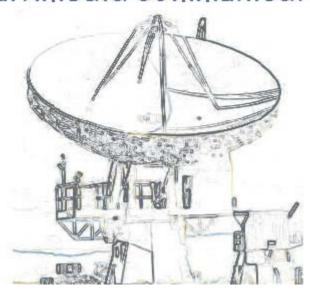
DEPARTMENT OF ELECTRONICS AND MULTIMEDIA TELECOMMUNICATIONS

Department Of Electronics & Multimedia Communications



Ammual Report 2009

Technical University of Košice
Faculty of Electrical Engineering and Informatics

TECHNICAL UNIVERSITY OF KOŠICE

Faculty of Electrical Engineering and Informatics (Slovak Republic)

DEPARTMENT OF ELECTRONICS AND MULTIMEDIA TELECOMMUNICATIONS

ANNUAL REPORT 2009

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1 DEPARTMENT PROFILE

1.1 Brief overview

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

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

- ♦ Automotive electronics,
- ♦ Electronics,
- ♦ Telecommunications.

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

- ♦ Infoelectronics,
- ♦ Multimedia telecommunications.

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

- ♦ Infoelectronics.
- ♦ Telecommunications,
- ♦ Measurement Techniques.

The subjects in the degree courses are orientated to the linear and non-linear analogue circuits, automotive electronics and diagnostic of cars, digital electronics, microwave technology, optoelectronics, signal and systems, acoustics, digital signal processing, digital filtering, signal processors and microcontrollers, electronic measurement systems, television systems, signal recording, digital communication and digital transmission systems, optoelectronic communication systems, photonics, sensor systems, multimedia communication systems, mobile and satellite communication systems, digital image communication systems and medical electronics.

The basic research activities of Department are concentrated on digital image and speech processing, multimedia communications, digital filtering, optoelectronics and optical communication, A/D convertors modelling and testing.

1.2 Department staff and structure

Total number of staff members is 25.

♦ Professors: Anton Čižmár, Dušan Kocur, Dušan Levický, Stanislav Marchevský,

Ján Mihalík, Linus Michaeli, Viktor Špány, Ján Turán

♦ <u>Associate Professors</u>: Ľubomír Doboš, Miloš Drutarovský, Pavol Galajda, Ján Gamec, Jozef

Juhár, Ľuboš Ovseník, Ján Šaliga

♦ <u>Assistant Professors</u>: Mária Gamcová, Iveta Gladišová, Zita Klenovičová, Ľudmila

Maceková, Stanislav Ondáš, Radovan Ridzoň, Mária Švecová, Jozef

Zavacký

• Research Assistant: Michal Mirilovič, Ján Papaj, Matúš Pleva, Jana Rovňáková

♦ <u>Support staff</u>: Viktória Lovacká, Božena Marchevská, Milan Peška, Viera Šumáková

2 DIVISIONS OF THE DEPARTMENT

2.1 Teaching and research laboratories

Laboratory of Multimedia Communications

Head: Professor: prof. Ing. Dušan Levický, CSc., Member of the IEEE

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Associated professor: doc. Ing. Ľubomír Doboš, CSc.

Phone: +421-55-6022296 e-mail: Lubomir.Dobos@tuke.sk

Associated professor: doc. Ing. Jozef Juhár, PhD., Member of the ISCA

phone: +421-55-6022333 e-mail: Jozef.Juhar@tuke.sk

Assistant professor: Ing. Zita Klenovičová, CSc.

Phone: +421-55-6022829 e-mail: Zita.Klenovicova@tuke.sk

Assistant professor: Ing. Stanislav Ondáš, PhD.

phone: +421-55-6022298 e-mail: Stanislav.Ondas@tuke.sk

Assistant professor: Ing. Radovan Ridzoň, PhD.

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Research Assistant: Ing. Michal Mirilovič

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Research Assistant: Ing. Ján Papaj

phone: +421-55-6022298 e-mail: Jan.Papaj@tuke.sk

Research Assistant: Ing. Matúš Pleva

phone: +421-55-6022334 e-mail: Matus.Pleva@tuke.sk

Laboratory of Digital Signal Processing and Satellite Communications

Head: Professor: prof. Ing. Stanislav Marchevský, CSc.

Phone: +421-55-6022030 e-mail: Stanislav.Marchevsky@tuke.sk

Professor: prof. Ing. Dušan Kocur, CSc.

Phone: +421-55-6024233 e-mail: Dusan.Kocur@tuke.sk

Associated professor: doc. Ing. Miloš Drutarovský, CSc.

Phone: +421-55-6024169 e-mail: Milos.Drutarovsky@tuke.sk

Assistant professor: Ing. Mária Gamcová, PhD.

Phone: +421-55-6024180 e-mail: Maria.Gamcova@tuke.sk

Assistant professor: Ing. Ľudmila Maceková, PhD.

phone: +421-55-6024108 e-mail: Ludmila.Macekova@tuke.sk

Assistant professor: Mgr. Mária Švecová, PhD.

phone: +421-55-6024234 e-mail: Maria.Svecova@tuke.sk

Research Assistant: Mgr. Jana Rovňáková, PhD.

phone: +421-55-6024234 e-mail: Jana.Rovnakova@tuke.sk

Laboratory of Digital Image Processing and Videocommunication

http://www.tuke.sk/fei-ldipv/

Head: Professor: prof. Ing. Ján Mihalík, CSc.

