Scientific Committee of the Conference RCITD 2013 – Research Conference in Technical Disciplines, Zagreb, Croatia
	Scientific Committee of the Conference EIIC 2013 – Electronic International Interdisciplinary Conference, Praha, CR
	IEEE, New York, USA
Miroslav Gutten	PAK - Pomiary Automatyka Kontrola/Measurement Automation Monitoring – member of the editorial board
	Education Journal (EDU) – member of the editorial board
	International journal for traffic and transport (IJTTE) – member of the editorial board
	Scientific Committee of the Conference „Transformators in Operation", Kołobrzeg, Poland, 2013
	Scientific Committee of the Conference „New Electrical and Electronic Technologies and their Industrial Implementation", Zakopane, Poland, 2013
	Scientific Committee of the Conference „Results and Solutions of Young R & S for Innovations and Progress", 2013, TU-VSB Ostrava, CR
	Scientific Committee of the Conference „Instrumentation 2013", Minsk, Belarus
Milan Šimko	International Journal for Traffic and Transport Engineering (IJTTE), Beograd, Serbia – member of the editorial board
	Eletrotechnický magazín Etm, CR – member of the editorial board
Milan Chupáč	Eletrotechnický magazín Etm, CR – member of the editorial board

Membership in National Institutions/Committees

Dagmar Faktorová	Slovak Medical Association, section: Company of Biomedical Engineering and Medical Informatics, Bratislava
Miroslav Gutten	Council of Higher Education Institutions, Bratislava

Membership in University Boards

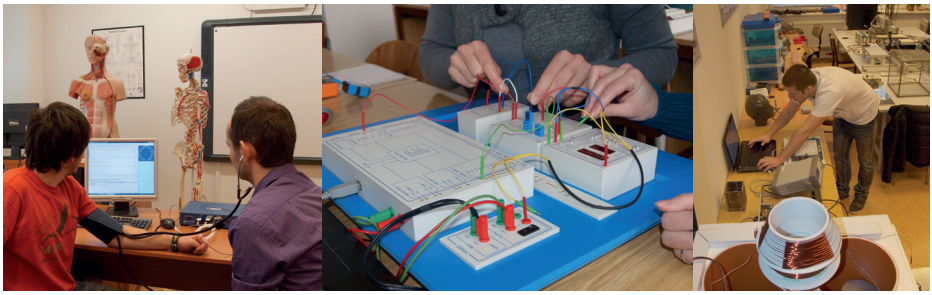
Dagmar Faktorová	Branch Committee for PhD. study field Theory of Electrical Engineering, Faculty of Electrical Engineering
Miroslav Gutten	Academic Senate of the Faculty of Electrical Engineering Scientific Board of the Faculty of Electrical Engineering Executive Committee KAP EF College of the Dean of the Faculty of Electrical Engineering
Daniel Korenčiak	Informatics Council of the Faculty of Electrical Engineering Academic Senate of the Faculty of Electrical Engineering
Milan Šebök	Working Committee of the VTS, University of Žilina
Ján Poliak	Auditing Committee of the VTS, University of Žilina Faculty Branch Committee for PhD. study field Transportation, Faculty of Operation and Economics of Transport and Communications

Contact Address

Department of Measurement and Applied Electrical Engineering **EN**
Faculty of Electrical Engineering
University of Zilina
Univerzitná 1, 010 26 Žilina
Slovak Republic
Phone: +421 41 513 2129
Fax: +421 41 513 1529
E-mail: kmae@fel.uniza.sk
www: http://fel.uniza.sk/kmae

Katedra merania a aplikovanej elektrotechniky **SK**
Elektrotechnická fakulta
Žilinská univerzita
Univerzitná 1, 010 26 Žilina
Slovenská republika
Phone: +421 41 513 2129
Fax: +421 41 513 1529
E-mail: kmae@fel.uniza.sk
www: http://fel.uniza.sk/kmae

Department of Electromagnetic and Biomedical Engineering



General Information

The original name of the department, founded in 1953 as a part of the Faculty of Electrical Engineering at the University of Railways in Prague, was the Department of Theoretical Electrical Engineering and Electric Machines.

After separating the Electric Machines' section, the education orientation of the Department was partly changed. For that reason the department was renamed to the Department of Theoretical Electrical Engineering in 1986. Since 1989, after spreading the teaching subjects to non-electrical branches of study of other faculties at the University of Žilina, the department was renamed to the Department of Theoretical and Applied Electrical Engineering.

Due to reorganization in 2005 the department has been divided into two independent departments which are Department of Electromagnetic and Biomedical Engineering (DEBE) and the Department of Measurement and Applied Electrical Engineering.

At present, the Department of Electromagnetic and Biomedical Engineering has two divisions. The Division of Electromagnetic Engineering provides courses and lectures of Theory of Electrical Engineering 1, B, 2, 3, Selected Topics from Theory of Electrical Engineering, Selected Chapters from Electromagnetic Theory, Fundamentals of Electromagnetic Compatibility, and Electromagnetic Compatibility for the students of the Faculty of Electrical Engineering. The Division of Biomedical Engineering provides teaching of some interdisciplinary and special subjects for the students of Biomedical Engineering (BME) study field. There are mainly the following subjects: Sensors and Measuring Methods in BME, Wave Processes in BME, Modelling and Simulation in BME, Signal Processing in Medicine, Biomedical Image Processing, Technical Means of Medicine, Radiation and Protection against Radiation, Instrumentation in Medicine, Fundamentals of Ecology, Bachelor's Project 1 and 2, Bachelor's Thesis BME, Diploma Project, Diploma Seminar and Diploma Thesis.

After the official accreditation of the master programme Biomedical Engineering in 2000 at the Faculty of Electrical Engineering, the department became the responsible one for the education and professional level of the study programme BME. In 2004 the Biomedical Engineering study programme was reaccredited for two grades study - Bachelor and Master degrees and the study programme in both grades has been approved by the last complex accreditation of the University of Žilina in 2009. The DEBE is the main guarantee of the study programme BME.

Along with the BME, the Department of Electromagnetic and Biomedical Engineering is the main one responsible for the postgradu-

ate doctoral programme Theory of Electrical Engineering (TEE). The staff of DEBE guarantees and provides the courses for the PhD. study in TEE. The study programme TEE has also been approved by the last complex accreditation of the University of Žilina in 2009. The Faculty of Electrical Engineering repeatedly obtained the rights to habilitate associate professors and to inaugurate full professors in this study field along with. The DEBE guarantees the above mentioned processes.

The research activities of the department are aimed mainly to the following topics: investigation of electromagnetic field and its interactions with various media, methods and tools of material non-destructive evaluation, problems of electromagnetic compatibility and biocompatibility, biomedical sensors and modelling, simulations of dynamic biological systems mainly for the use in medical diagnostics and electromagnetic field influence on living organisms.

Staff of the Department

Head of the Department:	**Klára Čápová**
Vice-head of the Department:	Ladislav Janoušek
Secretary:	Daniela Gombárska
Administrative Support:	Ester Kyselová

Sections of the Department

Section of Electromagnetic Engineering

Head of the Section:	Mariana Beňová
Professors:	Klára Čápová
Associate Professors:	Ladislav Janoušek, Mariana Beňová
Research Fellows:	Milan Smetana, Tatiana Strapáčová
Senior Lecturers (with PhD):	Vilibalda Darmová, Stanislav Hurta

Section of Biomedical Engineering

Head of the Section:	Daniela Gombárska
Professors:	Ivo Čáp
Research Fellows:	Ján Barabáš (until 2nd November 2013), Roman Radil
Senior Lecturers (with PhD):	Branko Babušiak, Michal Gála,Daniela Gombárska, Zuzana Pšenáková

External teachers (Biomedical Engineering)

Professors:	Kamil Javorka[1)], Ján Jakuš[1)], Ján Lehotský[1)], Anton Lacko[2)]
Associate Professors:	Viera Jakušová[1)], Michal Javorka[1)], Yvetta Mellová[1)], Martin Péč[1)], Ivan Poliačeк[1)]
Senior Lecturers:	Juraj Čáp[1)], Peter Štiak[1)], Ľubomír Kočner[3)], Štefan Pavlus[4)]

[1)] Jessenius Medical Faculty of the Comenius University in Martin
[2)] Faculty of Health Care, Catholic University in Ružomberok
[3)] Central Military Hospital in Ružomberok
[4)] Hospital with Policlinic in Žilina

External teachers (others)

Senior Lecturers:	Juraj Makarovič

Postgraduate Students

Internal (full-time):	Viera Pernišová, nee Maťková (until 31st August 2013), Štefan Borik, Ivona Malíková, Andrea Štubendeková (from 1st September 2013), Ivana Gálová (from 1st September 2013)

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			*(L) lessons - (S) seminars - (LE) lab. exercises
31205	Theory of Electrical Engineering 1	2	3 – 3 – 0
31206	Theory of Electrical Engineering B	2	3 – 3 – 0
31211	Seminar of TEE1	2	0 – 2 – 0
31314	Theory of Electrical Engineering 2	3	3 – 3 – 1
31316	Selected Topics from Theory of Electrical Engineering	3	2 – 1 – 0
31324	Seminar of TEE2	2	0 – 2 – 0
31439	Sensors and Measuring Methods in BME	4	2 – 0 – 1
31442	Theory of Electrical Engineering 3	4	3 – 2 – 0
31518	Bachelor's Project 1 BME	5	0 – 0 – 4
31543	Wave Processes in BME	5	2 – 2 – 0
31601	Bachelor's Thesis BME	6	0 – 2 – 0
31603	Bachelor's Project 2 BME	6	0 – 3 – 0
Within the framework of cooperation with external teachers from the Jessenius Medical Faculty of the Comenius University in Martin following courses for students of BME are provided:			
31106	Fundamentals of Anatomy and Histology 1	1	2 – 0 – 2
31207	Fundamentals of Anatomy and Histology 2	2	2 – 0 – 2
31304	Medical Biology	3	2 – 0 – 2
31423	Medical Biophysics	4	2 – 0 – 2
31448	Fundamentals of Biochemistry	4	2 – 0 – 2
31553	Fundamentals of Physiology and Pathological Physiology 1	5	2 – 0 – 2
31629	Fundamentals of Physiology and Pathological Physiology 2	6	4 – 0 – 4

Master Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering			*(L) lessons - (S) seminars - (LE) lab. exercises
32114	Modelling and Simulation in BME	1	2 – 0 – 2
32135	Selected Chapters from Electromagnetic Theory	1	3 – 2 – 0
32138	Fundamentals of Electromagnetic Compatibility	1	2 – 1 – 0

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering			*(L) lessons - (S) seminars - (LE) lab. exercises
32141	Biomedical Image Processing Neural Network	1	2 – 0 – 2
32214	Information Systems in Medicine	2	2 – 0 – 2
32220	Neuron networks	2	2 – 0 – 1
32245	Radiation and Protection against Radiation	2	1 – 0 – 1
32246	Signal Processing in Medicine	2	2 – 2 – 1
32310	Electromagnetic Compatibility	3	2 – 0 – 1
32334	Diploma Project	3	0 – 8 – 0
32402	Diploma Thesis	4	0 – 2 – 0
32404	Diploma Seminar	4	0 – 5 – 0
32426	Fundamentals of Ecology	4	4 – 4 – 0
Within the framework of cooperation with external teachers from the Jessenius Medical Faculty of the Comenius University in Martin, the Faculty of Health Care of the Catholic University in Ružomberok, the Central Military Hospital in Ružomberok, the Hospital with Policlinic in Žilina and others experts following courses for the students of BME are provided:			
32206	Technical Means in Medicine	2	2 – 0 – 2
32244	Basic Diagnostic and Therapeutic Methods in Medicine	2	2 – 0 – 2
32304	Bioethics and Medical Ethics	3	2 – 2 – 0
32319	Management of Health Services	3	2 – 2 – 0
32331	Instrumentation in Medicine	3	0 – 2 – 0
32140	Methods of Systematic Design	2	2 – 1 – 0

Research & Development

Within the framework of research in the field of electromagnetic methods the researchers of the department deal with the study of electromagnetic fields and electromagnetic phenomena. Scientific activities are concentrated mainly on problems of electromagnetic methods for non-destructive evaluation of conductive materials, primarily on eddy current testing. There are performed not only computer simulations but also experimental measurements and verifications within the frame of projects solutions. New possibilities of signal detection are investigated, mainly the use of advanced detection sensors and new ways of eddy current excitation.

In the laboratory of electromagnetic methods are realized comprehensive measurements for investigation of influence of low frequency electromagnetic field (EMF) on biological structures.

The laboratory of biomedical engineering (BME) offers the base for the study and research in the field of technical and information support of biomedicine. The research of BME is concentrated in the field of EM influence on living organisms, on modelling and computer simulations of physiological systems, especially of human haemodynamics and on biomedical signal processing including image processing and analysis.

Laboratory of electromagnetic methods (EMM)

The laboratory of EMM is determined mainly for the solution of department research. Its facilities and devices enable to solve research problems in the field of applied electromagnetism. At present there are investigated the problems of electromagnetic non-destructive testing of materials and of the EMF influences on biological structures and other systems.

Laboratory of Biomedical Engineering (BME)

The laboratory of BME at the department was originally determined for specialized education within the frame of the new established study field of BME. But now the laboratory activities are oriented to the research as well and now it is used also for the investigation selected problems of applied biomedicine, medical signal processing and also for elaboration bachelor, master and doctoral thesis.

Laboratory of Experimental Electrical Engineering (EEE)

The laboratory of EEE was established for the goals of education – experimental tasks and measurements for application both of theory of electrical engineering and sensors and special measuring methods in biomedical engineering.

Co-operation

Co-operation Partners in Slovakia

- Technical University, Košice
- Slovak Technical University, Bratislava
- Medical Faculty of the Comenius University, Bratislava
- Jessenius Medical Faculty of the Comenius University, Martin
- Faculty of Health Care, Catholic University in Ružomberok, Ružomberok
- Central Military Hospital, Ružomberok
- University of A. Dubček, Trenčín
- Technical University in Zvolen, Zvolen
- Department of Electronics, Academy of Armed Forces, Liptovský Mikuláš
- Constantine the Philosopher University in Nitra, Nitra
- Institute of Measurement Science SAS, Bratislava
- Slovak Institute of Metrology, Bratislava
- Hospital with Policlinic, Žilina
- Hospital of Jessenius Medical Faculty of the Comenius University, Martin
- ŽSR, Headquarters, Infrastructure Management Department, Bratislava
- Railway Institute for Research and Development, Žilina
- Slovcert, s.r.o. Bratislava

International co-operation Partners

- Tokyo University, Tokyo, Japan
- Tohoku University, Tohoku, Japan
- IIU Corp., Tokyo, Japan
- University of Kanazawa, Kanazawa, Japan
- Technical University RWTH, Aachen, Germany
- University of Technology, Compiegne, France
- Technical University, Graz, Austria
- National University of Ireland, Dublin, Ireland
- Xi'an Jiaotong University, School of Aerospace, Xi'an, China
- Czech Technical University, Prague, Czech Republic
- Technical University VŠB, Ostrava, Czech Republic
- Technical University, Brno, Czech Republic
- University of West Bohemia, Plzeň, Czech Republic
- Academy of Science, Prague, Czech Republic
- Norwegian University of Science and Technology, Trondheim, Norway
- Faculty of Education, University of Hradec Králové, Hradec Králové, Czech Republic
- Faculty of Science, University of Ostrava, Ostrava, Czech Republic
- Politecnico di Milano, Dipartmento di Meccanica, Milan, Italy
- AGUSTAWESTLAND, Samarate, Italy
- VITROCISET, Rome, Italy
- Consorzio Milano Ricerche, Milan, Italy
- SINTEF ICT, Dept. for Optical Measurement Systems and Data Analysis, Trondheim, Norway

- AGH University of Science and Technology, Department of Telecomunications, Krakow, Poland
- University of Patras, Department of Mechanical Engineering and Aeronautics, Patras, Greece
- Department of Electrical and Computer Engineering, Michigan State University, East Lansing, USA
- Nondestructive Testing Department, National Institute of Research and Development for Technical Physics, Iasi, Romania

Visitors to the Department

Name	Institution	Length of stay
Vladimír Blažek	TU RWTH Aachen, Germany	8 days
Ivo Doležel	FEL ZČU Plzeň, Czech Republic	2 days
Mihai Iulian Rebican	University Politehnica of Bucharest, Romania	10 days
Anton Duca	University Politehnica of Bucharest, Romania	5 days
Martin Černý	VŠB-TU Ostrava, Czech Republic	5 days
Martin Augustynek	VŠB-TU Ostrava, Czech Republic	5 days

Visits to Foreign Institutions

Name	Institution	Length of stay
Klára Čápová	Technical University of Denmark, Copenhagen, Denmark	9 days
	ČVUT Prague, Czech Republic	3 days
Ivo Čáp	Université du Luxembourg	8 days
	Technical University of Denmark, Copenhagen, Denmark	9 days
Ladislav Janoušek	European Commission, Brussels, Belgium	2 days
	University of West Bohemia, Pilsen, Czech Republic	4 days
	University Politehnica of Bucharest, Romania	9 days
	Hellenic Armed Forces Club, Athens, Greece	4 days
	Austrian Institute of Technology, Vienna, Austria	2 days
Mariana Beňová	University of West Bohemia, Pilsen, Czech Republic	4 days
Michal Gála	VŠB-TU Ostrava, Czech Republic	10 days
Branko Babušiak	VŠB-TU Ostrava, Czech Republic	10 days
Milan Smetana	University of West Bohemia, Pilsen, Czech Republic	4 days
	University Politehnica of Bucharest, Romania	9 days
Tatiana Strapáčová	University of West Bohemia, Pilsen, Czech Republic	4 days
	University Politehnica of Bucharest, Romania	9 days
Štefan Borik	Institut für Biomedizinische Technik und Informatik, TU Ilmenau, Ilmenau, Germany	60 days
Ivona Malíková	Institut für Biomedizinische Technik und Informatik, TU Ilmenau, Ilmenau, Germany	60 days

Other Activities

Invited Lectures/Papers

Intelligent textiles in biomedicine
Lecturer: Michal GÁLA
Where: VŠB-TU Ostrava, CZ
Date: 13th June 2013

Study at University of Zilina
Lecturer: Branko BABUŠIAK
Where: VŠB-TU Ostrava, CZ
Date: 14th June 2013

Intelligent textiles (Intelligent threads, Intelligent fabrics, Textile sensors)
Lecturer: Michal GÁLA
Where: VŠB-TU Ostrava, CZ
Date: 17th June 2013

Non-contact ECG measurement
Lecturer: Michal GÁLA
Where: VŠB-TU Ostrava, CZ
Date: 18th June 2013

Advanced segmentation methods of biomedical images - tumor localization
Lecturer: Branko BABUŠIAK
Where: VŠB-TU Ostrava, CZ
Date: 19th June 2013

Membership in International Institutions /Committees

Klára Čápová	International Society COMPUMAG, Southampton, UK Editorial Board of the international scientific journal Advances in Electrical and Electronic Engineering, ISSN 1804-3119, Ostrava,Czech Republic ENDE Standing Committee Member (International Workshop on Electromagnetic Non-Destructive Evaluation) Programme Committee of the international scientific joint conference CPEE – AMTEE 2013, Roztoky u Křivoklátu, September 4 - 6, 2013, Czech Republic
Ivo Čáp	Branch Committee for PhD. study field "Theory of Education of Physics", Pedagogical Faculty, University of Hradec Králové, Czech Republic Branch Committee for PhD. study field "Theory of Education of Physics", Faculty of Science, University of Ostrava, Czech Republic Editorial Board of the journal Československý časopis pro fyziku, Academy of Sciences of CR, Prague, Czech Republic Editorial Board of the journal ARNICA, University of West Bohemia, Plzeň, Czech Republic International Board of EUSO (European Union Science Olympiad), Dublin, Ireland International Board of the IPhO 2013 (International Physics Olympiad), Copenhagen, Denmark
Ladislav Janoušek	Japanese Society for Non-Destructive Inspection, Tokyo, Japan Program Committee of the 7th Framework Programme – Regions of Knowledge, Research Potential, Brussels, Belgium Programme Committee of the international scientific joint conference CPEE – AMTEE 2013, Roztoky u Křivoklátu, September 4 - 6, 2013, Czech Republic

Membership in National Institutions/Committees

Klára Čápová	Editorial Board of the international scientific journal Journal of Electrical Engineering, ISSN 1335-3632, Bratislava Scientific Board of Jessenius Medical Faculty CU, Martin Branch Committee for the PhD. study field "Theory of Electrical Engineering", FEI STU, Bratislava Branch Committee for the PhD. study field "Medical Biophysics", Jessenius Medical Faculty CU, Martin Branch Committee for the PhD. study field "Bionics and Biomechanics", FME TU, Košice

	PhD. supervisor in the study field "Bionics and Biomechanics", FME TU, Košice
	PhD. supervisor in the study field "Biomedical Engineering", FME TU, Košice
	Supervisory Board of the Slovak Medical Society, section of Biomedical Engineering and Medical Informatics, Bratislava
	Scientific Committee of the International Conference Trends in biomedical engineering 2013, Vysoké Tatry, July 2013
	Scientific Committee of the International Conference Transcom 2013, Žilina, June 2013
	Local organizing committee Chairman of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013
Ivo Čáp	Branch Committee for the PhD. study field "Physics of Condensed Matter and Acoustics", Faculty of Science, UKF, Nitra
	Branch Committee for the PhD. study field "Medical Biophysics", Jessenius Medical Faculty CU, Martin
	PhD. supervisor in the field "Medical Biophysics", Jessenius Medical Faculty CU, Martin
	National coordinator of the European Union Science Olympiad, Ministry of Education, Bratislava
	Head of the Slovak Committee of Physics Olympiad, Ministry of Education, Bratislava
	Head of Preparation of the Representation Team for International Physics Olympiad, Ministry of Education, Bratislava
	Vice-head of the Central Committee of the Slovak Mathematics and Physics Association, Bratislava
	Committee of the Slovak Medical Society, section of Biomedical Engineering and Medical Informatics, Bratislava
	Local organizing committee of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013
Ladislav Janoušek	FP7 support system for specific programme Regions of Knowledge, Research Potential, Ministry of Education, Bratislava
	Local organizing committee – Co-Chairman of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013
Branko Babušiak	Local organizing committee of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013
Ján Barabáš	Organizing Committee of the International Conference Transcom 2013, Žilina, June 2013
Vilibalda Darmová	Slovak Medical Society, section of Biomedical Engineering and Medical Informatics, Bratislava
Michal Gála	Local organizing committee of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013
D. Gombárska	Local organizing committee of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013
Zuzana Pšenáková	Slovak Medical Society, section of Biomedical Engineering and Medical Informatics, Bratislava
Milan Smetana	Local organizing committee of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013

T. Strapáčová	Local organizing committee of International Workshop on Electromagnetic Non-Destructive Evaluation (ENDE 2013), Bratislava, June 2013

Membership in University Boards

Klára Čápová	Scientific Board of the Faculty of Electrical Engineering College of the Dean of the Faculty of Electrical Engineering Academic Senate of the Faculty of Electrical Engineering Main Guarantee of the PhD. Degree (3rd grade) study field "Theory of Electrical Engineering", Faculty of Electrical Engineering Main Guarantee of the procedures to habilitate and to inaugurate in the study field "Theory of Electrical Engineering", Faculty of Electrical Engineering Head of the Branch Committee for the PhD. study field "Theory of Electrical Engineering", Faculty of Electrical Engineering Branch Committee for the PhD. study field "Marginal States of Materials", Faculty of Mechanical Engineering Administrative council of KAP, Faculty of Electrical Engineering PhD. supervisor in the study field „Theory of Electrical Engineering", Faculty of Electrical Engineering
Ivo Čáp	Scientific Board of the Faculty of Electrical Engineering Scientific Board of EDIS publishing of the University of Žilina Main Guarantee of the Bachelor and the Master Degree (1st and 2nd grade) study field "Biomedical Engineering", Faculty of Electrical Engineering Branch Committee for the PhD. study field "Theory of Electrical Engineering", Faculty of Electrical Engineering PhD. supervisor in the study field „Theory of Electrical Engineering", Faculty of Electrical Engineering
Ladislav Janoušek	Scientific Board of the Faculty of Electrical Engineering Advisory Board of Dean of the Faculty of Electrical Engineering Co-Guarantee of the PhD. Degree (3rd grade) study field "Theory of Electrical Engineering", Faculty of Electrical Engineering Co-Guarantee of the procedures to habilitate and to inaugurate in the study field "Theory of Electrical Engineering", Faculty of Electrical Engineering Branch Committee for the PhD. study field "Theory of Electrical Engineering", Faculty of Electrical Engineering PhD. supervisor in the study field „Theory of Electrical Engineering", Faculty of Electrical Engineering
Mariana Beňová	PhD. supervisor in the study field „Theory of Electrical Engineering", Faculty of Electrical Engineering
Milan Smetana	Executive council of KAP, Faculty of Electrical Engineering

Awards

- Plaque J. A. Commenius awarded by Faculty of Electrical Engineering for meritious teaching activities: Klára Čápová
- Small medal St. Gorazd awarded by Minister of Education: Ivo Čáp
- 1st rank in Students competition in Science and Technology (ŠVOS) with the work: Device for position measurements consisting of six degrees of freedom: Štefan Borik

Contact Address

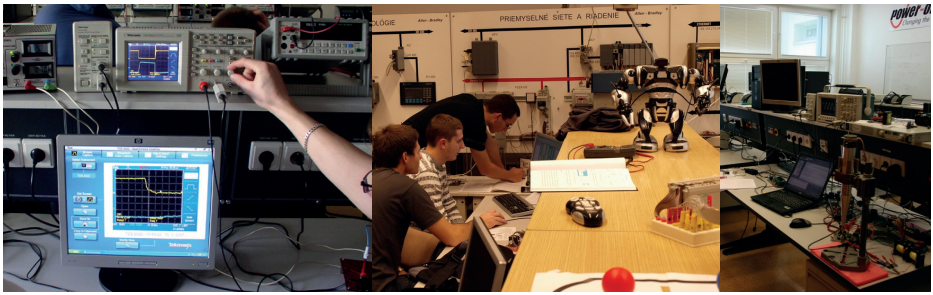
EN

Department of Electromagnetic and Biomedical Engineering
Faculty of Electrical Engineering
University of Žilina
Univerzitná 1, 010 26 Žilina
Slovak Republic
Phone: +421 41 513 2101
E-mail: ktebi@fel.uniza.sk
www: http://fel.uniza.sk/ktebi

SK

Katedra teoretickej elektrotechniky a biomedicínskeho inžinierstva
Elektrotechnická fakulta
Žilinská univerzita v Žiline
Univerzitná 1, 010 26 Žilina
Slovenská republika
Phone: +421 41 513 2101
E-mail: ktebi@fel.uniza.sk
www: http://fel.uniza.sk/ktebi

Department of Mechatronics and Electronics



General Information

Department of Mechatronics and Electronics (DME) 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 at 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, microcomputer systems involving industrial controllers and power electronics at the Faculty of Electrical Engineering, and also at further faculties of the University of Zilina. 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 has also 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 electromagnetic 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 three high-tech workplaces dedicated for research and development activities and to experimental part of PhD study. They include laboratory of power electronics, the laboratory of digital image processing and laboratories of digital signal processors and industrial programmable logic controllers.

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

Sections of the Department

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 Koniar, 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

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

Postgraduate Students

Internal (full-time):	Stanislav Štofan (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 Šištík, Peter Jeck, Ivan Lovás, Andrej Kaňovský, Jaroslav Ilončiak, Matej Bielik, Erika Záhorcová Polčanová, Zuzana Ridzoňová, Daniela Hívešová, Marián Novota, Anna Bystričanová Holásková

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			*(L) lessons - (S) seminars - (LE) lab. exercises
31302	Electronics I	3	2-0-3
31212	Introduction to Industry Automation and Mechatronics	1;3	1-0-3
31402	Automatic Regulation	1	4 2-2-0
31413	Electric Light and Heat	4	2-1-1
31414	Electromagnetic Compatibility	4	2-2-0
31415	Electronics II	4	2-0-3
31426	Measurement of Non-Electric Parameters	4	2-0-2
31427	Power Supplies	4	2-0-1
31430	Computers in Industrial Automation	4	2-0-2
31502	Power Electronics	5	3-1-2
31511	Microprocessor Technology	5	3-0-2
31524	Logical Circuits	5	3-0-2
31528	Multimedia Technology	5	2-0-1
31542	Image Processing and Analysis	5	2-0-2
31552	Computer and Office Technique	5	2-0-1
31556	Mechatronics	5	2-0-2
31557	Automatic Regulation	2	5 2-1-1
31563	Design of Electronic Devices	6	2-2-6
31628	Power Semiconductor Systems	6	3-1-1
31630	Bachelor Project Power Electronic Systems	6	0-0-6
31634	Bachelor Project Mechatronic Systems	6	0-0-6

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Mechanical Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
2B092	Drives of Mechatronic Systems	5	2-0-1
2B127	Electronics	6	2-0-2

Master Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
32107	Electromagnetic Compatibility in Electr.	1	2-2-0
32111	Information and Industrial Networks	1	2-0-2
32117	Design of ASIC	1	1-3-0
32119	Computers in Industrial Automation 2	1	2-0-2
32126	Control of Electric Actuators	1	3-1-1
32129	Theory of Automatic Control 1	1	2-1-1
32136	Power Semiconductor Converters	1	3-0-3
32200	Analysis and Synthesis of PE Circuits	2	2-2-0
32211	Measurement and Digit. Data Processing	2	2-2-0
32216	Microprocessors, Microcomputers and DSP	2	2-0-3
32233	Microproc. and Microcomputer Systems	2	3-0-3
32236	Theory of Automatic Control 2	2	2-1-1
32325	Design of ASIC	2	2-2-0
32341	Virtual Instrumentation	2,3	2-0-2
32300	Power Electronics Applications in ET & EE	3	3-0-1
32324	Design and Construction of PE Systems	3	2-2-0
32330	Semiconductor Sensors	3	2-2-0
32334	Semestral Project	3	0-4-0
31515	Mechatronic Systems	3	2-0-2
32402	Diploma Thesis PES	4	0-2-0
32404	Diploma Seminar	4	0-2-0
32405	Discrete Control of Power Systems	4	6-0-6
32406	Dispatching Systems	4	4-0-4
32416	Industrial Informatics	4	4-0-4
Courses at the Faculty of Mechanical Engineering			
2N125	Electronic Control Elements	1	2-2-0
2N244	Exploitation of Computer Networks	1	2-0-2
2N246	Microcomputer Technics	1	2-0-2
2N014	Information and Industry Networks	2	2-0-2
2N125	Electronic Control Elements	2	2-2-0
2N140	Converter Drives	3	2-2-0
2N141	Control Microcomputers	3	2-2-0

Research & Development

The Department has also 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.

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 electromagnetic compatibility belongs to main activities of the Department.

Laboratory of Electromagnetic Compatibility

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

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.

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.

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 sensorless motor position determination is realized.

Equipment of laboratory includes dSpace work station, measurement devices, oscilloscopes, function generators, power analyzer, power supplies, converters and electrical motors.

Co-operation

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
- Energo controls 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 zváračská 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

International co-operation Partners

- Universitá 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 Univesity 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 Automotion 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

Visitors to the Department

Name	Institution	Length of stay
M. Ali Rzig Abdalmula	Univ. of Aljabel Algarbi, Sabrata, Libya	21 days
Minoru Kubo	Panasonic, Kobe, Japan	1 day
Naoki Yuda	Panasonic, Japan	1 day
Norbert Glapa	Panasonic, DE	1 day
Yoshihide Kanakubo	Panasonic, DE	1 day
Nicky Nakajima	Panasonic, DE	1 day
Peter Durana	Panasonic, DE	1 day
Dmitry Kolosov	RSTU, Rostov on Don, RF	1 day
Zdeněk Halámka	ABB s.r.o., Ostrava-Hrabová, CZ	1 day
Andrea Dzidková	ABB s.r.o., Ostrava-Hrabová, CZ	1 day
Lucie Halasová	ABB s.r.o., Plzeň, CZ	1 day

Visits to Foreign Institutions

Name	Institution	Length of stay
Branislav Dobrucký	University of Catania, IT	5 days
	OPSFA 2013, Sousse, Tunis	6 days
	IASTED 2013, Banf, Alberta, CA	6 days

	ICERI 2013, Sevila, ES	5 days
Pavol Špánik	UNICT Catania, IT	5 days
	UNICT Catania, IT	7 days
Michal Frivaldský	UNICT Catania, IT	5 days
	UNICT Catania, IT	7 days
Peter Drgoňa	UNICT Catania, IT	7 days
Peter Čuboň	TCP 2014, Praha, CZ	2 days
	Poster 2014, Praha, CZ	2 days
Marek Valčo	TCP 2014, Praha, CZ	2 days
	Poster 2014, Praha, CZ	2 days
Juraj Koscelník	TCP 2014, Praha, CZ	2 days
Tomáš Laškody	TCP 2014, Praha, CZ	2 days
Martin Galád	TCP 2014, Praha, CZ	2 days
Jozef Šedo	Poster 2014, Praha, CZ	2 days
Miroslav Hrianka	Vojtek – Rudnik days, Rabka, PL	3 days
Libor Hargaš	Vojtek – Rudnik days, Rabka, PL	3 days
Dušan Koniar	Vojtek – Rudnik days, Rabka, PL	3 days

Other Activities

Specialised Lectures and Courses Organized by the Department

Power Supply Seminar

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

Freescale Seminar

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

eSeminar: Biometric Identifiers

Customer: GS1 SLOVAKIA, Department of Mechatronics and Electronics, University of Žilina
Lecturer: Pavel Pavlásek
Date: 9th December 2013

Biometric Identification Systems

Customer: GS1 SLOVAKIA, Department of Mechatronics and Electronics, University of Žilina
Lecturer: Miroslav Štaffen, Pavel Pavlásek
Date: 11th December 2013

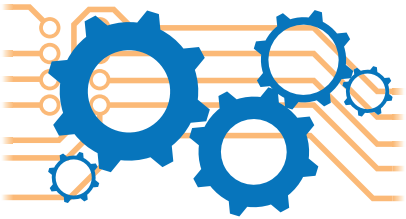
Control of Tunnel Operation Distant Education for Operators at the Bôrik Tunnel

Customer: SSC
Lecturer: Fedor Kállay
Date: November 2013

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



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 Commitee 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

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

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

Awards

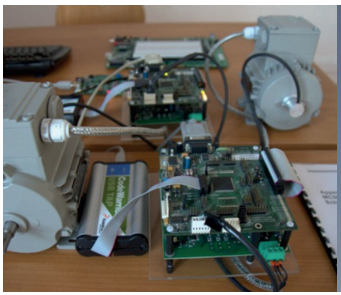
- NI days Eastern Europe, Bratislava – Automating Microscopic High-Speed Particle Analysis in Medical Applications Using DAQ, NI-IMAQ, NI LabVIEW, and Vision Software – the best Slovak contribution, research team: Dušan Koniar, Libor Hargaš, Miroslav Hrianka, Stanislav Štofan

Contact Address

Department of Mechatronics and Electronics **EN**
Faculty of Electrical Engineering
University of Žilina
Univerzitná 1, 010 26 Žilina
Slovak Republic
Phone: +421 41 513 1600
Fax: +421 41 513 1515
E-mail: kme@fel.uniza.sk
www: http://fel.uniza.sk/kme

Katedra mechatroniky a elektroniky **SK**
Elektrotechnická fakulta
Žilinská univerzita
Univerzitná 1, 010 26 Žilina
Slovenská republika
Phone: +421 41 513 1600
Fax: +421 41 513 1515
E-mail: kme@fel.uniza.sk
www: http://fel.uniza.sk/kme

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". The department graduates were formerly trained mainly for 24 and 12 FMD, for industrial plants producing electric traction equipment (Skoda Plzen, CKD Trakce Praha, ZOS Nymburk, ZOS Vrutky), 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 Electroenergetics 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 Electroenergetics, Electric Drives and Electric Traction. For PhD

degree, third study degree, the department was accredited in a study programme of Power Electrotechnics.