Phone: +421-55-6022854 e-mail: Jan.Mihalik@tuke.sk

Assistant professor: Ing. Iveta Gladišová, CSc.

Phone: +421-55-6022940 e-mail: Iveta.Gladisova@tuke.sk

Assistant professor: Ing. Jozef Zavacký, CSc.

Phone: +421-55-6024145 e-mail: Jozef.Zavacky@tuke.sk

Laboratory of Optoelectronic Communications

http://los.fei.tuke.sk/

Head: Professor: Dr.h.c. prof. RNDr. Ing. Ján Turán, DrSc., Senior Member of the IEEE

phone: +421-55-6022943 e-mail: Jan.Turan@tuke.sk

Associated professor: doc. Ing. Ľuboš Ovseník, PhD.

Phone: +421-55-6024336 e-mail: Lubos.Ovsenik@tuke.sk

Associated professor: doc. Ing. Ján Gamec, CSc.

Phone: +421-55-6024180 e-mail: Jan.Gamec@tuke.sk

Laboratory of Electronic Circuits & Measurement

Head: Professor: prof. Ing. Linus Michaeli, DrSc., Member of the IEEE

phone: +421-55-6022857 e-mail: Linus.Michaeli@tuke.sk

Professor emeritus: prof. Ing. Viktor Špány, DrSc.

Phone: +421-55-6022864

Associated professor: doc. Ing. Pavol Galajda, CSc.

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Associated professor: doc. Ing. Ján Šaliga, CSc.

Phone: +421-55-6022866 e-mail: Jan.Saliga@tuke.sk

2.2 Special laboratories and equipments

Laboratory of measurement is equipped by various analog and digital electronic instrumentations, data acquisition cards, computers and software as follows:

- Analogue and digital oscilloscopes by Tektronix, Hameg etc.,
- Spectral analyzers up to 3GHz,
- Network analyser R&S upto 3GHz,
- Various generators by Agilent, Stanford Research, Panasonic, Metex, etc.,
- Multimeters by. Agilent, Metex, Unitest, etc.,
- Logic analyzer Philips,
- Measurement system PXI by National Instruments,
- Multifunction data acquisition cards by National Instruments up to 2MHz and 18 bits,
- Communication cards and modules by National Instruments, e.g. GPIB, CAN, RS488, etc.,
- Department site license of all software by National Instruments (LabVIEW, LabWindows, SignalExpress, etc.),
- Special test stand (hardware and software) for analog-to-digital converters and interfaces testing up to 18 bits,
- Many other instrumentations, educational and research stands, and equipment for Bc. Ms. and PhD students.

Laboratory of communication technologies and advanced digital signal processing

- Advanced measurement equipments:
 - ♦ UWB m-sequence radar,
 - ♦ Anritsu MG3700A vector signal generator,
 - ♦ Tektronix digital storage oscilloscopes,
 - ♦ Agilent logic analyzer,
 - ♦ WiFi 802.11a/b/g link.
- Video and audio processing equipments:
 - ♦ Handycam SONY DCR SR 290,
 - ♦ 3CCD HDD camera Everio for HDD recording,
 - ♦ computer INTEL Pentium IV with satellite card STAR for reception and recording of packet oriented services and transmission of video-streams into IP networks,
 - ♦ satellite Dreambox receiver supported by computer with Linux operating system,
 - ♦ satellite receiver with 125cm parabola antenna and DISEC motor, combined DVB-S and DVB-T receiver,
 - GPS receivers ASUS, large plasma SAMSUNG display with 108 cm diagonal,
 - Pioneer sound laboratory system with recording and reproducing capabilities.
- Computers:
 - ♦ 4-core application DELL server,
 - ◆ 11 PC Pentium IV computers (2,8 GHz, HDD 200GB) and 10x 17"-LCD monitors.
- Software tools and development boards:
 - ♦ SystemView and IT ++ simulation software,
 - ◆ CAD-CAE development tools for FPGA Mentor Graphics (26 licenses) and Altera; FPGAs (16 licenses),
 - development tools for Analog Devices Blackfin DSPs (16 licenses),
 - ♦ Altera FPGA development boards:

- 1x UP-1 basic development board for Altera FLEX10K FPGA family,
- 2x UP-3 basic development board for Altera Cyclone FPAG family,
- 1x NIOS II development board for synthetic 32-bit soft processors in Altera Cyclone FPGAs.
- 1x Stratix DSP development kit for testing and development DSP algorithms in Stratix FPGA, support for analog signal processing up to 100 MHz, integrated AD and DA converter; 1xCyclone II DSP development kit with video input daughtercard for testing and development of video signals in Cyclone II FPGA.
- ♦ Analog Devices Blackfin DSP development boards:
 - 8x development board EZ-KIT 533 600 MHz with Analog Devices signal processor Blackfin ADSP21533,
 - 2x development board EZ-KIT 561 600 MHz with Analog Devices signal processor Blackfin ADSP21561,
 - 5x development board EZ-KIT 535 350 MHz signal processor Analog Devices Blackfin ADSP21535,
 - 2x extender for video signal processing with Blackfin DSPs; 1x HS-USB Emulator for Blackfin DSPs.
- Development boards for 32-bit Freescale microcontrollers:
 - 10 x development board of 32-bit microcontroller Freescale M52233DEMO with ColdFire V2 core and integrated Ethernet communication interface,
 - 2 x development board Freescale M5329EVB with ColdFire V3 core and cryptographic coprocessor.
- Freescale development tools for RadioFerequency (RF) ZigBee networks:
 - 1x 1321xNSK: Freescale Network Starter Kit with highly integrated chips (CPU + RF), external emulation interface,
 - 8x ZigBee RF interface with integrated 2.4 GHz antenna and SPI interface.
- ♦ Development tools for 8-bits microcontrollers:
 - 7x development boards based on Analog Devices ADuC83x microconverters with embedded 16 a 24-bits AD converters.