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

Since 1997 the department has had an accreditation for PhD degree study in a field of "Power Electrotechnics" with the following branches: Electric Drives, Electric Machines and Apparatus, Power Electronics and Electric Traction. Another field of PhD studies, "Electroenergetics," was added after complex accreditation in 2009.

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 help of European 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.

Freescale Semiconductor from 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 APVV projects recently, which have identified students, graduates and staff of the department.

Department intensively cooperate with significant companies from Slovakia. These are mainly Slovenske elektrarne, Slovenska elektrizacna prenosova sustava, Stredoslovenska energetika, EVPU Nova Dubnica, Freescale Semiconductor, SIEMENS, ZSR, SEZ Krompachy and others.

Staff of the Department

Head of the Department:	**Juraj Altus**
Vice-head of the Department:	Alena Otčenášová
Secretary for Research:	Peter Braciník
Administrative Support:	Darina Rúfusová
Technical Support:	Anna Žuffová

Sections of the Department

Section of Electroenergetics

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

Section of Electric Drives and Electric Traction

Head of the Section:	Ján Vittek
Professors:	Valéria Hrabovcová, Ján Vittek
Associate Professors:	Milan Pospíšil, Pavol Rafajdus
Research Fellows:	Pavel Lehocký, Vladimír Vavrúš
Senior Lecturers (with PhD):	Pavol Makyš, Matěj Pácha, Marek Štulrajter (1/10)

Postgraduate Students

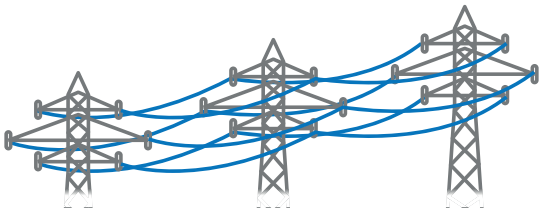
Internal (full-time):	Zdeno Biel (to 22. 8. 2013), Ján Faber (to 22. 3. 2013), Michal Hrkeľ, Daniel Hropko, Ján Ivanecký, Miroslav Kováč (to 22. 7. 2013), Peter Dúbravka, Lukáš Gorel, Marek Musák, Michal Reguľa, Dominik Szabó, from 1. 9. 2013: Michal Baherník, Roman Bodnár, Peter Butko, Tomáš Fedor, Adrián Peniak
External (part-time):	Miroslav Dubovský, Ján Sitár, Michal Janíček (from 1. 9. 2013)

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			*(L) lessons - (S) seminars - (LE) lab. exercises
31103	Business Management and Economy	1	2 – 1 – 0
31107	Basics of Electrical Engineering	1	3 – 0 – 0
31311	Informatics 2	3	2 – 0 – 2
31404	Work safety in Electrical Engineering	4	2 – 0 – 1
31408	Electricity distribution	4	2 – 1 – 1
31411	Electric Machines in English 1	4	1 – 1 – 0
31447	Production and Maintenance of Elect. Devices	4	2 – 1 – 1
31454	Electric Machines	4	4 – 1 – 2
31105	Materials and Technologies in Electric. Engineer.	4	2 – 1 – 1
31500	Electrical Power Apparatus	5	2 – 0 – 2
31501	Electric Traction 1	5	3 – 2 – 0
31507	Electroenergetics 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	3 – 0 – 2
31608	Electric Drives 2	6	3 – 1 – 1
31610	Electroenergetics 2	6	3 – 1 – 1
31615	Quality Management	6	2 – 1 – 0
31632	Application of digital signal processors 2	6	0 – 0 – 2
31633	Bachelor Project Electroenergetics	6	0 – 0 – 6
31637	Bachelor Project Electric Drives	6	0 – 0 – 6



Master Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering			*(L) lessons - (S) seminars - (LE) lab. exercises
32105	Dynamics a energetics of Electric Traction	1	2 – 2 – 0
32106	Electroenergetics in English	1	0 – 2 – 0
32121	Transmission of Electric Energy	1	3 – 1 – 1
32122	Programmable logic controllers	1	2 – 0 – 2
32123	Programming of microcontroller systems	1	2 – 0 – 2
32125	Control of Electric Drives 1	1	3 – 2 – 0
32137	Electric Energy Generation	1	3 – 1 – 1
32201	Analysis of Electric Machines	2	2 – 0 – 2
32207	Electric Traction	2	2 – 1 – 1
32208	Electric Drives in Electroenergetics	2	2 – 1 – 1
32209	Electric Substations	2	2 – 0 – 1
32210	Electroheat and light	2	2 – 2 – 0
32213	Information Systems in Electroenergetics	2	2 – 0 – 2
32218	Power Supply of Electric Railways	2	2 – 2 – 0
32224	Microcomputer Systems Programming	2	2 – 0 – 2
32228	Control of Electric Drives 2	2	3 – 2 – 0
32229	Control of Electric Power Systems	2	2 – 1 – 1
32335	Simulation languages in Electroenergetics	2	2 – 0 – 2
32231	Sensors, actuators and interfaces	2	2 – 0 – 2
32241	Calculations of electrical networks	2	2 – 2 – 0
32303	Sensorless Control of Electric Drives	3	3 – 1 – 1
32308	Discreet Control of Electric Drives	3	3 – 0 – 3
32309	Electroheat	3	2 – 2 – 0
32327	Negative Influences on Power System	3	2 – 2 – 1
32333	Control of Electric Drives 1	3	3 – 1 – 1
32334	Annual project	3	0 – 0 – 4
32336	Lighting technique	3	2 – 1 – 0
32337	Special Electric Machines	3	2 – 0 – 2
32343	Electric Traction Vehicles	3	3 – 0 – 1
32402	Diploma Thesis	4	0 – 2 – 0
32404	Diploma Seminar	4	0 – 0 – 4
32409	Economy in Electroenergetics	4	4 – 4 – 0
32412	Materials in High Voltage technology	4	4 – 0 – 4
32413	Fundamental Design in Electroenergetics	4	0 – 0 – 2
32414	Total Quality Management	4	2 – 4 – 0
Courses at the Faculty of Mechanical Engineering			
2N111	Electrical Traction Equipment	2	3 – 2 – 0

Research & Development

Scientific research activities of the Section of Electroenergetics are focused on issues

of generation, transmission and distribution of electricity. In the area of electricity generation research activities aimed at modeling the operation of renewable energy sources. Acquired knowledge is then used in the designing of simulation models for the analysis of power system operation and to optimize the deployment of these resources within the virtual block.

In the area of transmission and distribution of

electricity the scientific research activities are focused on modeling and simulation of power system operation.

Now, this work focuses on the application of the concept of intelligent networks (Smart Grids) to control the transmission and distribution system. The research focuses mainly on the issue of the use of artificial intelligence elements (expert systems, multi-agent systems) and intelligent electronic devices.

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 department of electric drives 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, Stepper Motor). Research focus can be divided into the following areas:

Sensorless control of electric 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 published on significant international conferences.

Design new progressive control methods – In this area research has focused on methods which used force dynamic control or sliding mode control. New method has been design called Hyper sliding mode control. This scheme does not need any PI controllers what means more easily 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 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.

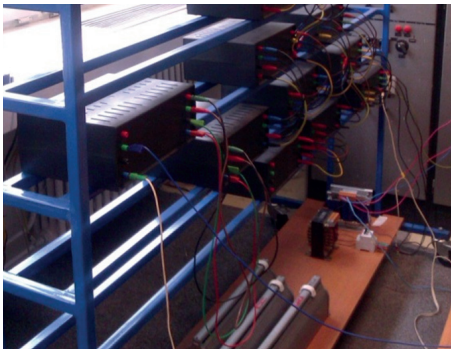
Laboratory of renewable energy sources

The function of the Laboratory of renewable energy sources is to examine essential operating characteristics especially photovoltaic and wind turbines. Aim is to take advantage of lessons learned in the development of simulation models for the analysis of power system with renewable sources.

The laboratory consists of a small wind power and photovoltaic power plant, which includes a system for predicting the production of photovoltaic power plants using image data from NOAA satellites.

Laboratory of Electroenergetics

The laboratory is used for research of Smart Grid in the area control of distribution networks. The research focuses mainly on the issue of the use of artificial intelligence elements (expert systems, multi-agent systems) and intelligent electronic devices for determining the place of failure and subsequent reconfiguration of the network in order to minimize the number of customers without electricity. For modeling and verification of new management concepts is used three-phase 22 kV line model. Model can be monitored and controlled through the computer. The model consists of modules that represent sections of cable and overhead line, remote-controlled components, electrical protection and load.



Laboratory of electric power quality

The laboratory is equipped with measurement instruments procured with support of EU funded international project "Cooperation between the University of Žilina and VSB-TU Ostrava on improving the quality of education and training of researchers in area of electrical engineering". The main purpose of the laboratory is research and PhD. thesis activities. The instruments are used for measurements in laboratory as well as for outdoor measurements. Equipment consists of three power analysers (evaluation of power quality according to STN EN 50160) and accessories (software and hardware of SCAD system), which enable online data acquisition from all three analysers, including post-analysis and data display on PC.

In the laboratory, 110 kV and 22 kV power line models will be used to study different types of interferences, their interactions and propagation.

The power line models enable 4Q energy measurements and remote data analysis using three digital energy meters.

Laboratory of electric drive control

Laboratory of control systems has been created in cooperation with Freescale 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 Freescale 56F8346 DSC 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 debugging tools Freescale USB-TAP.

Students can use other Freescale development tools as TOWER system, SLK (Student learning kits), etc. 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 at 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 invertor by VONSCH and controlled by a digital signal controller Freescale 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 EVPÚ, a.s., Nová Dubnica and supported by Slovak Research and Development Agency (APVV-99-031205). The control of power converters is handled by two Freescale MC56F8367 units. Positioning and the cutter commands use CNC Mach3 interface and software.

Laboratory NI304 – Center of Excellence of Power Electrical Systems and Materials for Their Components

In laboratory NI304, Center of Excellence projects are implemented (CEEX I a CEEX II), managed by 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.

The main aim of the projects is a financial support of the Faculty in the area of research and development to get new, high-end, unique laboratory equipment. Retrofitting laboratories with new equipment allows to establish the centers of excellence and to offer new abilities, directions and services in the research and development, followed by an increase of projects and publications number. The new equipment is also used in students' lectures and projects.

The project consists of 9 main activities; two of them were covered by IEP SAS and FEI TUKE and ended in April 2011. The laboratory NI304 has been retrofit with equipment on behalf of Activity 2.1 and 2.2. The research is focused on power electrical systems in traction, what means power converters, electric machines and control algorithms such as a robust control, quasi-optimal motion control, neural network algorithms, etc.

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 analog 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).

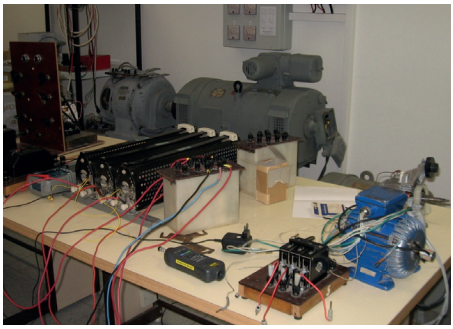
The laboratory is being equipped with another combined system of two AC induction traction motors (50 kW) driven by two converters. This stand is supported by EVPÚ, a.s., Nová DUbnica and Operational Programme Research and Development, measure 2.1 Support of networks of excellence in research and development 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 atractive 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 (ČR) and ČD, a.s., DKV Brno (ČR). 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 to measure and identify 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. Laboratory use students all three levels of education,

and of course is also used for theses or other research activities of the department.



Co-operation

Co-operation Partners in Slovakia

- STU Bratislava: Department of Electrical Machines and Devices
- STU Bratislava: Department of Electrical Power Engineering
- TU Kosice: Department of Electric Power Engineering
- TU Kosice: Department of Electrical Drives and Mechatronics
- ABB Elektro s.r.o. Zilina
- CE Qualite Slovakia Nova Dubnica
- Comenius University in Bratislava, Jessenius Faculty of Medicine in Martin
- ELTECO Zilina, Slovakia
- ELZA Zilina, Slovakia
- EVPU Nova Dubnica, Slovakia
- GI-BON Quality systems Zilina
- IBG Slovakia s.r.o.
- MARKAB spol. s r.o. Zilina
- NES Nova Dubnica
- SUTN Bratislava
- PPA Controls
- PV SZKV Zvolen
- Regional Advisory and Information Centre Povazska Bystrica
- SIEMENS
- Slovak centre of productivity Zilina, University of Zilina
- Stredoslovenska energetika, a.s. Zilina
- SEPS, a.s. Bratislava
- SEZ Krompachy
- Schneider Electric Slovakia s.r.o.
- Sungwoo hitech, s.r.o. Zilina
- Technical Testing Institute in Piesťany
- Vinuta Rajec, s.r.o.
- VUKI, a.s. Bratislava
- VUVT Engineering, a.s. Zilina
- VVUZ Vrutky
- ZSSK Division ZKV Bratislava
- ZOS Vrutky
- ZOS Zvolen
- ZSR Bratislava
- CARGO Slovakia Bratislava

International co-operation Partners

- Aalto University Helsinki, School of Science and Technology, Department of Electrical Engineering, Prof. Tapani Jokinen, FIN
- ABB Brno, s.r.o. PTPM Brno, CZ
- ABD Praha, s.r.o. zavod Technika – prof. Kejzlar, Ing. Nemecek, CZ
- AD Developments Milton Keynes, p. Frank Shepard, UK
- Appraisals Services – Forensic Institute Praha, Ing. Karel Simek, CZ
- AZD Praha, dr. Ing. Ales Lieskovsky, dr. Ing Ivo Myslivec, CZ
- Berner Fachhochschule, Hochschule für Technik und Architektur Burgdorf, prof. Jean-Pierre Steger – vizedirektor, CH
- Cinvestav Guadalajara, Dr. A. G. Loukjanov, Prof. Bernardino Castillo-Toledo, MEX
- Control Technique Dynamics, Andover, p. Suji Jayasoma, UK
- CZ Loko, a.s., Ceska Trebova, Ing. Bohumil Skala, CZ
- Ceske drahy O12 Praha, Ing. Jan Plomer, CZ
- ELCOM Praha, Ing. Jiri Korenc, Ing. Jiri Holoubek, CZ
- Freescale semiconductor, Czech Systems Laboratory, Ivan Skalka, Martin Mienkina, Peter Balazovic, Roman Filka, Ladislav Makovic, CZ
- Hochschulle für Technik und Wirtschaft,

Dresden, Fachbereiches Elektrotechnik, Prof. Dr. Ing. habil. Gerhard Hofmann, D
- Institut National des Telecommunications Paris/Evry, Dr. Jean-Pierre Vidal, Dr. J. C. Chimenez, Dr. Michele Merlier, F
- Lappeenranta University of Technology Finland, Faculty of Electric Engineering –
- prof. Juha Pyrhőnen, FIN
- Politechnika Gdańska, Prof. Krzysztof Karwowski, PL
- Politechnika Warszawa, Instytut Maszyn Elektrycznych, Prof. Ing. Jan Kacprzak, DrSc., Prof. Ing. Adam Szelag, PhD., PL
- SKODA Transportation Plzen, Ing. Milan Sramek, CZ
- SKODA Electric Plzen, dr. Ing. Ladislav Sobotka, CZ
- Technical University of Bochum, prof. Andreas Steimel, D
- Technische Universität Darmstadt, Institut für Elektrische Energiewandlung – Prof. Dr. Ing. Andreas Binder, D
- Technische Universität Dresden, Lehrstuhl Elektrische Antriebe und Grundlagen der Elektroenergietechnik – Prof. Dr. Ing. habil. P. Büchner, D
- Technische Universität Dresden, Institut für Energieversorgung und Hochspannungs-Technik – Prof. Dr. Ing. habil. Peter Schegner, D
- Technische Universität Graz, Fakultät für Elektrotechnik – Prof. Dr. Ing. Manfred Rentmeister, Institut für Elektrische Machines und Antriebe – Prof. Dr. Ing. Hansjőrg Kőfler, Institut der El. Leistungssysteme – Prof. Dr. Ing. Manfred Sakulin, A
- Technical University Cluj-Napoca, Romania - prof. Lorand SZABO, prof. Ioan-Adrian Viorel
- TECHNODAT Elektro, s.r.o. Zlín
- University of Brandford, Leeds, Dr. Li Zhang, UK
- Universita degli Studi di Catania, Dipartimento Elettrico Elettronico e Sistemistico, ITA
- University of East London, Department of Electrical and Electronic Engineering,
- Dr. Roy Perryman, Prof. Stephen Dodds, UK
- University of Nottingham, Dr. Pat Wheeler, Dr. G. M. Asher, UK
- Universidade do Porto, prof. F. Maciel Barbosa, PT
- University of Picardie – Jules Verne, Amien, Prof. Gerard-Andre Capolino, F
- VSB – Univerzita Ostrava, prof. Ing. Josef Palecek, doc. Ing. J. Kijonka, CZ
- VSB – Univerzita Ostrava, doc. Ing. Robert Cep, PhD., Ing. Lenka Cepova, PhD. CZ
- VUT Brno, Ústav elektroenergetiky,
- Zapadoceska univerzita Plzen, doc. Ing. Jiri Danzer, CSc., prof. Ing. Vaclav Kus, CSc., prof. Ing. Zdeněk Peroutka, PhD., CZ
- Zeleznicni zkusebni okruh VUZ Cerhenice, Ing. Eduard Novak, CSc. CZ