Laboratory of optoelectronics

- Microwave measuring bench for cm waves with klystron power,
- Fiber optic education system,
- Fiber optic power meter,
- Fiber optic refractometer,
- Optically powered system,
- Optical bench with HeNe laser.

Laboratory of multimedia and network security

- Server (PC Pentium IV, 2.8 GHz, HDD 200GB),
- Switch (24 port Signamax),
- Wifi 802.11a/b/g Access Point (Asus WL 520g),
- 12 x PC Pentium IV (2,8 GHz, HDD 200GB, Windows/Linux,
- 13 x 17"-LCD monitors, LCD TV Samsung 40" Full HD,
- 6x Web cameras,
- 6x Cisco routers 1841,
- Videoconferencing system Eagle,

• Magio box.

Laboratory of speech technologies in telecommunications

- Telecommunication server, equipped with 12 port Dialogic D120JCT, three GSM gateways, Skype box, SIP Linksys Gateway a PSTN link,
- Telecommunication workstation with 4 port Dialogic D40JCT card,
- Smart speech telecommunication interface for research and development in the spoken language dialogue domain (prototype),
- Application server for research and development in the domain of speech and language technologies (XEON 2GB RAM, 2TB HDD, OS Debian Linux),
- Web and FTP server department of KEMT (OS Linux, 1GB RAM, 1TB HDD, kemt.fei.tuke.sk),
- MediaServer (cooperation with TV cable company S-team, recording of broadcast TV news corpus KEMT-BN, R+TV),
- CorpusServer (DVB-T, speech data recording, text data collecting),
- Collection of "opensource" and own software tools for research and development of speech and language technologies,
- Speech and text corpuses,
- PC workstations (6 pcs) and notebooks (6 pcs).

3 TEACHING

3.1 Courses

Bachelor Degree Course (title Bc.) -Automotive electronics

The Bachelor degree course is orientated into the field of Automotive electronics into the basic automotive electronics systems. The students achieve good skills in automotive electrical measurement, automotive electronics components, digital electronics and digital signal processing.

Bachelor Degree Course (title Bc.) –Electronics

The Bachelor degree course is orientated into the field of Electronics into the basic electronics systems. The students achieve good skills in electrical measurement, electronics components, linear and non-linear circuits, digital electronics, microprocessors and signal processors and optoelectronics.

Bachelor Degree Course (title Bc.) – Telecommunications

The Bachelor degree course is orientated into the field of Telecommunication mainly into the basic telecommunication systems and networks. The students achieve good skills in telecommunication services, management of telecommunication networks and economics in telecommunications.

Master Degree Course (title Ing.) - Infoelectronics

The Master degree course is oriented into the field of Infoelectronics the students have been achieve good skills in mathematics, physics, electromagnetic field, electrical measurement, electronics components, linear and non-linear circuits, digital electronics, microprocessors and signal processors, optoelectronics and digital signal processing.

Master Degree Course (title Ing.) – Multimedia telecommunications

The Master degree course is oriented into the field of Multimedia telecommunications the students have been achieve good skills in digital communication and transmission systems, mobile and satellite communications, optoelectronics communication systems and multimedia communication.

Ph.D. Degree Courses (title Ph.D.) – Infoelectronics

The Ph.D. degree course is orientated into the field of digital image and speech encoding and transmission, optoelectronics systems and digital filtering as well as design of electronic and optoelectronics systems, sensor systems and digital circuit's simulation.

Ph.D. Degree Courses (title Ph.D.) - Telecommunications

The Ph.D. degree course is orientated into the field of multimedia communications, mobile and satellite communications as well as modern telecommunication technologies and networks and digital signal processing in telecommunications.

Ph.D. Degree Courses (title Ph.D.) – Measurement Techniques

The Ph.D. degree course is focused into the methodology of instrumentation in industry, scientific research and monitoring of physical parameters. The related scientific areas are metrology, sensors of different physical qualities, digital signal processing and pre-processing, calibration and self-diagnostic as well as virtual instrumentation.

3.2 List of subjects taught

3.2.1 Study plan for Bc. degree

Undergraduate Study (Bc.) – Automotive Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of electronics	2 nd	3/2	Micheali
Circuit theory	3 rd	3/2	Kocur
Signals and systems	3 rd	3/2	Mihalík, Zavacký
Digital electronics	3 rd	3/3	Levický
Programming environments for electronics and communications	3 rd	1/2	Drutarovský, Šaliga
Electronic measurement systems	4 th	2/2	Šaliga
Electroacoustics	4 th	2/2	Juhár
CAD in electronics	4 th	2/2	Galajda
Microelectronic circuits	4 th	3/2	Michaeli
Electromagnetic waves and antennas	4 th	2/2	Ovseník
Sensor networks	5 th	2/2	Kocur
Semestral projects	5 th	0/6	Galajda
Automotive electronics	5 th	2/2	Gamec
Microprocessor technology	5 th	2/2	Drutarovský
High frequency and microwave technology	5 th	2/2	Gamec
Videocommunications	5 th	2/2	Mihalík
Bachelor work	6 th	0/9	Galajda
Automotive embedded systems	6 th	3/2	Drutarovský
Active and passive safety systems	6 th	3/2	Gamec
Optoelectronic systems	6 th	2/2	Turán
Smart measurement systems	6 th	2/2	Šaliga
Satellite technology and services	6 th	3/2	Marchevský
Mobile networks and services	6 th	3/2	Doboš

Undergraduate Study (Bc.) – Electronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of electronics	2 nd	3/2	Micheali
Circuit theory	3 rd	3/2	Kocur
Signals and systems	3 rd	3/2	Mihalík, Zavacký
Digital electronics	3 rd	3/3	Levický
Programming environments for electronics and communications	3 rd	1/2	Drutarovský, Šaliga
Electronic measurement systems	4 th	2/2	Šaliga
Microelectronic circuits	4 th	3/2	Michaeli
Electroacoustics	4 th	2/2	Juhár
Electromagnetic waves and antennas	4 th	2/2	Ovseník
CAD in electronics	4 th	2/2	Galajda
High frequency and microwave technology	5 th	2/2	Gamec
Semestral projects	5 th	0/6	Galajda
Microprocessors technology	5 th	2/2	Drutarovský
Videocommunications	5 th	2/2	Mihalík
Automotive electronics	5 th	2/2	Gamec
FPGA circuits	5 th	2/2	Drutarovský, Galajda
Bachelor work	6 th	0/9	Galajda
Optoelectronic systems	6 th	2/2	Turán
Smart measurement systems	6 th	2/2	Šaliga
Mobile networks and services	6 th	3/2	Doboš
Satellite technology and services	6 th	3/2	Marchevský

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Active and passive safety systems	6 th	3/2	Gamec

Undergraduate Study (Bc.) – Telecommunications

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of electronics	2 nd	3/2	Micheali
Circuit theory	3 rd	3/2	Kocur
Signals and systems	3 rd	3/2	Mihalík, Zavacký
Digital electronics	3 rd	3/3	Levický
Programming environments for electronics and communications	3 rd	1/2	Drutarovský, Šaliga
Electronic measurement systems	4 th	2/2	Šaliga
Electromagnetic waves and antennas	4 th	2/2	Ovseník
Introduction to telecommunication	4 th	3/2	Levický
Electroacoustics	4 th	2/2	Juhár
Semestral projects	5 th	0/6	Galajda
Switching technology	5 th	3/2	Marchevský
Networks architecture	5 th	3/2	Čižmár
Access networks	5 th	3/2	Marchevský, Maceková
High frequency and microwave technology	5 th	2/2	Gamec
Microprocessor technology	5 th	2/2	Drutarovský
Videocommunications	5 th	2/2	Mihalík
FPGA circuits	5 th	2/2	Drutarovský, Galajda
Mobile networks and services	6 th	3/2	Doboš
Bachelor work	6 th	0/9	Galajda
Satellite technology and services	6 th	3/2	Marchevský
Network security	6 th	2/2	Levický
Optoelectronic systems	6 th	2/2	Turán
Smart measurement systems	6 th	2/2	Šaliga

3.2.2 Study plan for MSc. degree

Graduate Study (Ing.) – Infoelectronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Digital signal processing	1 th	3/2	Mihalík
Programmable logic Devices	1 th	2/2	Drutarovský, Galajda
Optoelectronics	1 th	2/2	Turán
Signal processors	1 th	3/2	Drutarovský
Semestral projects	2 nd	0/4	Galajda
Microwave circuits and systems	2 nd	3/2	Gamec
Digital image processing and coding	2 nd	3/2	Mihalík
Processing and transmission of speech and audio	2 nd	3/2	Juhár
Optical communication systems	2 nd	3/2	Turán
Digital filters	2 nd	2/2	Kocur
Applied cryptography	2 nd	3/2	Levický
Digital television	3 rd	3/2	Marchevský
Photonics	3 rd	3/2	Turán
Multimedia technologies	3 rd	3/2	Levický
Master thesis	3 rd	0/6	Galajda
Vehicle diagnostics systems	3 rd	3/2	Galajda
Medical electronics	3 rd	3/2	Michaeli
Mobile communications	3 rd	3/2	Doboš
Satellite communications	3 rd	3/2	Marchevský

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Multimedia database	3 rd	2/2	Juhár
Project management	4 th	0/2	Marchevský
Master thesis	4 th	0/18	Galaida