Visitors to the Department

Name	Institution	Length of stay
Jindřich Stuchlý	VŠB – TU Ostrava, CZ	5 days
Jakub Vramba	VŠB – TU Ostrava, CZ	5 days
Klemen Deželak	University of Maribor, Slovenia	4 days
Petr Pětvaldský	VŠB – TU Ostrava, CZ	60 days
Marek Hořínek	VŠB – TU Ostrava, CZ	60 days
Koval and 16 students	VŠB – TU Ostrava, CZ, excursion	2 days
Lorand Szabo	TU – Cluj Napoca, Romania	6 days
Ioan Adrian Viorel	TU – Cluj Napoca, Romania	6 days
Zoltan Kovacs	TU – Cluj Napoca, Romania	6 days
Bohumil Skala	University of West Bohemia, Plzeň, CZ	3 days
Pavel Drábek	University of West Bohemia, Plzeň, CZ	3 days
Jiří Fořt	University of West Bohemia, Plzeň, CZ	3 days

Visits to Foreign Institutions

Name	Institution	Length of stay
Valéria Hrabovcová	ČVUT Prague, FEE, CZ	4 days
Pavol Rafajdus	ČVUT Prague, FEE, CZ	6 days
Peter Braciník	Austrian Institute of Technology (AIT) Wien	1 days
	Invited lecture at FEKT VUT Brno, CZ,	1 days
	Silesian University of Technology, Gliwice, PL	14 days
Alena Otčenášová	Invited lecture at FEKT VUT Brno, CZ	1 days
A. Otčenášová, P. Braciník and 12 students	Excursion at VŠB – TU Ostrava, CZ	2 days
Daniel Hropko	Tampere University of Technology, Finland	90 days
Peter Dúbravka	Technical University of Cluj-Napoca, Rumunsko	4 days
	Silesian University of Technology, Gliwice	14 days
Matěj Pácha	AMPER2013 Brno, CZ	5 days
	ESIEE Paris, France	2 days
Michal Reguľa	VŠB – TU Ostrava, CZ	60 days
	Silesian University of Technology, Poland	14 days
Dominik Szabó	VŠB – TU Ostrava, CZ	60 days

Other Activities

Invited Lectures/Papers

Brushless DC Machines
Lecturer: Valéria Hrabovcová
Where: ČVUT Prague, FEE
Date: 28.11.2013

Brushless DC Machines + seminars
Lecturer: Valéria Hrabovcová
Where: ČVUT Prague, FEE
Date: 04.12.2013

Switched Reluctance Machines
Lecturer: Valéria Hrabovcová
Where: ČVUT Prague, FEE
Date: 05.12.2013

Switched Reluctance Machines + seminars
Lecturer: Pavol Rafajdus
Where: ČVUT Prague, FEE
Date: 11.12.2013

Localization of failures on 22 kV lines using triangular principles
Lecturer: Peter Braciník
Where: FEKT VUT Brno, CZ
Date: 23.5.2013

Measurement of voltage sags and interruptions in the Slovak distribution networks
Lecturer: Alena Otčenášová
Where: FEKT VUT Brno, CZ
Date: 23.5.2013

Membership in International Institutions /Committees

Juraj Altus	Representative of University of Zilina, CIRED, CZ
	Representative of SK in International Energetic Agency IEA, Paris, F
	Member of IEEE, IEEE senior member
	Member of international scientific committee of EPE 2012, Brno, CZ
Valéria Hrabovcová	IEEE senior member
	Head of professional group of IEEE IAS/IES CS

Ján Vittek	Member of program committee of conferences IASTED, EPE-PECM Member of committee for PHD thesis EF ZCU Plzen, CZ Member of IEEE
Peter Braciník	Member of IEEE
Alena Otčenášová	Member of international scientific committee of conference EPE 2012, Brno, CZ Member of IEEE
Matěj Pácha	Member of IEEE, IAS/IES Joint Chapter Treasurer Member of expert group Research and development CZ LOKO, Ceska Trebova, CZ
Pavol Rafajdus	IEEE senior member Member of international committee of conference Low Voltage Electrical Machines
Milan Pospíšil	Vice-Chairman of committee for PHD thesis defense in the scientific field of Energetics, FEI VSB TU Ostrava, CZ
Marek Höger	Member of IEEE
Pavol Makyš	Member of IEEE
Vladimír Vavrúš	Member of IEEE
Marek Roch	Member of IEEE

Membership in National Institutions/Committees

Juraj Altus	Departmental Committee for PhD thesis defense in a field of Electroenergetics in Bratislava Member of the commission of „Aurel Stodola Award in Power Engineering", SE Bratislava Programme committee, XIV. Slovak Seminar for Electrical Specialists Trencin, 2013, October 16. – 17.
Valéria Hrabovcová	Member of Slovak Electro-technical Committee at SUTN Member of the APVV Board for the programme "Human Potential in a Field of Research and Development and Popularisation of Science (LPP)" Departmental Committee for PhD thesis defence in a field of Power Electrotechnics at FEI STU Bratislava Faculty Committee of PhD study in Mechanical Faculty TU Kosice in the field of Mechatronics
Ján Vittek	Magazine Editorial Board Acta Electrotechnica et Informatica, FEI TU Kosice Faculty committee for PhD thesis defence in the field of Mechatronics, SjF TU Kosice
Michal Pokorný	Programme committee, XIV. Slovak Seminar for Electrical Specialists Trencin, 2013, October 16. – 17.
Josef Beran	Executive board of Association of Electrical Specialist active in SVK 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 Organisation committee for XIV. Slovak Seminar for Electrical Specialists Trencin, 2013, October 16. – 17.

Peter Braciník	Contact Person at University of Zilina for International PhD Workshop – OWD, which is annually organized by Department of Mechatronics at Silesian University of Technology, Gliwice, Poland
Milos Bůžek	Executive board of Association of Electrical Specialist active in SR (vice-chairman) Periodical „ELEKTROREVUE", ISSN 1336-8559, with a nationwide operation for the members of Association of Electrical Specialist (executive editor), registered at the Ministry of Culture under licence number EV 927/08 Organisation committee for XIV. Slovak Seminar for Electrical Specialists Trencin, 2013, October 16. – 17.
Alena Otčenášová	Chairman of the Commission for the first attestation in the category teacher and subcategory secondary school teacher for training electrical subjects – MŠVVaŠ SR Chairman of the attestation commission for the second attestation in the category teacher and subcategory secondary school teacher for training electrical subjects – MŠVVaŠ SR Programme committee, XIV. Slovak Seminar for Electrical Specialists Trencin, 2013, October 16. – 17.
Matěj Pácha	Contact Person at University of Zilina for cooperation with Freescale Semiconductor Inc., the organizer of student competitions Programme committee, ELEKTRO 2014 Conference
Pavol Makyš	Programme committee, ELEKTRO 2014 Conference
Ivan Litvaj	Slovak Society for Quality, „Schools and Education" work group member

Membership in University Boards

Juraj Altus	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at Faculty of Electrical Engineering Departmental committee for PhD thesis defence in a field of Energetics at Faculty of Electrical Engineering Scientific board of Faculty of Electrical Engineering Scientific board of University of Zilina Academic Senate of Faculty of Electrical Engineering (chairman)
Valéria Hrabovcová	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at Faculty of Electrical Engineering Scientific board of Faculty of Electrical Engineering
Michal Pokorný	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at Faculty of Electrical Engineering Departmental committee for PhD thesis defence in a field of Energetics at Faculty of Electrical Engineering (chairman) Scientific board of Faculty of Electrical Engineering
Ján Vittek	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at Faculty of Electrical Engineering Scientific board of Faculty of Electrical Engineering
Peter Braciník	Alumni club of Faculty of Electrical Engineering (secretary) Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at Faculty of Electrical Engineering

Alena Otčenášová	Departmental committee for PhD thesis defence in a field of Energetics at Faculty of Electrical
Milan Pospíšil	Departmental committee for PhD thesis defence in a field of Power Electrical Engineering at Faculty of Electrical Engineering, Zilina Departmental committee for PhD thesis defence in a field of Motor Vehicles, Rail Vehicles, Ships and Aeroplanes, Zilina
Pavol Rafajdus	Scientific board of Faculty of Electrical Engineering, Zilina Departmental committee for PhD thesis defence in a field of Energetics at Faculty of Electrical
Marek Roch	Board of Information and Communication Technology of the University (member) Board of Information and Communication Technology at Faculty of Electrical Engineering (member)
Ivan Litvaj	Quality Manager at Faculty of Electrical Engineering

Contact Address

Department of Power Electrical Systems **EN**
Faculty of Electrical Engineering
University of Žilina
Univerzitna 1
010 26 Žilina
Slovak Republic
Phone: +421 41 513 2151
Fax: +421 41 513 1515
E-mail: kves@fel.uniza.sk
www: www.kves.uniza.sk

Katedra výkonových elektrotechnických systémov **SK**
Elektrotechnická fakulta
Žilinská univerzita
Univerzitná 1
010 26 Žilina
Slovenská republika
Phone: +421 41 513 2151
Fax: +421 41 513 1515
E-mail: kves@fel.uniza.sk
www: www.kves.uniza.sk

Department of Control and Information Systems



General Information

The Department of Control and Information Systems (further referred to as the DCIS) guarantees three study programmes in the study branch Automation at the University of Žilina. Specifically it is the study programme Automation in bachelor degree, study programme Process Control Engineering in MSc. degree and study programme Process Control Engineering in PhD. degree.

Research activities of the DCIS are oriented in the field of information and safety-related system analysis and synthesis ranging from solution of theoretical models to practical projects of operation including implementation. There are many sectors of activities in which the DCIS has an exclusive position in the Slovak Republic, especially in expertise activities in the field of analysis and synthesis of railway interlocking systems.

The area of reliable and safe information transmission and processing in control of selected critical processes both in safety-related systems for all kinds of transport, complex technologies and in security systems for protection of humans and property provides dynamic incentive for all the staff. Realization of information services for operative control supported by automation and computer technology is applicable in decisive branches of the national economy.

Activities performed at the DCIS are integrated to the national and international co-operation with academic and industry sphere and realized through various forms - from research projects to exchanges of students and experts.

In 2013 the staff of the DCIS consisted of 14 university teachers, 1 researcher, 2 technicians and administrative support and 8 full-time postgraduate students. The pedagogical staff consisted of 4 professors, 1 guest professor, 1 associate professor, 6 senior lecturers with an academic degree PhD, 2 senior lecturers without this degree.

Staff of the Department

Head of the Department:	**Juraj Spalek**
Vice-head of the Department:	Aleš Janota
Department secretary:	Rastislav Pirník
Study Consultant:	Peter Nagy
Administrative Support:	Klára Berešíková
Technical Support:	Kamila Kršíková

Sections of the Department

Section of Automation and Signalling Systems

Head of the Section:	Karol Rástočný
Professors:	Aleš Janota, Karol Rástočný, Juraj Spalek
Guest Professor:	Pavel Přibyl
Senior Lecturers (with PhD):	Jozef Hrbček, Vojtech Šimák, Juraj Ždánsky
Senior Lecturers (without PhD):	Peter Nagy

Section of Communication and Information Systems

Head of the Section:	Mária Franeková
Professors:	Mária Franeková
Associate Professors:	Peter Vestenický
Senior Lecturers (with PhD):	Tatiana Brončeková († 4.12.2013), Peter Peniak, Peter Holečko, Rastislav Pirník (since 1.9.2013)
Senior Lecturers (without PhD):	Emília Bubeníková

Postgraduate Students

Internal (full-time):	Ján Ďurech (since 1.9.2013), Tomáš Mravec (since 1.9.2013), Igor Miklóšik (since 1.9.2013), Michal Gregor, Tomáš Mikluščak, Ľubomír Pekár, Ján Halgaš (till 19.8.2013), Peter Matis, Zuzana Lobotková, Marek Výrostko, Ján Beňuš (till 12.7.2013), Marián Hruboš
External (part-time):	Milan Slivka, Ján Slezák, Peter Nagy, Emília Bubeníková, Anna Cerovská, Peter Lüley

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			*(L) lessons - (S) seminars - (LE) lab. exercises
31100	Algorithmisation of problems	1	2-2-0
31443	Theory of automated control 1	4	3-1-1
31504	Bachelor project	5	0-0-5
31521	Communication security	5	3-1-1

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
31534	Single-chip controllers programming	5	2-0-2
31536	Sensor technology	5	3-1-1
31541	Control systems reliability and safety	5	3-2-0
31209	Programming languages 1	1	2-2-0
31202	Information and communication networks	2	1-0-2
31204	Computing technical environment	2	1-0-2
31425	Logical systems	4	3-1-1
31437	Control systems	4	2-1-2
31443	Theory of information and signals	4	3-1-1
31620	Bachelor project 2	6	2-0-3
31600	Bachelor work	6	0-2-0
31606	Distributed control systems	6	3-1-1
31612	Information systems	6	3-1-1
31623	Control systems programming	6	2-0-2
Courses at the Faculty of Civil Engineering			
92347	Applied electronics	2	2-0-2

External Bachelor Degree Programme

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Civil Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
97347	Applied electronics	2	18-0-0

Master Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Civil Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
32101	Control systems safety analyses	1	3-2-0
32103	Information systems security	1	3-0-2
32120	Computer networks	1	3-1-1
32130	Theory of automated control 2	1	3-1-1
32142	Signal processing appliances	1	3-1-1
32124	Signalling systems components	1	3-1-1
32311	Expert systems	3	3-0-2
32316	Master project	3	0-0-5
32342	Processes visualisation	3	2-0-2
32301	Signalling systems applications	3	3-0-2
32302	Security systems	3	3-0-2
32329	Applications of information systems in process control	3	3-1-1
32202	Higher programming languages applications	2	2-1-2
32203	Secure system communication	2	3-1-1
32221	Object-oriented system development	2	2-0-2
32225	Signal processing appliances	2	3-1-1
32238	Artificial intelligence	2	3-1-1
32243	Signalling systems	2	3-1-1

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Civil Engineering			*(L) lessons - (S) seminars - (LE) lab. exercises
32401	Wireless communication	4	4-1-2
32402	Diploma work	4	0-2-0
32403	Diploma project	4	0-0-10
32338	Robotic systems	4	4-0-2
32411	Intelligent transportation systems	4	4-2-0
Courses at the Faculty of Operation and Economics of Transport and Communications			
13P102	Information systems in transport	1	2-2-1

Science, Research and Development

Scientific-research and development activities of department are focused on the area of control tasks algorithmisation, automation of control on process, operational and management levels while utilising modern artificial intelligence approaches, and on the area of reliable, safe and secure communication and information processing in control of selected critical processes, above all the ones which imply the criterion of safety besides usual optimisation criteria. For reasons given there is a large number of research projects and cooperation projects with praxis and industry directed into the area of applied telematics and intelligent control and safety systems in transport and industry.

Laboratory of industrial processes control

The laboratory is oriented on development and simulation of algorithms for industrial processes control. The fundamentals of equipment are PCs, Siemens PLCs, extension modules for sensors and actuators connection, modules for remote inputs and outputs, visualisation panels, frequency converters and programming and configuration software. The interconnection of components and positions is realised by industrial networks. The operation of this technology is supported by actual models of industrial processes.

Laboratory of safety critical control systems

The laboratory is focused on development of safety related control systems. The fundamentals of technology equipment are PCs and Siemens PLCs with software support. Safety relevant communication between these programmable automata and cooperating devices is realised using safety relevant protocol PROFISAFE. The laboratory includes operational safety systems by Scheidt&Bachmann (BUES2000, ZBS2000).

Laboratory of traffic processes control

The laboratory is focused on the area of system identification, design and implementation of control algorithms for traffic and industrial systems. It is equipped with programmable logical automata, safety PLCs, I/O modules, converters, traffic and industrial systems models and specialised computers with software; Automation Studio, Safe Designer, MATLAB, Atmel Studio, RSLogix, RSLinx, RSView.

Laboratory Betamont

The laboratory aims on experimental works of PhD. students and final degree students of bachelor and master programmes. The focus is the area of development, customisation and realisation of experimental communication subsystem of Intelligent Transportation Systems (ITS). The development heads towards display appliances in the function of dynamic traffic

signs, information panels and similar, primarily in the direction ITS infrastructure – driver. The development in laboratory also includes applications of distinct communication standards, primarily intended for the communication between vehicles, vehicles and infrastructure and between ITS infrastructure objects.

The laboratory is built within the following projects: „Centre of excellence for intelligent transportation systems and services I", „Centre of excellence for intelligent transportation systems and services II" and „New methods for measuring dynamic properties of motor vehicle and its interaction with roadway" (in cooperation with BETAMONT), which have been acquired in the operational programme Research and development by the EU Structural funds agency of Slovak Department of Education.