Graduate Study (Ing.) – Multimedia telecommunications

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Digital signal processing	1 th	3/2	Mihalík
Optoelectronics	1 th	2/2	Turán
Communication channel modelling	1 th	2/2	Kocur
Spread-spectrum communication systems	2 nd	3/2	Kocur
Semestral projects	2 nd	0/4	Galajda
Communications systems theory	2 nd	3/2	Čižmár
NGN networks	2 nd	3/2	Doboš
Optical communication systems	2 nd	3/2	Turán
Processing and transmission of speech and audio	2 nd	3/2	Juhár
Digital filters	2 nd	2/2	Kocur
Applied cryptography	2 nd	3/2	Levický
Multimedia technologies	3 rd	3/2	Levický
Mobile communications	3 rd	3/2	Doboš
Satellite communications	3 rd	3/2	Marchevský
Master thesis	3 rd	0/6	Galajda
Photonics	3 rd	3/2	Turán
Digital television	3 rd	3/2	Marchevský
Interactive telecommunication systems and services	3 rd	3/2	Juhár
Multimedia database	3 rd	2/2	Juhár
Project management	$4^{ ext{th}}$	0/2	Marchevský
Master thesis	4 th	0/18	Galajda

3.2.3 Study plan for Ph.D. degree

Graduate Study (PhD.) - Infoelectronics

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Theory of infoelectronics	1 th	0/2	
Foreign language	1 th	0/2	
Research project I.	1 th	0/2	
Foreign language	2 nd	0/2	
Infoelectronics systems	2^{nd}	0/2	
Research project II.	2^{nd}	0/2	
Specialization subject	$3^{\rm rd}$	0/2	
Research work	3 rd	0/8	
Research project III.	$3^{\rm rd}$	0/4	
Research work	4 th	0/8	
Research project IV.	4 th	0/2	
Research work	5 th	0/12	
Research project V.	5 th	0/2	
Thesis - Research work	6 th	0/9	

Graduate Study (PhD.) - Measurement technique

Graduate Study (1 iib.) – Weasurement teeninque			
Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Topics from mathematics and physics	1 th	0/2	
Foreign language	1 th	0/2	
Research project I.	1 th	0/2	

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Foreign language	2 nd	0/2	
Measure theory	2 nd	0/2	
Research project II.	2 nd	0/2	
Specialization subject	3 rd	0/2	
Research work	3 rd	0/8	
Research project III.	3 rd	0/4	
Research work	4 th	0/8	
Research project IV.	4 th	0/2	
Research work	5 th	0/12	
Research project V.	5 th	0/2	
Thesis - Research work	6 th	0/9	

Graduate Study (PhD.) – Telecomunications

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Communication system theory	1 th	0/2	
Foreign language	1 th	0/2	
Research project I.	1 th	0/2	
Foreign language	2 nd	0/2	
Advanced communication technology	2^{nd}	0/2	
Research project II.	2^{nd}	0/2	
Specialization subject	3 rd	0/2	
Research work	3 rd	0/8	
Research project III.	3 rd	0/4	
Research work	4 th	0/8	
Research project IV.	$4^{ ext{th}}$	0/2	
Research work	5 th	0/12	
Research project V.	5 th	0/2	
Thesis - Research work	6 th	0/9	

4 RESEARCH AND PROJECTS

4.1 International scientific projects

Project title: Cross-Modal Analysis of Audio and Video Signals

Acronym: COST 2102 Number: COST Action 2102 Program/agency: COST

Coordinator from TU: Dr.h.c. prof. Ing. Anton Čižmár, PhD.

Project partners: 160 partners from universities, research and industrial institutions from 30

European countries and from Canada and Japan

Start of project: 01/2006 End of project: 12/2010 Founding in 2009: 0,00 EUR Total founding: 0,00 EUR

Annotation: The main objective of the Action is to develop an advanced acoustical, perceptual and psychological analysis of verbal and non-verbal communication signals originating in spontaneous face-to-face interaction, in order to identify algorithms and automatic procedures capable of identifying human emotional states. Several key aspects will be considered, such as the integration of the developed algorithms and procedures for application in telecommunication, and for the recognition of emotional states, gestures, speech and facial expressions, in anticipation of the implementation of intelligent avatars and interactive dialogue systems that could be exploited to improve user access to future telecommunication services.

This COST Action is organized around three Working Groups as follows.

WG1: Task 1: Cross-modal analysis of audio and video.

Task 2: Data analysis and feature correlations.

WG2: Task 3: Cultural differences and individual and socio-cultural variations.

Task 4: Emotional states.

WG3: Task 5: Video and audio relationships synthesis and recognition.

Task 6: Data encoding and definition of an extended MPEG-7 standard annotation.

Project title: Pervasive Mobile & Ambient Wireless Communications

Acronym: COST 2100
Number: COST Action 2100
Program/agency: COST

Coordinator from TU: doc. Ing. L'ubomír Doboš, CSc.

Project partners: 56 partners from universities, research and industrial institutions from 26 European

countries and from Canada and Japan

Start of project: 01/2006 End of project: 12/2010 Founding in 2009: 0,00 EUR Total founding: 0,00 EUR

<u>Annotation:</u> To increase knowledge of mobile and wireless network technologies by exploring and developing new methods, models, techniques, strategies and tools that will facilitate the implementation of next generation mobile radio communication systems and that will foster the development of the paradigms of pervasive and ambient wireless communications.

This COST Action is organized around three Working Groups (WGs), dealing respectively with propagation and antenna issues, physical layer (i.e. mainly modulation and signal processing) aspects, and radio network aspects, as follows.

WG1: Transmission Techniques and Signal Processing

WG2: Radio Channel

WG3: Radio Network Aspects

<u>Project title:</u> INDECT – Intelligent Information System Supporting Observation, Searching and Detection for Security of Citizens in Urban Environment

Acronym: INDECT

Number: Contract No 218086

Program/agency: 7. FP

Coordinator from TU: doc. Ing. L'ubomír Doboš, CSc.

Project partners: Coordinator AGH Cracow + next 16 partners from EU countries

Start of project: 01/2009 End of project: 12/2013

<u>Founding in 2009:</u> 25.000,00 EUR Total founding: 287.203,00 EUR

Annotation: The main objectives of the INDECT project are: (1) to develop a platform for: the registration and exchange of operational data, acquisition of multimedia content, intelligent processing of all information and automatic detection of threats and recognition of abnormal behavior or violence, (2) to develop the prototype of an integrated, network-centric system supporting the operational activities of police officers, providing techniques and tools for observation of various mobile objects, (3) to develop a new type of search engine combining direct search of images and video based on watermarked contents, and the storage of metadata in the form of digital watermarks, (4) to develop a set of techniques supporting surveillance of internet resources, analysis of the acquired information, and detection of criminal activities and threats. The main expected results of the INDECT project are: (a) to realise a trial installation of the monitoring and surveillance system in various points of city agglomeration and demonstration of the prototype of the system with 15 node stations, (b) implementation of a distributed computer system that is capable of acquisition, storage and effective sharing on demand of the data as well as intelligent processing, (c) construction of a family of prototypes of devices used for mobile object tracking, (d) construction of a search engine for fast detection of persons and documents based on watermarking technology and utilizing comprehensive research on watermarking technology used for semantic search, (e) construction of agents assigned to continuous and automatic monitoring of public resources such as: web sites, discussion forums, UseNet groups, file servers, p2p networks as well as individual computer systems, (f) elaboration of Internet based intelligence gathering system, both active and passive, and demonstrating its efficiency in a measurable way.

Project title: High Altitude Platforms (HAPs) for Communications and Other Services

Acronym: HAPCOS

Number: COST Action 297 Program/agency: COST

Coordinator from TU: doc. Ing. Pavol Galajda, CSc.

Project partners: 17 partners from university, research and industrial institutions

Start of project: 10/2005 End of project: 10/2009

Founding in 2009: 4.900,00 EUR Total founding: 35.000,00 EUR

Annotation: The work is ongoing in three Working Groups (WG): "WG1 Radio Communication Aspects", "WG2 Optical Communication Aspects" and "WG3 Aerial Platform Developments". Our

research group is focused on the tasks of WG1 such as multi-carrier systems, multiple-access techniques, multi-user detection and interference suppression techniques in wireless communication services based on HAPs. The partial goals are focused on wireless transmission systems from High Altitude Platforms based on MC-CDMA and OFDM techniques, considering channel estimation problems, peak-to-average-power ratio reduction problem, high power amplifier nonlinearities, power amplifier linearization and predistortion schemes and MIMO-OFDM receiver design and compensation of the non-linear distortion due to the high power amplifiers of the transmitters.

Project title: RF/Microwave Communication Subsystems for Emerging Wireless Technologies

Acronym: RFCSET

Number: COST Action IC0803

Program/agency: COST

Coordinator from TU: prof. Ing. Dušan Kocur, CSc.

Project partners: 25 partners from university, research and industrial institutions

Start of project: 04/2009 End of project: 04/2012

<u>Founding in 2009:</u> 1.038,19 EUR Total founding: not defined

Annotation: The research within RFCSET is focused on two different directions. The former is represented by MIMO-OFDM systems, considering channel estimation problems, peak-to-average-power ratio reduction problem, MIMO-OFDM receiver design and compensation of the non-linear distortion due to the high power amplifiers of the transmitters. The latter research line of RFCSET is intent on radar signal processing for through wall tracking of moving target by UWB radar systems. Some of the problems considered here will be the design of new sophisticated methods of background subtraction and weak signal enhancement, development of new methods of multiple-target detection and tracking and the development of suitable cooperative methods of target localization by two independent UWB radar systems.

<u>Project title:</u> Ultra Wideband Radio Application for Localisation of Hidden People and Detection of Unauthorised Objects

Acronym: RADIOTECT

Number: COOP-CT-2006-032744

Program/agency: 6.FP

Coordinator from TU: prof. Ing. Dušan Kocur, CSc.

Project partners: MEODAT Meßtechnik, Ortung und Datenverarbeitung GmbH (Germany),

Geozondas Ltd (Lithuania), Ingmetal (Slovakia), Ingenieur Büro Ralf Klukas – Dresden (Germany),

Technische Universitaet Ilmenau (Germany), Vrije Universiteit Brussel (Belgium), Techische Universiteit Delft (Netherlands), Statens Räddningsverk (Sweden), Crabbe Consulting Ltd

(Germany)

Start of project: 01/2007 End of project: 06/2009 Founding in 2009: 0,00 EUR Total founding: 112.800,00 EUR

Annotation: The aim of the project RADIOTECT has been to develop a high resolution radar (the width frequency band up to 5GHz) and the radar systems performing in M-band (60 GHz radar system). The project team of Technical University of Kosice has been responsible for the development of signal processing methods for through wall tracking of moving persons as well as for through wall imaging of static objects by SAR by using of UWB radars.