Laboratory of information technologies

The laboratory is oriented on information systems (databases, web technologies, virtualisation), computer networks (modelling, simulation, monitoring) and its safety (penetration testing, intrusion detection, firewalls, cryptanalysis, antimalware).

Hardware equipment: Juniper IDP 75 – intrusion detection system; Fluke Networks Time Machine Express NTM - EX2 – network traffic monitoring device

Software equipment: OPNET Modeler + Wireless Suite – network modelling, simulation and emulation environment; OPNET IT Guru Academic Edition – academic edition of environment; PRTG Paessler Network Monitor – network traffic monitoring tool.

Laboratory of experimental tasks AB

The laboratory is intended for experimental operations related to bachelor, master and research tasks including realisation of electronic devices.

Laboratory of automated control theory and signal processing

The laboratory is aimed on testing of theoretical fundamentals from the area of automated control theory (continuous and discrete systems), theory of information and signals and digital signal processing with custom programs and MATLAB with its specialised toolboxes (Simulink, Control Toolbox, Signal Processing Toolbox). It includes actual educational models by Humusoft CE 151 (ball on plane) with accessories (Extended Real Time Toolbox and Real Time Windows Target) and appliances by IMFsoft (motor rpm regulator, temperature regulation).

Joint laboratory of tunnel systems AB

The laboratory serves for experimental works for bachelor, master and PhD. students by providing a joint laboratory of tunnel systems (JLTS) as a competence centre, which systematically cooperates on optimisation of equipment and permanent increasing of safety of tunnel systems in Slovak and Czech Republic. The laboratory is built within the projects „ Centre of excellence for intelligent transportation systems and services II " and "Transport telematics systems research centre", which have been acquired in the operational programme Research and development by the EU Structural funds agency of Slovak Department of Education. A part of the laboratory will be a laboratory for research of methods for tunnel systems safety quantification.

Laboratory of modelling and simulation

The laboratory is aimed on education of specialised subjects requiring support of software tools. It is mainly intended for modelling of functional properties of control systems (UML; Rhapsody software tool), reliability and safety attributes (CARE software tool), control procedures and control structures (Matlab and Lab-

View environments). In case of need, it is available for other applications – design and work with database systems, expert systems and so on. The laboratory includes technology utilised in objects protection (alarm systems, electric fire signalisation, camera surveillance systems). The laboratory can also be utilised for students' individual work during working out the semester projects and diploma theses.

Laboratory of computer networks and secure communications

The laboratory is focused on the area of LANs including wireless communication technologies. The technical equipment for computer networks includes basic PCs, structural cabling distributor, switches and routers 3com a Cisco, IEEE 802.11 wireless networks analyser. The technical equipment for industrial communication networks includes PROFIBUS and CAN protocol analysers.

Laboratory of microcomputers and robotics

The laboratory is intended for research and development in the area of robotics and microcomputers. It is equipped with computers and programmable interfaces for ATMEL microcomputers and ABB industrial robots. The laboratory hosts the research of mobile sensor platform for robots navigation.

Laboratory of modelling, optimisation and simulation technologies for ITS

The laboratory is focused on development, modification and realisation of mathematical and simulation models for the support of traffic network control. The main objective is development of methods and algorithms for predictive control of telematic subsystems.

Device equipment: I/O card, SW - toolbox for predictive control, workstation for the complex control system model, specialised literature.

Co-operation

Co-operation Partners in Slovakia

- AP Signaling s.r.o., Martin
- AQUASTYL s.r.o., Považská Bystrica
- AŽD Slovakia, Bratislava
- B+R automatizace, s.r.o. – organisation section, Nové Mesto nad Váhom
- Betamont, s.r.o. Zvolen
- Faculty of Electrical Engineering and Information Technology, Slovak Technical University, Bratislava
- HP Slovakia, Bratislava
- KIA Motors, Žilina
- MtF, Slovak Technical University, Bratislava
- National highway company (Národná diaľničná spoločnosť a. s.), Bratislava
- ROBOTEC, s.r.o., Sučany
- Rockwell Automation Slovakia s. r. o.
- Scheidt&Bachmann Slovakia s. r. o., Žilina
- Siemens PSE, Bratislava
- Siemens PSE, Žilina
- Siemens s.r.o. Automation technology and traction division (IA&DT)
- Slovak Standards Institute, Bratislava
- SOMI Systems a.s., Banská Bystrica
- Technical university Košice
- URAP-Automatizácia s.r.o
- Transportation research institute, Žilina
- Slovak Railways, Bratislava

International co-operation Partners

- AŽD Praha Ltd., Prague, CR
- ELTODO EG, Prague, CR
- První Signální Inc., Ostrava, CR
- SIEMENS AG, I MO RA ML SEE, Vienna, Austria
- Siemens Ltd., CT DC EU IC MOL CZ, Prague
- Signalbau Inc., Přerov, CR
- Thales Rail Signalling Solutions GmbH, Vienna, Austria

Visitors to the Department

Name	Institution	Length of stay
Borna Abramovic	Faculty of Transport and Traffic Sciences, University of Zagreb, Department of railway transport	1 day
Tomáš Šmerda	Technical division chief ELTODO - dopravní systémy s.r.o, Prague, CZ	4 days
Vladimír Faltus	FD CTU Prague, CZ	3 days
Valentina Hristova	Todor Kableskov University, Sofia, Bulgaria,	5 days

Visits to Foreign Institutions

Name	Institution	Length of stay
Mária Franeková	Silesian University of Technology, Faculty of Transport, Ustroň, Poland (TST 2013)	3 days
	Eltodo Prague	2 days
Aleš Janota	Silesian University of Technology, Faculty of Transport, Ustroň, Poland (TST 2013)	3 days
	Wien, Austria – DC-TUD COST (20th meeting)	3 days
	Rijeka, Croatia – DC-TUD COST (21st meeting)	3 days
	Dubrovnik, Croatia (COST TU1105 - 4. MC meeting)	3 days
	West Pomeranian University of Technology Szczecin, Poland – Erasmus lecture stay	5 days
	FD CTU Prague	3 days
Karol Rástočný	Siemens s. r. o., CT DC EU IC MOL CZ, Prague, CR (Interlocking systems course)	10 days
	TU Budapest, Hungary (lecture)	3 days
	Altpro d.o.o., Zagreb, Croatia (research cooperation)	4 days
	VUŽ Prague, CR (work visit)	1 day
	KPM Konzult, Brno, CR (editorial board meeting New railway technology magazine)	1 day
Juraj Spalek	FD CTU Prague	1 day
Rastislav Pirník	FD CTU Prague, Erasmus teacher mobility	4 days
Ľubomír Pekár	Silesian University of Technology, Faculty of Transport, Ustroň, Poland (TST 2013)	3 days
Marián Hruboš	Silesian University of Technology, Faculty of Transport, Ustroň, Poland (TST 2013)	3 days
Jozef Hrbček	Silesian University of Technology, Faculty of Transport, Ustroň, Poland (TST 2013)	3 days
Vojtech Šimák	Silesian University of Technology, Faculty of Transport, Ustroň, Poland (TST 2013)	3 days
	Lappeenranta University of Technology, LUT Energy, Electrical Engineering, Control Engineering and Digital Systems, Lappeenranta, Finland, Erasmus lecture stay	7 days
Igor Miklóšik	ELTODO Transport systems s.r.o., Prague, CR,	5 days
Ján Ďurech	Study stay nt Silesian University of Technology, Department of mechatronics, Gliwice, 2013, Poland	5 days

	Silesian University of Technology, XIV International PhD Workshop OWD 2012, Wisła, Poland	3 days
Juraj Ždánsky	West-Czech university in Pilsen (Applied Electronics 2013)	2 days

Other Activities

Specialised Lectures and Courses Organized by the Department

Information systems security management
Customer: Lecture for the students of Safe process control
Lecturer: Martin Šuták, GiTy Inc., Martin
Date: 15. 10. 2013

Tunnel operation, operational states
Lecturer: Rastislav Pirník
Where: UNIZA – Road tunnels dispatcher course for NDS
Date: 22.06.2013

Tunnel operation, operational states
Lecturer: Rastislav Pirník
Where: UNIZA – Road tunnels dispatcher course for NDS
Date: 15.11.2013

Tunnel operation control (central control system)
Lecturer: Jozef Hrbček
Where: UNIZA – Road tunnels dispatcher course for NDS
Date: 15.11.2013

Invited Lectures/Papers

Safety of Signalling Systems - Opinions and Reality
Lecturer: Karol Rástočný
Where: TU Budapest
Date: 22. 04. 2013

Interpretation and use of SIL-table
Lecturer: Karol Rástočný
Where: International conference OZT, Vyhne
Date: 13.-15.02.2013

International and European standardisation organisations for electronic communications
Lecturer: Rastislav Pirník
Where: USI UNIZA – Electronics experts course
Date: 01.02.2013

Information and communication networks
Lecturer: Rastislav Pirník
Where: UNIZA – Faculty of Civil Engineering
Date: 20.03.2013

Design of 3D model of a road communication for ITS applications
Lecturer: Rastislav Pirník
Where: ČVUT- Faculty of Transport
Date: 04.-08.11.2013

Membership in International Institutions /Committees

Aleš Janota

Member of Domain Committee, Transport Urban Development - COST, Brussels
Member of programme committee of the 13th International conference Transport Systems Telematics TST'2013, Katowice-Ustroń, Poland: 23. – 26.10.2013
Member of programme committee of the XVII. International conference Computer Aided Science, Industry and Transport TRANSCOMP 2013, Zakopané, Poland: 2. – 5. 12. 2013
Member of programme committee of the 10th Jubilee International Conference TransNav 2013 on Marine Navigation and Safety of Sea Transportation, Gdynia, Poland: 19. – 21. 6. 2013
Chairman of Editorial board of the international scientific journal Archives of Transport System Telematics, Katowice, Poland, ISSN 1899-8208

	Member of international programming council of TransNav International Journal on Marine Navigation and Safety of Sea Transportation, Gdynia, Poland, ISSN 2083-6473, ISSN 2083-6481 (electronic version)
	Member of Scientific board of Faculty of Transport and Electrotechnics, UTH Radom, Poland (do 30.6.2013)
	Member of ACM – Association for Computing Machinery, USA
	Member of International Institute of Informatics and Systemics, USA
Karol Rástočný	Member of programme committee of the 13th International conference Transport Systems Telematics TST'2013, Katowice-Ustroń, Poland: 23. – 26.10.2013
	Member of programme committee of the 9th International conference IEEE Applied Electronics, Pilsen, CR: 10. – 12. 09. 2013
	Member of Editorial board of the international scientific journal Transport Problems, ISSN 1896-0596
	Member of Editorial board of the international scientific journal Archives of Transport System Telematics, ISSN 1899-8208
	Member of Editorial board of the international scientific journal Advances in Electrical and Electronic Engineering, ISSN 1804-3119
	Member of Editorial board of the journal Nové železniční trendy (New railway trends), ISSN1212-3942
Juraj Spalek	Vice chief-editor of the scientific journal ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL OF ENGINEERING, ISSN: 1584-2665, ISSN: 1584-2673, indexed in COPERNICUS – Journal Master List
	Member of scientific board ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering, e-ISSN: 2067-3809, Edited by Faculty of Engineering Hunedoara University Politehnica Timisoara, http://acta.fih.upt.ro/bibliographic-info.html
	Member of Programme board of the international scientific journal Archives of Transport Systems Telematics, Polish Association of Transport Telematics, ISSN 1899-8208
	Member of Programme board of the international scientific multiconference Federated Conference on Computer Science and Information Systems FedCSIS – event: International Conference on Wireless Sensor Networks (WSN'2013), Kraków, Poland, 8. – 11. September, 2013 (http://www.fedcsis.org/wsn/committee)
	Member of scientific board and reviewer of the international electronic conference ICTIC 2013 (Information and Communication Technologies- International Conference), FRI-UNIZA, March 25-29, 2013
	Member of reviewer team of the International Journal of Mechanic Systems Engineering (IJMSE), World Academic Publishing Company
	Member of scientific board of the 10th European conference of young researchers and scientists TRANSCOM 2013, Žilina, 24. – 26. 6. 2013
Mária Franeková	Member of international scientific programme board of the 13th International conference Transport Systems Telematics TST'13, Katowice-Ustroń, Poland: 23. – 26. 10. 2013
	Member of Editorial board of the international scientific journal Advanced in Electrical and Electronic Engineering, Poland, ISSN 1804-3119
	Member of Editorial board of the international scientific journal Archives of Transport System Telematics, CR, ISSN 189-8208

	Member of Editorial board of the international scientific journal Journal of Scientific and Applied research, Bulgaria ISSN 1314-6289
Juraj Ždánsky	Member of scientific-programme board of the Archives of Transport System Telematics, ISSN 1899-8208
	Member of scientific-programme commission of the 13th International conference Transport System Telematics, Katowice, Ustroň, Poland, 23. – 26. 10. 2013

Membership in National Institutions/Committees

Mária Franeková	Member of the Cultural and educational grant agency (KEGA) MŠVVaŠ, SR, KEGA committee Nr. 2
	Member of the Technical standardisation committee nr. 83, Slovak Institute of Technical Standardisation (SÚTN), Bratislava
	Member of the Slovak society for cybernetics and informatics at the Slovak science academy (SSKI)
	Member of the PROFIBUS.sk association, FEI STU Bratislava
	Member of the organisational committee of International scientific conference RTT 2013 – 15th International Conference on Research in Telecommunication Technologies, Senec, SR: 11.-13.9.2013
	Member of the international scientific board of the: „Meeting of automation, cybernetics and informatics departments (SKAKal 2013) of technical universities in SR and CR" workshop, 11. —13.September 2013, Rajecké Teplice, SR
	Member of the organisational board of Children university UNIZA, 8. – 12. 7. 2013, Žilina
	chairperson of the organisational board Meeting of employees, pensioners and friends KRIS 60 (STREPPP KRIS 60)
Aleš Janota	Member of the Technical standardisation committee Nr. 104 Industrial processes control, Slovak Institute of Technical Standardisation (SÚTN) Bratislava
	Member of the programme committee of the 21st International symposium ŽEL 2013. Žilina, 04.- 05. 06. 2013
	Member of the programme committee of the 15th Slovak seminar of electrotechnicians with international participation – 15.CSE, Trenčín:16. – 17.10. 2013
	Chairman of organisational and international programme board of the Meeting of automation, cybernetics and informatics departments (SKAKal 2013) of technical universities in SR and CR, Rajecké Teplice: 11. – 13. 9. 2013
	Member of scientific board of the 1st International Virtual Conference on Intelligent Transportation Systems 2013, Žilina, SR: 26.– 30. August 2013
Karol Rástočný	Member of the programme committee of the International conference of railway communication and interlocking technology, Vyhne, SR: 13. – 15. 02. 2013
	Member of the programme committee of the 21st International symposium ŽEL 2013. Žilina, 04.- 05. 06. 2013
	Member of scientific and organisational board of SKAKal 2013, Rajecké Teplice, 11. – 13. 09. 2013
	Chairman of the editorial board of AT&P Journal, ISSN 1335-2237
	Member of the Technical standardisation committee Nr. 83, Slovak Institute of Technical Standardisation (SÚTN), Bratislava
Juraj Spalek	Member of the Slovak society for cybernetics and informatics of SAV (SSKI)

	Member of the Slovak society for applied cybernetics and informatics (SSAKI)
	Member of the working group for technical sciences of the Agency for research and development support for Slovak Ministry of Education
	Member of the working group for OV 16 of the Accreditation committee of Slovak Ministry of Education
Jozef Hrbček	Member of organisational board of the 10th International conference of young researchers TRANSCOM 2013, Žilina, 24. – 26. June 2013
Juraj Ždánsky	Member of the programme committee of the International conference of railway communication and interlocking technology, Vyhne, SR: 13. – 15. 02. 2013
	Member of the organisational board of the 10th International conference of young researchers TRANSCOM 2013, Žilina, 24. – 26. June 2013
Rastislav Pirník	Member of programme and organisational board of SKAKal 2013, Rajecké Teplice, 11. – 13. 09. 2013

Membership in University Boards

Emília Bubeníková	Member of the executional board of Alumni Club (KAP) FEE association
	Member of the Student scientific and expert contest
Mária Franeková	Member of the Faculty Committee for science branch 5.2.14 Automation at the FEE University of Žilina
	Member of the Scientific Board of FEE University of Žilina
	Chairperson of the Alumni Club (KAP) FEE association
Aleš Janota	Member of the Scientific Board of FEE University of Žilina
	Member of the Branch Committee for science branch 5.2.14 Automation at the FEE University of Žilina
	Member of the Branch Committee for science branch 9.2.9 Applied informatics at the FMI UNIZA (since 18. 4. 2013)
Karol Rástočný	Chairman of the Branch Committee for study branch 5.2.14 Automation at the FEE University of Žilina
	Member of the Scientific Board of FEE University of Žilina
	Member of FEE UNIZA senate
Juraj Spalek	Member of the Scientific Board of the University of Žilina
	Member of the Scientific Board of FEE University of Žilina
	Member of the Branch Committee for science branch 5.2.14 Automation at the FEE University of Žilina
	Member of the Branch Committee for science branch 9.2.9 Applied informatics at the FMI UNIZA
	Member of FEE UNIZA academic senate
Peter Vestenický	Member of the Branch Committee for science branch 5.2.14 Automation at the FEE University of Žilina

Contact Address

Department of Control and Information Systems **EN**
Faculty of Electrical Engineering
University of Žilina
Univerzitná 1, 010 26 Žilina
Slovak Republic
Phone: +421 41 513 3301
Fax: +421 41 513 1515
E-mail: kris@fel.uniza.sk
www: http://kris.uniza.sk/english

Katedra riadiacich a informačných systémov **SK**
Elektrotechnická fakulta
Žilinská univerzita
Univerzitná 1, 010 26 Žilina
Slovenská republika
Telefón: +421 41 513 3301
Fax: +421 41 513 1515
E-mail: kris@fel.uniza.sk
www: http://kris.uniza.sk/

Department of Telecommunications and Multimedia

General Information

The Department of Telecommunications was founded in 1967. In first years, activities of the Department were concentrated on circuits' theory and signals, digital and impulse techniques, transmission systems and switching systems, telecommunication networks and their reliability. Aim of the Department has been directed towards following and dictating modern trends in communication technologies. Several new laboratories have been built and education has been gradually increasing in a domain of software oriented-courses. In recent years specialization of the Department has been extended also to area of multimedia technologies including multimedia content development. In 2008 the name of the Department was changed to Department of Telecommunications and Multimedia (DTaM).

At the present, the research and education of the Department of Telecommunications and Multimedia is covered by wide range of activities related to telecommunication, information and multimedia technologies. In the field of telecommunication technologies, attention is focused on communication networks, access technologies, convergence of network technologies with main activities oriented on quality of media services.

Regarding fixed networks technologies, great afford is paid to wideband optical networks, which is joint activity with the Department of Physics. Wireless technologies are directed towards mobile and satellite communications, positioning systems as well as to DVB-x. Other significant research activities are in the area of digital signal processing, the stress is laid upon semantic analysis and recognition of audio – visual content including 3D image/video processing.

Relatively new interdisciplinary areas of interest are the multimedia technologies that are oriented to multimedia content creation. This specialization incorporate the courses on fundamental of image composition, film directing, multimedia editing and post-processing, etc. The main target of this area is the support of future multimedia services. Regarding number of students that have been studying at the Department, DTaM belongs among the biggest departments and most important of Faculty of Electrical Engineering. DTaM consists of 3 divisions: Telecommunication Groupe, Radiocommunication Group, Digital signal processing Group.

Staff of the Department

Head of the Department:	**Martin Vaculík**
Vice-head of the Department:	Róbert Hudec
Secretary:	Jozefa Imrišková
Technical Support:	Jozefa Imrišková, Mariana Kazimírová, Miloslav Karch, Katarína Prokšová
Research workers:	Miroslav Benčo, Róbert Gubka (from September 1, 2013), Michal Chmulík, Juraj Machaj, Miroslava Mrvová (from September 1, 2013), Martina Zachariášová, (from September 1, 2013)

Sections of the Department

Section of telecommunication technique

Head of the Section:	Peter Kortiš
Professors:	Milan Dado
Associate Professors:	Milan Trunkvalter, Ladislav Schwartz, Peter Počta (from November 1, 2013), Martin Vaculík (at the professor position)
Senior Lecturers (with PhD):	Jozef Dubovan, Ivan Dolnák, Ján Hlubík, Miroslav Markovič, Slávka Pitoňáková (part-time), Martin Vestenický, Miroslav Uhrina
Senior Lecturers (without PhD):	Vladimír Soviar

Section of radiocommunication technique

Head of the Section:	Vladimír Wieser
Professors:	Vladimír Wieser
Associate Professors:	Vladimír Hottmar, Peter Brída
Senior Lecturers (without PhD):	Bohumil Adamec, Darina Jarinová

Section of digital signal processing

Head of the Section:	Roman Jarina
Associate Professors:	Roman Jarina, Róbert Hudec, Daša Tichá
Senior Lecturers (with PhD):	Martin Brezňan (to August 31, 2013), Patrik Kamencay (from September 1, 2013), Michal Kuba, Martin Paralič

Postgraduate Students

Internal (full-time):	Martin Bojmír, Daniel Benedikovič, Tomáš Čakan (to August 31, 2013), Veronika Ďurčeková (to August 31, 2013), Miroslav Frič, Róbert Gubka (to August 31, 2013), Katarína Kotianová (from September 1, 2013), Jozef Kozák (to August 31, 2013), Ján Litvík (to August 31, 2013), Slavomír Matúška, Miroslava Mrvová (to August 31, 2013), Michal Mlynka (to August 31, 2013), Michaela Solanská (from September 01, 2013), Peter Sýkora, Jana Šajgalíková (from September 01, 2013), Martin Šimaliak, Andrej Tkáč, Martina Zachariášová (to August 31, 2013)
External (part-time):	Jozef Benikovský, Ivan Dolnák, Ladislav Petko

Education

Courses in Bachelor and Master Degree Programmes

Bachelor Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Civil Engineering			*(L) lessons - (S) seminars - (LE) lab. exercises
Programme: Telecommunications			
31301	Electroacoustics	3	3 – 1 – 1
31400	Analog Circuit Systems	4	2 – 1 – 2
31420	Communication Technologies 1	4	2 – 1 – 1
31433	Transmission Media	4	3 – 1 – 0
31440	Signals and Systems	4	3 – 2 – 0
31419	Java - Language and Applications	4	2 – 0 – 2
31424	Linear Circuits and Systems	4	2 – 0 – 1
31432	Computer Networks 1	4	2 – 0 – 4
31503	Bachelor Project 1	5	0 – 0 – 2
31522	Communication Technologies 2	5	2 – 0 – 1
31526	Measurement in Telecommunications	5	0 – 0 – 2
31535	Radiocommunication Systems 1	5	2 – 1 – 0
31544	Television Technique	5	3 – 1 – 0
31515	Electroacoustics	5	3 – 1 – 1
31532	Computer Networks 2	5	2 – 0 – 4
31546	Design of Multimedia Web Pages	5	2 – 0 – 2
31600	Bachelor Work T	6	0 – 2 – 0
31603	Bachelor Project 2	6	0 – 0 – 2
31605	Database Systems	6	4 – 0 – 2
31625	Radiocommunication Systems 2	6	4 – 0 – 0
Programme: Multimedia Technologies			
31301	Electroacoustics	3	3 – 2 – 1
31308	Image Composition and Stylistics	3	1 – 2 – 0
31309	Legal Aspects of Multimedia. Applications	3	1 – 1 – 0
31310	Transmission Techniques	3	2 – 2 – 0
31312	Image Composition Project	3	0 – 0 – 2
31313	Television Technique	3	3 – 1 – 0
31406	The Past of Literature and Film	4	2 – 2 – 0
31417	Photographic and Film Technology	4	2 – 0 – 2
31420	Communication Technologies	4	2 – 0 – 1
31431	Vector Graphic and Typography	5	1 – 0 – 2
31435	Audio Production Project	4	0 – 0 – 2
31438	Scriptwriting and Dramaturgy	4	2 – 2 – 0
31440	Signals and Systems	4	3 – 2 – 0
31451	Audio Production	4	2 – 0 – 2
31436	Rhetoric	4	1 – 1 – 0
31508	Digital Video and Audio	5	2 – 0 – 2
31539	Group project	5	0 – 0 – 6
31546	Design of Multimedia Web Pages 1	5	2 – 0 – 2
31554	Fundamentals of Stage Management	5	2 – 2 – 0
31506	The Past and Present of Visual Arts	5	2 – 1 – 0
31600	Bachelor Work MT	6	0 – 2 – 0
31631	Final Project	6	0 – 4 – 0

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Institute of High Mountain Biology		*(L) lessons - (S) seminars - (LE) lab. exercises	
62145	Wireless Technology and Radiocommunication	5	2 – 1 – 0
63199	Multimedia Composition	6	2 – 2 – 0
63200	Image Composition and Stylistics	6	2 – 2 – 0

Master Degree Programmes

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
Programme: Telecommunications			
32108	Photonic Communication Systems	1	2 – 0 – 2
32127	Electromagnetic Waves Propagation and Antennas	1	2 – 1 – 0
32133	Signals and Systems Theory	1	2 – 2 – 0
32100	Algorithms and Program Languages	1	2 – 0 – 2
32113	Measurement in Telecommunications 2	1	0 – 0 – 2
32116	Computer Aided Circuits Design	1	1 – 0 – 2
32204	Digital Signal Processing 1	2	2 – 0 – 2
32226	Radiocommunication Systems and Networks 1	2	2 – 1 – 1
32205	Digital Audio Processing	2	2 – 1 – 0
32215	Measurement in Telecommunications 3	2	0 – 0 – 2
32219	Non-linear Circuit Systems	2	2 – 1 – 0
32220	Neural Networks	2	2 – 0 – 1
32232	Circuit Synthesis	2	2 – 0 – 2
32239	Fiber Optics	2	2 – 2 – 0
32242	Enhanced Programming Languages	2	2 – 0 – 2
32306	Digital Signal Processing 2	3	2 – 0 – 2
32317	Communication Technologies 3	3	2 – 0 – 1
32332	Radiocommunication Systems and Networks 2	3	2 – 0 – 2
32322	Microwave Technique	3	2 – 0 – 2
32323	Microwave Circuits	3	2 – 1 – 2
32339	Special Circuit for Communication Systems	3	2 – 2 – 0
32402	Diploma Work	4	0 – 2 – 0
32403	Diploma Project	4	0 – 0 – 2
32418	Networks Projection and Operation	4	4 – 0 – 2
32422	Reliability of Telecommunication Systems	4	2 – 1 – 0
32423	Trends in ICT	4	2 – 0 – 0
Programme: Multimedia Engineering			
32100	Algorithms and Program Languages	1	2 – 0 – 2
32102	Architectural Acoustics	1	2 – 1 – 1
32104	Introduction to Visual Arts	1	2 – 1 – 0
32110	3D Graphic and Animation	1	1 – 1 – 0
32128	3D Graphic Project	1	0 – 5 – 0
32134	Design of Multimedia Web Pages 2	1	2 – 0 – 2
32139	Digital Image and Video Processing	1	1 – 0 – 3
32247	Radiocommunication Systems and Networks MI	1	2 – 1 – 1
32212	Editing Services	2	2 – 1 – 0
32217	Digital Television	2	2 – 1 – 0
32227	Project 2	2	0 – 6 – 0
32234	API Graphic Interfaces	2	2 – 0 – 2
32235	WEB application design 1	2	1 – 0 – 2

Code	Title	Sem.	Hours/Week L-S-LE*
Courses at the Faculty of Electrical Engineering		*(L) lessons - (S) seminars - (LE) lab. exercises	
32314	WEB application design 2	3	1 – 0 – 2
32240	Literature and movie arts	2	2 – 2 – 0
32222	Distribution of multimedia signals	3	2 – 1 – 1
Courses at the Faculty of Operation and Economics of Transport and Communications			
13P103	Radiocommunication systems	5	3 – 1 – 0

Research & Development

Research activities of the department are oriented in area of fixed and mobile networks and signal processing. The research in the telecommunication technology is focused on communication networks and network technologies in transport and access network, convergence of network technologies and services and also methodology of quality multimedia services evaluation. Dominant part of research is focused on research and development of mathematical models and technologies for high-speed all optical networks using on modelling of numerical computer models of physical structures. Design of methods for speech quality evaluation and quality evaluation of audio-visual streams in IP networks is also very significant research activity.

In field of radiocommunication technique, research activities are focused on wireless communication systems and mobile positioning in these systems. Scientific activities are based on quality of services improving in mobile networks with fixed and ad hoc architecture. The optimization of routing and topology in these networks is main research scope. Research in field of mobile positioning is very interesting topic. It is focused on proposal of new positioning methods and integration of various positioning systems. Part of research capacity is devoted to theory of operation load and fronts.

Research in field of digital signal processing is focused on processing and annotation of video and audio data. Crucial part of the research is semantic annotation of the observed data, classification of 2D/3D objects and faces, segmentation, reconstruction and modelling of 3D scene with application to industry. The research results are mainly implemented to intelligent transport systems and computer support of medical applications. In case of audio signal processing, attention is paid to recognition of general voices, analyse of emotional status from audio scene and quality of speech and audio evaluation. Attention is primarily devoted to parametric description of audio with using of optimization techniques and new procedures of stochastic modelling of audio data time sequences.

ExpLab laboratory

ExpLab laboratory is located in ND317 room at Department of Telecommunication and Multimedia. This laboratory is focused on research and development in the field of very high frequencies technology/circuits and modern converged packet networks. This laboratory is equipped with modern measurement and emulation technology (e.g. network analyzer Rhode&Schwartz allowing measurements of microwave devices up to 6 GHz, digital oscilloscope LeCroy 104MXS with 1 GHz maximum input frequency, programmable generator, LCR bridge and so on). Converged packet network part of this laboratory is equipped with unique multifunction network traffic emulator and analyzer AVALANCHE 290 and with various network devices (routers, switches and so on). This network technology allows to emulate and to analyze a complex network infrastructure.

Laboratory is used for research purposes and practical experiments mainly for PhD. students. Within a short time of laboratory activity (approximately 3 years) two PhD. thesis have been successfully completed. One PhD. thesis will be completed this year. The significant results of experiments and results of emulations have been published in indexed international journals.

Laboratory of digital communications

The laboratory is focused on research and education in the area digital communications, e.g. networks security from sophistically attacks on network components point of view, QoS evaluation, optical transmissions from spectrum, dispersion and attenuation optical fibres point of view and access networks. The laboratory is equipped with unique equipment as named spectrum analyzer, reflectometer, network analyzer of transmissions protocols, different networks simulators and network operations analyzer. The laboratory is equipped with optical access system GPON, all components for xDSL technology analysis and various types of communication terminals for connection to private also public networks.

Laboratory of the optical communicatios sytems

The laboratory of the optical communication systems is primarily used for students, who deal with problems of the physical layer of optical networks. Simulation software VPI Photonic is utilized for teaching. Software by numerical models of real optical and electronic components, and due to its modular design, allow quick work and deeply understanding of the problematic. In the laboratory, the courses provided by the Department of Telecommunications and Multimedia are Photonic Communication Systems, Fibre Optics, and more. Laboratory capacity is 16 students.

Laboratory of the Information Technology ("HP Innovative Education")

Laboratory of the Information Technology ("HP Innovative Education") is situated in a modern equipped room (ND326) at the Department of Telecommunications and Multimedia. The available hardware equipment was obtained by a grant from Hewlett-Packard Company include installed graphics software Photoshop CS4, CorelDraw X4 and Cinema4D too. For teachers are available two HP tablets that can be interactively used by wireless connection to the projector to work with students. There are realized several courses organized by the Department of Telecommunications and Multimedia, for example: Creating multimedia web sites, Web applications, 3D - graphics, Vector graphics, and more. Laboratory capacity is 12 students.

Laboratory of digital video processing

The laboratory creates a group of scientists and staff, graduates and students with common research goals in the area of digital image processing and video. The laboratory consists of a total of 3 sub-laboratories:

1. *Laboratory of semantic analysis image and video data analysis.*
2. *Laboratory of applied research and prototype solutions of electronic systems.*
3. *Laboratory of 3D modelling and virtual reality.*

Laboratory of semantic analysis of image and video data is located in the room ND309B. The research in this part of laboratory is specialized on semantic analysis of video data with application for different segment, for example web, traffic, medicine, army, etc. The part dominant is created by research of algorithm not only for low-level description but also high-level description of image data, analysis of content by MPEG-7 descriptors, classification image data, cut detection, image and video segmentation, videoconcealment, etc. Laboratory is equipped

by 2D sensing and projective technology for area of traffic, web and industry, 16-core workstations, HeavyHorse, SW, etc.

Laboratory of applied research and prototype solutions of electronic systems is located in the room ND312C. The research and development in this part of laboratory is orientated on applied electronics in domains such as medical, military, ICT etc. The systems of intelligent textiles for measurement of humans biological parameters (EKG, muscle activity, heartbeat etc.) and On Board Unit systems for monitoring structural conditions of airplanes and helicopters is dominant part of research. Laboratory is equipped with complete technology from company LPKF for Rapid Prototyping (design, fabrication, initiation and testing), with 8-layers DPS and SMD components (Eagle v6, ProtoMat S103, MultiPress S, Minicontact RS, ProtoPlace S, ProtoFlow E), different design of processor boards and peripherals (Freescale, Virtex, Atmel, etc.), and with otherwise top measurement technology and safe data-store with 8TB in RAID.

Laboratory of 3D modelling and virtual reality is located in the room under the student restaurant at Veľký Diel. The research and development in this part of laboratory is focused on the area of virtual reality, especially in areas, like a web, medicine, transportation, and so on. The dominant part in this laboratory is research of stereovision algorithms, modelling of 3D scenes and objects (CAD software, 3D scanner and video data), 3D face recognition, classification of 3D objects, 3D modelling of traffic flow, diagnosis and treatment of cancer. At the heart of the laboratory is 3D printing. This means that the proposed 3D models using 3D printer can be printed. The laboratory is equipped with 3D sensors, projection equipment and printing technology from ZCorp (3D scanner ZScanner 700/Creaform, Z650 3D printer), 32-core workstation HeavyHorse, SW and so on.

Laboratory of multimedia

The laboratory is equipped with audio and video technology so that students have the opportunity to become familiar with the basic tasks of processing audiovisual material. In terms of research, the laboratory focuses on assessing the quality of internal and external factors on the transmitted audiovisual data and 3D applications. It is equipped with rich camera systems, mixer, video on-line editing systems and application servers for processing audiovisual material. In terms of measuring technique the laboratory is equipped with basic measuring devices allowing the measurement and analysis of video and audio. Laboratory is situated at two places. The part of laboratory focused on editing of video is located in room the NB321. The second part focused on studio technique and atelier works (audio and video) is placed in the room under the Student restaurant at Veľký Diel.