Project title: Metrological Characterisation of the ADConverters "ADCWAN"

Acronym:

Number: EUR 75000

Program/agency: MIUR Italy call: D. M. 5.8.2004, n. 262 - Programmazione del sistema

universitario

Coordinator from TU: prof. Ing. Linus Michaeli, DrSc.

Project partners: University of Italy

Start of project: 01/2007 End of project: 12/2009 Founding in 2009: Total founding:

<u>Annotation:</u> Research of the hardware and software tools of the Data Acquisition Systems integrated with the computerized information environment. The project meets needs of highly qualified graduates, experienced in the quality assessment of the virtual instruments utilized in the industry and their permanent monitoring.

Project title: Innovation Transfer Network

Acronym: IN.TRA.NET

Number: LLP-LDV/TOI/08/IT/493 Program/agency: Leonardo da Vinci

Coordinator from TU: doc. Ing. Ján Šaliga, PhD.

<u>Project partners:</u> DIDA NETWORK SRL, Rome, Italy, University of Sannio, Benevento Italy, Universitat Politècnica de Catalunya, Spain, Sannio Industry Union, Benevento, Italy, Technical

university of Kosice, Slovakia Start of project: 10/2008 End of project: 10/2010

Founding in 2009: 11.600,00 EUR Total founding: 38.000,00 EUR

Annotation: IN.TRA.NET. (INnovation TRAnsfer NETwork) is a project that aims to realize a learning environment specific for continuous updating of European professionals and SMEs that use electronic and control apparatus. The general purpose is to improve the competitiveness of European SMEs thanks to the possibility of professionals and technicians to make self training on last generation apparatus to better the quality of final products. IN.TRA.NET environment allows to access to didactic courses to acquire important and innovative information concerning the practical use of electronic devices and to control these last by remote instrumentation via web.

<u>Project title:</u> Propagation Tools and Data for Integrated Telecommunication, Navigation and Earth Observation Systems

Acronym:

Number: COST Action IC0802

Program/agency: COST

Coordinator from TU: Dr.h.c. prof. RNDr. Ing. Ján Turán, DrSc.

Project partners: TU Graz, TU Budapest, TU Toulouse, University Nothumbia UK, CVUT Prague,

University Bonn, University Roma, University Vigo

Start of project: 09/2009 End of project: 09/2012

Founding in 2009: 8.000,00 EUR Total founding: 24.000,00 EUR

<u>Annotation:</u> Telecommunication, Navigation and Earth Observation systems and services are developing world-wide with a multiplicity of standalone terrestrial and space systems that operate in diverse frequency bands. Global Integrated Networks (GIN) will be necessary in the near future to provide better integrated services. Their design requires a comprehensive knowledge of the various propagation media. Up to now radio channel modelling has been performed separately for each type of radio systems.

This activity will develop a coordinated set of models, techniques and data related to the radio channel in order to improve the design and performance of Global Integrated Networks.

The activity will recommend and provide the most appropriate radio channel models, channel assessment techniques and data for the design and operation of these GINs.

The frequencies of interest range from 100 MHz to 100 GHz (VHF to W band) and cover optical free space communications. The target architectures include mobile and fixed, satellite and terrestrial communication systems (including optical links), satellite navigation systems and Earth Observation systems.

The activity will bring together remote sensing, propagation and systems experts. The physical propagation fundaments will be based on experimental and climatological data.

4.2 National scientific projects

<u>Project title:</u> Remote Laboratory for Experimental Testing of Complex Reconfigurable Systems/Circuits Based on FPGA Circuits

Acronym:

Number: 3/5238/07

Program/agency: KEGA of Ministry of education of Slovak Republic

Coordinator from TU: doc. Ing. Miloš Drutarovský, CSc.

Project partners:

Start of project: 01/2007 End of project: 10/2009

<u>Founding in 2009:</u> 24.517,00 EUR Total founding: 56.914,00 EUR

Annotation: Establishment of comprehensive software and technological platform for development with complex Altera FPGA circuits from specification up to the real verification in target hardware. Providing access to modern EDA (Electronic Design Automation) tools of Altera and Mentor Graphics companies, selected licensed IP (Intellectual Property) blocks and their remote usage through application and license servers. Set up of hardware working place with powerful measurement equipments (logic analyzer, digital storage oscilloscope, programmable generator) for testing complex designs based on FPGA circuits with basic remote acquiring of measured signals and configuration of target FPGA kits. Providing of a working place with selected kits for testing designs of basic CPLD and FPGA circuits, utilization of DSP IP blocks for digital signal processing, and utilization of soft processors in embedded applications. Creating of web learning materials about basic blocks, tools and principles for effective development with FPGA circuits.

<u>Project title:</u> Speech Technologies for Advanced Telecommunication and Information Systems and Services in Slovak Language

Acronym: SPEETIS Number: APVV-0369-07 Program/agency: APVV

Coordinator from TU: doc. Ing. Jozef Juhár, CSc.