Audiolab - Laboratory of Acoustics and Audio Signal Processing

Specialized research laboratory was established in 2003. Research of the laboratory was initialized under the SEMANTICA FP6 Marie Curie ERG project. Activities of the lab are oriented to both basic and apply research in various areas of speech and audio signal processing using machine learning and artificial intelligence approaches. During its existence, Audiolab research group was involved in several national projects either supported by the Grant Agency for R&D (APVV), Scientific Grant Agency (VEGA), or under the framework of the State Program of Science and Research of the Ministry of Education. It was also partner of the COST Action 292. Currently, members of the laboratory participate on research of selected tasks within EU COST Action IC1003 QUALINET and IC 1103 – „Integrating Biometrics and Forensics for the Digital Age". In 2013, the research team successfully participated on international benchmark initiative MediaE-

val2013 (www.multimediaeval.org). Laboratory is part of Centre of excellence for systems and services of intelligent transport. The laboratory is equipped with 2 powerful multicore workstations intended for advanced mathematical solutions, server, powered PCs, specialized software as well as common instrumentation for acoustical measurements and sound analysis. Nowadays, laboratory infrastructure is upgraded by support of Structural Funds of EU. Within the Audiolab research group, 6 PhD students have completed their studies, 3 of them in 2012.

Laboratory of mobile communication systems

The laboratory is focused on scientific research and education of mobile radiocommunication networks and systems. The laboratory consists of 2 sub-laboratories:

1. *Laboratory of mobile communication networks,*
2. *Laboratory of localization systems and services.*

Laboratory of mobile communication networks is located in ND312A and ND312B rooms. Education is oriented in various radiocommunication networks, e.g. mobile radio networks 2G and 3G (GSM, GPRS, EDGE, UMTS, HSPA), TETRA, ZigBee, WLAN (IEEE 802.11a, b, g, n). The laboratory is equipped with station used for signal receiving of meteorological satellite NOAA. The laboratory is also equipped with Qualnet software for simulation of various kinds of wireless networks. Radio signal propagation is modelled by Radioplan, EDX and it is possible to compare with experimental measurements. Education of radiocommunication theory is based on hardware and software platform TIMS. Research in laboratory is focused on proposal of new algorithms and methods improving some QoS parameters in mobile communication networks. Particular algorithms are modelled by means of software tools NS-2 and Qualnet. Hardware equipment enables to establish more simply wireless ad hoc and wireless mesh networks based on IEEE802.11a, b, g, n and IEEE 802.15.4. Tester Agilent N4010 is possible to use for analysis of these networks.

Laboratory of localization systems and services is located in ND312B rooms. It is devoted to research of positioning algorithms and methods in heterogeneous wireless networks. Achieved results are implemented to real positioning systems designed by the laboratory staff. Localization systems are able to localize mobile terminals in indoor and outdoor environment. Some very interesting location based applications were implemented for user indoor/outdoor navigation. The proposed solutions are implemented to intelligent transport systems. Laboratory is equipped with several development kits for wireless networks and systems, e.g. sensor networks, RFID systems and GNSS. There are GNSS simulator GSS6700 and wi-fi network simulator for positioning process GSS5700, too.

mented to intelligent transport systems. Laboratory is equipped with several development kits for wireless networks and systems, e.g. sensor networks, RFID systems and GNSS. There are GNSS simulator GSS6700 and wi-fi network simulator for positioning process GSS5700, too.

Co-operation

Co-operaation Partners in Slovakia

- General Milan Rastislav Štefánik Armed Forces Academy in Liptovský Mikuláš
- Slovak University of Technology, Bratislava
- Technical University of Košice
- Pavol Jozef Šafárik University in Košice
- Constantine the Philosopher University in Nitra
- Matej Bel University, Banská Bystrica
- Technical University in Zvolen
- Alcatel Lucent
- Association of Telecommunication Operators, Bratislava
- Academy Support Centrum, Košice
- Instructor Training Center, Košice
- CISCO Academy, Košice
- CISCO Slovakia
- Gity Slovensko, Inc., Martin

- IBM Slovensko, Ltd. Banská Bystrica
- Cluster Z@ICT, Žilina
- Nokia Siemens Networks, Bratislava
- Orange, Inc. Bratislava
- PC Consulting, Bratislava
- Slovak Electrical Society Section with the Department of Telecommunications University of Žilina
- RRC-CZ, Ltd. Prague
- SEPS, Inc., Bratislava
- Slovak Society for System Integration, Banská Bystrica
- Slovak Organization for Space Activities, Bratislava
- Slovak Telekom, Inc., Bratislava
- Siemens Program and System Engineering s.r.o. Slovensko Bratislava, Žilina
- Siemens Ltd., Bratislava
- Slovak Electrotechnical Society, Banská Bystrica
- Central Slovak Energetic, Žilina
- Telemont Slovakia, Bratislava
- Catholic University in Ružomberok
- ES Slovakia, Inc., Žilina
- Research Institute of Posts and Telecommunications Banská Bystrica
- Transport Research Institute, Inc., Žilina
- WRX Slovakia Limited, Malinovo
- Institute of Informatics, Slovak Academy of Sciences, Bratislava
- Contineo Ltd., Košice
- TES Media Ltd., Žilina
- ZTV Television Žilina
- Betamont, Zvolen
- VUTCH-CHEMITEX, Žilina

R&D cooperation partners abroad

- Czech Technical University Prague, ČVUT, CZ
- VŠB -TU Ostrava, CZ
- Universidad Politechnica Valencia, Spain
- ENIC Lille, France
- SIU Györ, Hungaria
- KTP Sofia, Bulgaria
- SUT St. Peterburg, Russia
- SibSUTI Novosibirsk, Russia
- European Telecommunications Standards Institute, Sophia-Antipolis, France
- MESAQIN.com, Prague, CZ
- Athens Information Technology (AIT), an internationally-renowned education and research center in the fields of information technology and telecommunications, Greece
- COST Office Brussels
- EACEA Education, Audiovisual and Culture Executive Agency ERASMUS MUNDUS and EXTERNAL COOPERATION
- Alcatel Lucent, Stuttgart, Germany
- University of Patras, Greece
- University of Applied Sciences FH, Leipzig, Germany
- Todor Kableshkov Higher School of Transport, Sofia, Bulgaria
- College of Post and Telecommunications, Sofia, Bulgaria
- Telenor, Norway
- University of Graz, Austria
- TU Dresden, Germany
- Telekom Austria, Austria
- Deutsche Telekom, Germany
- Swisscom, Switzerland
- Ankara University, Turkey
- National University of Ireland, Galway, Ireland
- University College Dublin, Ireland
- Trinity College Dublin, Ireland
- TNO, Netherlands
- FTW, Austria
- France Telecom, France
- Politecnico di Milano (POLIMI), Italy
- AGUSTAWESTLAND, Italy
- Vitrociset S.p.A., Italy
- Consorzio Milano Ricerche, Italy
- Stiftelsen SINTEF, Norway
- AGH University of Science and Technology, Poland
- B&M Internets, CZ

Visitors to the Department

Name	Institution	Length of stay
Hugh Melvin	National University of Ireland, Galway, Ireland	3 days
Martin Brand	Telekom Austria AG, Austria	5 days
Christoph Furer	SWISSCOM SA, Switzerland	7 days
Hans Wilhelm Gierlich	Head acoustics GmbH, Germany	4 days
Jan Holub	Mesaqin.com s.r.o (Ltd.), CZ	5 days
Jean-Yves Le Saout	Orange SA, France	5 days
Jean-Yes Monfort	JYM C.I.S., France	4 days
Joachim Pomy	PQM Consultants, Germany	7 days
Isabelle Scott	Audience Inc, USA	5 days
Markus Klein	Ministry of Economics and Technology, Germany	5 days
John S. Lee	BlackBerry, Canada	5 days
Cyril Plapous	Orange SA, France	5 days
Chris Steck	Audience Inc, USA	5 days
Heinz Thürauf	DSPG Edinburgh Ltd, Germany	5 days
Oleg Chernojarov	Moscow Power Engineering Institute Department of Radio engineering Devices, Russia	30 days
Aleksandra Salnikova	Moscow Power Engineering institute Department of Radio engineering Devices, Russia	30 days
Marián Marciniak	National Institute of Telecommunications, Poland	3 days
Pavel Cheben	National Research Council Canada, Canada	3 days
Ivan Glesk	University of Strathclyde, England	9 days
Vasilis Stylianakis	University of Patras, Greece	5 days
Ondrej Krejcar	University of Hradec Králove, CZ	7 days
Zdeněk Diviš	VŠB – Technical University Ostrava, CZ	2 days
Miroslav Vozňák	VŠB – Technical University Ostrava, CZ	2 days

Visits to Foreign Institutions

Name	Institution	Length of stay
Peter Brída	Universidade da Beira Interior, Covilhã, Portugal	5 days
	Universidad de Costa Rica, San Jose Costarica	8 days
	University of Craiova, Romania	5 days
	COST Office, Brussels, Belgium	1 day
	Al-Ahliyya Amman University, Jordan	4 days
	COST Office, Brussels, Belgium	1 day
Milan Dado	Silesian University of Technology, GLIWICE, Poland	1 day
	CTU Prague, CZ	3 days
	VŠB – Technical University Ostrava, CZ	1 day
	University of Zagreb, Croatia	4 days
	COST CSO (Committee of Senior Officials), Copenhagen, Denmark	3 days
	COST Office, Brussels, Belgium	2 days
Róbert Hudec	European defence agency (Hellenic Ministry of national defence), Athens, Greece	3 days

Roman Jarina	VŠB – Technical University Ostrava, CZ	3 days
	Dublin City University, Dublin, Ireland	7 days
Darina Jarinová	Dublin City University, Dublin, Ireland	7 days
Peter Počta	CTU Prague, CZ	5 days
	Universidade da Beira Interior, Covilhã, Portugal	5 days
	Mesaqin.com, Prague, CZ	5 days
	COST Office, Brussels, Belgium	3 days
	ETSI, Sophia-Antipolis, France	5 days
Martin Vaculík	VŠB – Technical University Ostrava, CZ	2 days

Other Activities

Lectures and courses organized by the Department

Lectures and practical demonstrations (POPULAS)
Customer: Stredná odborná škola dopravná, Martin-Priekopa
Lecturer: Róbert Hudec et al.
Date: 12th November 2013

Invited Lectures

Quality of voice and video transmission over IP networks (as one of the crucial aspects of current Telecommunications)
Lecturer: Peter Počta
Where: Universidade da Beira Interior, Covilha, Portugal
Date: 14th May 2013

Mobile positioning in heterogeneous environment
Lecturer: Peter Brída
Where: Universidade da Beira Interior, Covilha, Portugal
Date: 14th May 2013

Session Initiation Protocol, 8th European Students Meeting – ESM Intellectual Knowledge Transfer in Engineering for a Sustainable Global ICT Community
Lecturer: Peter Kortiš
Where: Debreceni Egyelem, Faculty of Informatics, Hungary
Date: 10th May 2013

Parametric Speech Coding in VoIP
Lecturer: Roman Jarina
Where: VŠB – Technical University Ostrava, CZ
Date: 7th October 2013

Sub-second OSPF Convergence
Lecturer: Ivan Dolnák
Where: University of Hradec Králové, CZ
Date: 11th April 2013

Selected advanced technology – MPLS
Lecturer: Ivan Dolnák
Where: University of Hradec Králové, CZ
Date: 17th May 2013

The Fast Network Convergence in Research IP Networks
Lecturer: Ivan Dolnák
Where: University of Hradec Králové, CZ
Date: 26th November 2013

Advanced Network Services in IP/MPLS Networks
Lecturer: Ivan Dolnák
Where: University of Hradec Králové, CZ
Date: 3rd December 2013

Membership in International Organizations and Societies

Peter Brída — ICST member (Institute for Computer Sciences, Social Informatics and Telecommunications Engineering), Gent, Belgium
Member of IGNSS (International Global Navigation Satellite Systems), Australia

	Scientific Committee member of the Conf. on Knowledge in Telecommunication and Optics, Ostrava, CZ
	Scientific Committee member of the 36th International Conference on Telecommunications and Signal Processing (TSP)
	Editor in scientific journal Central European Journal of Engineering, publisher: Versita and Springer Verlag
	Scientific Committee member of The 9th Advanced International Conference on Telecommunications AICT 2013
	Scientific Committee member of The 5th Asian Conference On Intelligent Information and Database Systems ACIIDS 2013
	National representative and MC member of COST TU1302 SaPPART
Milan Dado	Member of SPIE, USA
	National coordinator of COST and member of CSO COST
	Chair of International sec. of the editorial Board – Journal Advances in Electrical and Electronic Engineering, Ostrava
	Member of programme board of Faculty of Electrical Engineering, Politechnika Slaska, PL
	Member of IEEE, USA
Ivan Dolnák	Member of IEEE, USA
Jozef Dubovan	Scientific committee member of the conference "Optické komunikace 2013"
Róbert Hudec	Member of JIP-ICET EDA (European Defence Agency), Brussels
Roman Jarina	National representative and MC member of COST IC 1003
	Member of IEEE, Signal processing Society, USA
	Member of IET, UK
	Member of AES, USA
	Member of Audio Engineering Society, USA,
Juraj Machaj	Scientific Committee member of The 9th Advanced International Conference on Telecommunications AICT 2013
	Editorial board member of journal Computer Science and Information Technology
Daša Tichá	Member of IEEE, Signal processing Society, USA
	Member of Radioengineering, Prague
Peter Počta	Member of Speech Transmission Quality working group (ETSI), Sophia–Antipolis
	Member of Study Group 12 at ITU-T, Geneva
	Member of Scientific Committee of Int. conf. on Knowledge in Telecommunication and Optics, Ostrava
	National representative and MC member of COST IC 1003 Qualinet
	National representative and MC member of COST IC 1304 Across
Darina Jarinová	Member of IEEE, Communication Society, USA
Ladislav Schwartz	Editorial board member of journal Network and Communication Technologies, Canada, ISSN 1927-064X(Print) ISSN 1927-0658 (Online)
	Editor in Chief, Horizon Research Publishing Corporation, http://www.hrpub.org, USA
Martin Vaculík	Member of Scientific Committee of Int. conf RTT 2013
	Member of Scientific Committee of Int. conf on Knowledge in Telecommunication and Optics, Ostrava

	Editorial Board member of Journal Advances in Electrical and Electronic Engineering, Ostrava
	Scientific committee member of the conference "Optické komunikace 2013"
Vladimír Wieser	Editorial Board member of Journal Radioengineering, CZ

Membership in National Institutions/Committees

Milan Dado	Chairman of Development Agency of the Žilina Self-governing region
	Member of scientific board LF Martin
	Member of scientific board FEI STU, Bratislava
	Member of scientific board FEI TU, Košice
	Member of scientific board CVUT Prague
	Chairman of board of directors in Orange Foundation
	Member of board of directors SAIA regional
	Member of chairmanship of Cluster Z@ICT
Ladislav Schwartz	Member of committee for technical normalization "TK41 Telekomunikácie" at SÚTN, Bratislava
	Terminology forum at VÚS Banská Bystrica
Dáša Tichá	Member of SES council
Milan Trunkvalter	Council member for development and financing of the Council for Higher Education SR, University of Žilina
	Member of the Slovak National Committee of FEANI Development Council and the Council of Higher Education funding for SR University of Žilina
Vladimír Wieser	Member of working group AK for research field 16: Informatics sciences, automatization and telecommunications
	Member of VEGA - 5 for electrotechnics, automatization and control system and close fields of informative and communication technologies for Electrotechnic and informatics

Membership in University Boards

Peter Brída	Member of organizing committee of international conference Transcom 2013
Milan Dado	Chairman of Branch committee for study specialization no. 5.2.15 telecommunications
	Chairman of the Scientific Council of FEE, University of Žilina
	Member of editorial board of EDIS Žilina
	Member of Scientific Council of University of Žilina
	Member of Scientific Council of Faculty of Management Science and Informatics, University of Žilina
	Member of Scientific Council of Faculty of Mechanical Engineering, University of Žilina
Róbert Hudec	Member of Branch committee for study specialization no. 5.2.15 telecommunications
	Member of Academic Senate of FEE, University of Žilina
	Member of Scientific Council of FEE, University of Žilina
Roman Jarina	Member of Branch committee for study specialization no. 5.2.15 telecommunications
Daša Tichá	Chairman of scientific and organizing committee of Digital Technologies

	Member of editorial board Slaboproudy obzor, Prague
	Member of examining board, VŠB Ostrava
Milan Trunkvalter	Member of Scientific Council of FEE, University of Žilina
	Member of Scientific Council of University of Žilina
	Chairman of Editorial Board of University of Žilina
	Chairman of Publishing Board of University of Žilina
	Co-chairman of University of Žilina board of directors
Martin Vaculík	Member of Branch committee for study specialization no. 5.2.15 telecommunications
	Member of Scientific Council of FEE, University of Žilina
	Member of Scientific Council of University of Žilina
	Member of editorial board at journal Communications – Scientific Letters
	Member of Academic Senate of FEE, University of Žilina
	Chairman of Academic Senate of University of Žilina
Vladimír Wieser	External member of Branch committee at FEI TU Košice
	Member of Scientific Council of FEE, University of Žilina
	Member of Branch committee for study specialization no.5.2.15 telecommunications
	Member of Branch committee for doctoral study "8.4.6 Military communication and information systems." AOS gen. M .R. Štefánika, Liptovský Mikuláš

Awards

- Mrvová, M.: The 3rd place in MAREW 2013 – Student Award (Pardubice, Czech Republic), the paper: Mrvová, M., Počta, P.: "Novel Parameter-based Models estimating Quality of Synthesized Speech Transmitted over IP Network based on Genetic Programming Approach.
- Počta P.: Best Paper Award at conference QoMEX 2013 (Klagenfurt, Austria), the paper: Andrew Hines, Peter Počta, and Hugh Melvin: Detailed Comparative Analysis of PESQ and ViSQOL Behaviour in the Context of Playout Delay Adjustments Introduced by VoIP Jitter Buffer Algorithms.

Contact Address

Department of Telecommunications and Multimedia **EN**
Faculty of Electrical Engineering
University of Žilina
Univerzitná 1, 010 26 Žilina
Slovak Republic
Phone: +421 41 513 2200
Fax: +421 41 513 1520
E-mail: kt@fel.uniza.sk
www: http://kt.uniza.sk/kt/

Katedra telekomunikácií a multimédií **SK**
Elektrotechnická fakulta
Žilinská univerzita
Univerzitná 1, 010 26 Žilina
Slovenská republika
Phone: +421 41 513 2200
Fax: +421 41 513 1520
E-mail: kt@fel.uniza.sk
www: http://kt.uniza.sk/kt/

Institute of Aurel Stodola

General Information

Institute of Aurel Stodola (IAS) operates at the department level in the hierarchy of the Faculty of Electrical Engineering. IAS situated in Liptovský Mikuláš was established on the 1st April 2012 by the Academic Senate of the Faculty of Electrical Engineering as an educational and research institute of the Faculty of Electrical Engineering. Two departments at the former Satellite Workplace in Liptovský Mikuláš founded in September 2002 (Department of Engineering Fundamentals and Department of Experimental Electrical Engineering) were merged to form IAS. In 2013 IAS was pleased to operate in the buildings already renovated by the means of the European Structural Funds' project "Support of the University of Žilina Infrastructure to Improve the Educational Conditions".

The institute retains features of the university environment. IAS students are provided with standard conditions for studying in all areas as students of other faculties of the University of Žilina or other faculties of Slovakian universities. Educational activities of the staff are aimed at the bachelor's degree programme of Digital Technologies in the field of Telecommunications. IAS manifests continuous research activities in the field of the study branch at an appropriate level for students to be able to adequately accept new knowledge in the field and respond to it. IAS is competent to fully integrate this knowledge into the provided education.

IAS research addresses the role of scientific research in the field of alternative energies, especially photovoltaics. The main directions are measuring methods for solar cells, the physical properties of thin films, especially for solar cells and hybrid electronics, research in optical elements for the physical layer of optical networks and systems and the theory of real functions. Research work is based on long-term cooperation with the institutes of the Slovak Academy of Sciences and some Slovak and foreign universities.

Staff of the Institute

Head of the Institute:	**Jarmila Müllerová**
Vice-head of the Institute:	Marcela Koščová
Manager:	Daniela Brunová
Administrative Support:	Eva Púčeková
Technical Support:	Ľubomír Bako, Milan Kňava
Associate Professors:	Jarmila Müllerová, Marcela Koščová, Zdeněk Dostál, Zdislav Exnar
Research Fellow:	Gabriel Cibira
Senior Lecturers (with PhD):	Miroslav Ďulík, Milan Gottstein, Stanislav Jurečka, Róbert Menkyna, Mária Pálušová
Senior Lecturer (without PhD):	Ľubomír Mydielka
External Lecturers:	Katarína Hrubjaková

Postgraduate Students

Internal (full-time):	Libor Ladányi, Ľubomír Scholtz (from 1st September 2013)
External (part-time):	Dušan Korček

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			*(L) lessons - (S) seminars - (LE) lab. exercises
31100	Algorithmization of Tasks	1	2 – 2 – 0
31102	Linear Algebra	1	2 – 2 – 0
31103	Management and Economics in Business	1	2 – 1 – 0
31104	Mathematical Analysis	1	2 – 2 – 0
31107	Fundamentals of Electrical Engineering	1	3 – 0 – 0
31110	Introduction to Physics	1	1 – 2 – 0
31200	Foreign Language for DT	2	0 – 2 – 0
31201	Physics 1	2	3 – 2 – 1
31203	Mathematical Analysis 2	2	4 – 3 – 0
31205	Theoretical Electrical Engineering 1	2	3 – 3 – 0
31209	Programming Languages 1	2	2 – 2 – 0
31208	Selected Topics in Mathematics	2	2 – 2 – 0
31303	Physics 2	3	3 – 2 – 1
31305	Mathematics	3	3 – 3 – 0
31306	Measurements and Measuring Systems	3	2 – 0 – 3
31311	Programming Languages 2	3	2 – 0 – 2
31314	Theoretical Electrical Engineering 2	3	3 – 3 – 0
31325	Electronics of Digital Technologies	3	3 – 0 – 2
31307	Computer Modelling of Real Processes	3	1 – 0 – 2
31318	Digital Media and Devices	4	2 – 0 – 2
31319	Digital Electronics	4	2 – 0 – 2
31321	Computer Networks	4	2 – 0 – 2
31433	Transmission Media	4	3 – 1 – 0
31444	Theory of Signals and DT Systems	4	3 – 2 – 0
31546	Design of Multimedia Web Pages	4	2 – 0 – 2
31423	Communication & Information Services	5	2 – 0 – 2
31544	Digital Transmission Systems and Networks	5	3 – 1 – 1
31545	Optical Data Recording and Storage	5	3 – 1 – 0
31547	Discrete Control Systems	5	2 – 1 – 1
31504	Bachelor Project	5	0 – 0 – 2
31531	Computer Graphics and Animation	5	1 – 0 – 2
31549	Sensors and Security Systems	5	2 – 0 – 1
31527	Communication Technologies of DT	6	3 – 0 – 1
31530	Radiocommunication & Navigation Systems	6	2 – 1 – 0
31600	Bachelor Thesis	6	0 – 0 – 12
31615	Management of Quality	6	4 – 2 – 0
31616	Marketing	6	0 – 2 – 0
31605	Database Systems	6	2 – 0 – 1

Research & Development

The focus area in mathematics is the real functions theory. In physics, the effort is aimed at diagnostics of physical properties of thin films and thin-film structures, morphological properties of their surfaces and fractal properties of interfaces. Materials and systems for photovoltaic applications are researched primarily. A new research trend is aimed at the design and simulation of optical switching elements and optical filters for all-optical communication systems and digital devices. Moreover, the research activity is focused on the area of alternative energy resources. Activities have been concentrated on the solar simulator implementation and the development of an original method of diagnostics of solar panels using infrared monitoring within research projects. Furthermore IAS staff has been dealing with the processing and transmission of sensor signals and with the design of algorithms of adaptive and fuzzy control. The main research effort is directed towards applications of digital technologies in the solar power devices as well as in the education.

In 2013, the IAS staff has been involved into investigator teams of three projects of the Scientific Grant Agency of the Slovak Republic, three projects of the Slovak Research and Development Agency and two projects of Structural Funds of EU. Two invited lectures were presented by the staff at international conferences abroad in 2013. Papers published in journals registered in the renowned databases have witnessed the IAS efforts.

Laboratory of thin films

The Laboratory is the Joint Laboratory of the Institute of Physics (IoF), Slovak Academy of Sciences, Bratislava and IAS (established by the agreement between IoF and the University of Žilina in 2004). The laboratory serves for solving projects of the Scientific Grant Agency of the Slovak Republic, the Slovak Research and Development Agency and international projects. Laboratory research programme is focused on the microstructure and optical properties of thin-film systems and on the analysis of the impact of technological processes of the preparation of thin films on their microstructure and optical properties. Laboratory equipment allows investigating properties of semiconductor and dielectric thin-film structures.

The Laboratory is equipped with AvaRaman Raman spectrometer, Thermo DXR Raman microscope, spectrophotometers for measurements in ultraviolet, visible and infrared spectral regions (fiber optics AvaSpec 2048 a grating Unicam SP 700C), NICOLET iS10FTIR spectrometer, Ocean Optics SPECEL 2000 ellipsometer and Perkin Elmer infrared spectrophotometer. Electron scanning microscope BS 350 aimed at the investigation of analysed sample surfaces belong to the laboratory appliances, too. The laboratory is further furnished by a computer grid using Matlab environment for solving tasks connected with scientific projects concerning the research on optical properties of materials and on optical communications.

In 2013 an experimental setup for measuring electrical parameters of solar cells was built in the laboratory within the APVV-0888-11 project.

Laboratory of the research on alternative energy resources

The laboratory is intended to be used for experiments related to the research within the projects of the Scientific Grant Agency of the Slovak Republic and the Slovak Research and Development Agency. The laboratory equipment includes basic analogue and digital measuring tools, multimeters, oscilloscopes, generators, special-purpose measuring instruments (global solar radiation meter FLA613-GS, non-contact laser thermometer TM2000), Fluke Ti20 Infrared Camera with IR Inside software, central measuring station, solar simulator, accessory for measuring reflection coefficient and attenuation, calorimetric measurement set

INMAT66 etc. The laboratory is furnished with computers with software package COMSOL Multiphysics 3.4 which are designed to solve scientific and research tasks. CAD Import Module extends the import of the model geometry created by CAD systems and also allows importing other types of graphic files. The result can be used for the mathematical modelling of physical processes and verification of properties in the synthesis of systems.

The biaxial solar tracker designed to track solar panels towards the sun in order to maximize their energy output is a part of the laboratory. On 14 November 2013 a measuring station of the laboratory of solar technologies was opened. The opening ceremony was attended not only by the IAS staff but also by guests from the Academy of the Armed Forces of General M. R. Štefánik in Liptovský Mikuláš and the GoldenSun Slovakia, Ltd. Company.

Laboratory of simulation and modelling

The laboratory is equipped with a computer grid for solving ab-initio tasks in parallel mode by algorithms applied in high-performance computing. Simulation methods are designed to analyse problems of quantum states of electrical charge carriers in semiconductor or dielectric structures, of particle tunnelling through a dielectric layer and of the impact of technological processes of the preparation of semiconductor structures on their microstructure, electrical and optical properties. The laboratory is also equipped with measuring cards using National Instruments LabVIEW environment for the research on electrical properties of semiconductor structures. Methods of high performance computing can significantly increase the quality of research and improve the international cooperation on the issue, which has been developed for a long time under several research projects. The laboratory is planned to involve students of the Bachelor and Master degree into the research projects.

Co-operation

Co-operation Partners in Slovakia

- Institute of Physics, Slovak Academy of Sciences, Bratislava
- Academy of the Armed Forces of General Milan Rastislav Štefánik, Liptovský Mikuláš
- Institute of Electronics and Photonics, Institute of Nuclear and Physical Engineering, Faculty of Electrical Engineering and Information Technology, Slovak University of Technology in Bratislava
- Department of Experimental Physics, Faculty of Mathematics, Physics and Informatics,
- Comenius University, Bratislava
- Faculty of Mining, Ecology, Process Control and Geotechnology, Technical University of Košice
- Alcatel – Lucent Slovakia, a.s.
- Ceragon Networks Ltd. Liptovský Hrádok

International Co-operation Partners

- Institute of Scientific and Industrial Research, Osaka University, Japan
- New Technologies - Research Center, University of West Bohemia, Plzeň, the Czech Republic
- Faculty of Electrical Engineering and Communication, Brno University of Technology, the Czech Republic
- Institute of System Engineering and Informatics, Faculty of Economics and Administration,
- University of Pardubice, the Czech Republic
- HZB Helmholtz Zentrum Berlin, Institute for Silicon Photovoltaics, Berlin, Germany
- Technical University of Cluj-Napoca, Romania
- National Instruments (Czech Republic), Ltd., the Czech Republic

Visitors to the Department

Name	Institution	Length of stay
Pavel Šutta	University of West Bohemia, Plzeň, The Czech Republic	5 days
Jiří Křupka	Univerzita of Pardubice, the Czech Republic	2 days
Pavel Cheben	National Research Council, Ottawa Canada	1 day

Visits to Foreign Institutions

Name	Institution	Length of stay
Miroslav Ďulík	Escola Universitària Salesiana de Sarrià, Barcelona, Spain	7 days
Zdislav Exnar	University of Pardubice, Faculty of Economics and Administration, Czech Republic	3 days
Jarmila Müllerová	Universidad Politécnica de Cartagena, Cartagena, Spain	4 days

Other Activities

Specialised Lectures and Courses Organized by the Department

Title of Lecture/Course: Tripple play
Customer: students and the staff of IAS
Lecturer: Dušan Korček, Alcatel – Lucent Slovakia a.s.
Date: 15 April, 2012

Ceragon Networks Ltd. - Professional Orientation and HR Policy
Customer: students and the staff of IAS
Lecturer: Alena Tomašáková, Ceragon Networks Ltd.
Date: 21 February, 2013

Characteristics of Ceragon Networks Ltd. (former Nera Networks Ltd.)
Customer: students and the staff of IAS
Lecturer: Jaroslav Grygar, Ceragon Networks Ltd.
Date: 15 April, 2013

Social Programme of Ceragon Networks Ltd. (former Nera Networks Ltd.)
Customer: students and the staff of IAS
Lecturer: Alena Tomašáková, Ceragon Networks Ltd.
Date: 15 April, 2013

Introduction to the Laboratory of Solar Technique at IAS
Customer: IAS staff and guests from business and university environments
Lecturer: Zdeněk Dostál
Date: 14 November, 2013

Invited Lectures/Papers

Wavelength protection within coexistence of current and next-generation PON networks.
Lecturer: Jarmila Müllerová
Where: 15th International Conference on Transparent Optical Networks ICTON 2013, Universidad Politécnica de Cartagena, Cartagena, Spain
Date: 23 – 27 June, 2013

Closed cycles of a biosystem and energy under the influence of civilization
Lecturer: Zdeněk Dostál
Where: 34th International Conference on Non-conventional Resources of Electrical Energy, the Czech Society for Electrical Engineering Prague and Brno University of Technology, Blansko, the Czech Republic
Date: 29 – 31 May, 2013

Membership in International Institutions/Committees

Jarmila Müllerová	Programme committee of International Symposium SPIE Optics and Optoelectronics Symposium, Integrated Optics: Physics and Simulations Conference, 15 – 18 April, 2013, Prague, the Czech Republic Scientific commitee of the International Conference Photonics North, 3 – 5 June, 2013, Ottawa, Canada Scientific committee of the International Conference Information Photonics 2013, 16 – 19 September, 2013, Warsaw, Poland
Zdeněk Dostál	Programme commitee of 34th Conference on Non-conventional Resources of Electrical Energy, the Czech Society for Electrical Engineering Prague and Brno University of Technology, 28 – 31 May, 2013, Blansko, the Czech Republic
Stanislav Jurečka	American Nano-Society ANS Czech and Slovak Crystallographic Association CSCA

Membership in National Institutions/Committees

Jarmila Müllerová	Commission of the Slovak Grant Agency VEGA for Electrical Engineering, Automatization and Control Systems and related fields of information and communication technologies, Branch Committee for PhD. Study in study branch No. 4.1.4 Quantum Electronics and Optics, Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava Committee on Education of the Town Council, Liptovský Mikuláš Programme committee of the 1st International Conference on Advances in Electronic and Photonic Technologies ADEPT, 2 – 5 June, 2013, Nový Smokovec Programme committee of the 19th International Conference on Applied Physics of Condensed Matter APCOM 2013, 19 – 21 June, 2013, Štrbské Pleso
Marcela Koščová	Programme committee of the conference ALER 2013 Alternative Energy Resources, 2 – 4 October, 2012, Liptovský Ján
Zdislav Exnar	Programme committee of the conference ALER 2013 Alternative Energy Resources, 2 – 4 October, 2012, Liptovský Ján
Zdeněk Dostál	Scientific committee of the 8th International Conference Renewable Energy Sources Potential, Economy, Character and Technology „RESpect 2013", 26 – 28 March, 2013, Poráč Park

Membership in University Boards

Jarmila Müllerová	Branch Committee for PhD. Study in study branch No. 5.2.15 Telecommunications Branch Committee for PhD. Study in study branch No. 5.2.12 Electrotechnologies and Materials Scientific Board of the Faculty of Electrical Engineering Academic Senate of the Faculty of Electrical Engineering
Marcela Koščová	Academic Senate of the Faculty of Electrical Engineering

Awards

- Commemorative certificate of the Mayor of the town of Liptovský Mikuláš „For excellent results and outstanding teaching involvement in the education of the young generation", 26 March 2013, Liptovský Mikuláš: Marcela Koščová

Contact Address

Institute of Aurel Stodola **EN**
Faculty of Electrical Engineering
University of Žilina
Educational and research workplace in
Liptovský Mikuláš
ul. kpt. J. Nálepku 1390
031 01 Liptovský Mikuláš
Slovak Republic
Phone: +421 41 513 1483, +421 44 562 3976
Fax: +421 44 562 3976
E-mail: mullerova@lm.uniza.sk, studijne@lm.uniza.sk
www: www.lm.uniza.sk

Inštitút Aurela Stodolu **SK**
Elektrotechnická fakulta
Žilinská univerzita v Žiline
Vzdelávacie a vedecko-výskumné
pracovisko so sídlom v Liptovskom Mikuláši
ul. kpt. J. Nálepku 1390
031 01 Liptovský Mikuláš
Slovenská republika
Phone: +421 41 513 1483, +421 44 562 3976
Fax: +421 44 562 3976
E-mail: mullerova@lm.uniza.sk, studijne@lm.uniza.sk
www: www.lm.uniza.sk

Notes:

Notes:

Annual Report 2013 - Faculty of Electrical Engineering

Univerzitná 8215/1, 010 26 Žilina, Slovak Republic

First Edition

Printed by EDIS - Žilina University publisher
Univerzitná, blok HB, 010 26 Žilina, Slovak Republic

ISBN 978-80-554-0864-4