Project partners: Institute of Informatics SAS in Bratislava, University of Žilina

Start of project: 09/2008 End of project: 12/2010

<u>Funding in 2009:</u> 69.873,00 EUR <u>Total funding:</u> 148.510,00 EUR

Annotation: Project is focused on speech technologies for advanced, voice operated telecommunication and information systems and services with potential impact of research results on other areas of speech technologies. The goals of the project are strictly aimed at Slovak language and research of robust and large vocabulary continuous speech recognition, concatenative and corpus speech synthesis and advanced dialogue modeling and management for spoken dialogue systems. An originality and innovativeness of the proposed tasks lies in technical, theoretical and knowledge pre-requisites, which will further improve a naturalness and reliability of the manmachine speech interface in Slovak.

Project title: Intelligent Control of Service Robot

Acronym: INTRO

Number: VMSP-P-0004-09 Program/agency: APVV

Coordinator from TU: doc. Ing. Jozef Juhár, CSc.

Project partners: ZŤS VVÚ Košice a.s., STU in Bratislava

Start of project: 09/2009 End of project: 08/2011

<u>Funding in 2009:</u> 7.192,00 EUR <u>Total funding:</u> 43.150,00 EUR

Annotation: The project deals with intelligent control of mobile servis robots, meant for using in nuclear plants, in fight again therorism and in pyrotechnics. The goal of the project is to improve the self-reliance of the robots by introducing abilities to recognize speech, to analyze picture, to respond to informations from sensors and to cooperate and coordinate its activity with other robots. The goal of KEMT TUKE team is to develop a robust module for voice control of robot, based on speech recognition of isolated commands in Slovak language and its experimental evaluation in real conditions.

<u>Project title:</u> Development of Measurement Apparatus and Multimedia e-Learning Book Supporting Education in the Field of UWB Sensor Networks

Acronym: UWB-BSS Number: 3/7523/09

Program/agency: KEGA of Ministry of education of Slovak Republic

Coordinator from TU: prof. Ing. Dušan Kocur, CSc.

Project partners:

Start of project: 01/2009 End of project: 06/2011

<u>Founding in 2009:</u> 17.040,00 EUR <u>Total founding:</u> 48.064,79 EUR

Annotation: Project UWB-BSS is intent on the evolution of students' knowledge in the field of UWB wireless networks within M.Sc. study programs Infoelectronics and Multimedia Telecommunications given at the Technical University of Košice through the development of the new subject "UWB Wireless Networks" to be provided within the mentioned study programs. The project results will be represented by the creation of the excellent conditions for education in the field of UWB sensor networks (new top world-standard technology) with the application of the

advanced education methods (lectures and exercises held in the specialized laboratory, education supported by multimedia and e-learning technology).

Project title: Through Wall Tracking of Moving Targets by Using UWB Radar Systems

Acronym: TW-MTT-UWB Number: LPP-0080-09 Program/agency: APVV

Coordinator from TU: prof. Ing. Dušan Kocur, CSs.

Project partners:

Start of project: 09/2009 End of project: 08/2012

<u>Founding in 2009:</u> 5.925,00 EUR <u>Total founding:</u> 49.800,00 EUR

Annotation: The project is intent on the design of new methods of radar signal processing obtained by the UWB radar for the purpose of through obstacle (e.g. wall) detection and tracking of moving multiple targets with a possibility to track individual targets within a group of targets. For that purpose, two research lines will be followed and investigated. The former will be represented by the development of a multiple target tracking method based on a modification and extension of the trace estimation method. On the contrary, the latter approach will be based on the application of two independent radar systems in combination with the advanced methods of the multiple target localization by using cooperative positioning methods.

Project title: Digital Signal Processing for Target Detection and Tracking in UWB Radars

Acronym: DSP-UWB-RAD

Number: LPP-0287 Program/agency: APVV

Coordinator from TU: prof. Ing. Dušan Kocur, CSc.

Project partners:

Start of project: 06/2006 End of project: 08/2009

<u>Founding in 2009:</u> 21.941,18 EUR <u>Total founding:</u> 94.802,00 EUR

Annotation: The intention of the LPP-0287-06 project has been to develop new signal processing methods intent on UWB radar signal processing for the purpose of through obstacle tracking of moving targets. For that purpose, the project team developed the new radar signal processing procedure referred to as trace estimation method consisting of the following phases of signal processing: (1) radar signal pre-processing, (2) background subtraction, (3) post-processing of radargram with subtracted background, (4) distributed target detection, (5) time of arrival and trace estimation, (6) target localization, (7) wall effect compensation and (8) multiple target tracking. The properties of the proposed trace estimation method have been verified based on processing of UWB radar signals obtained at measurements for number representative scenarios. The obtained results has shown very clearly that propose approach enables robust through wall tracking of single moving target as well as under some circumstances, through wall tracking of multiple moving targets.

Project title: Center of Information and Communication Technologies for Knowledge Systems

Acronym: CE-FEI-I

Number: IMTS-26220120020

Program/agency: Operational Program Research and Development, Call OPVaV-2008/2.1/01-

SORO

Coordinator from TU: prof. Ing. Dušan Kocur, CSc.

Project partners:

Start of project: 05/2009 End of project: 04/2011 Founding in 2009: 0,00 EUR Total founding: 1.327.756,75 EUR

Annotation: The project objective is to establish the "Center of Information and Communication Technologies for Knowledge Systems" as the excellency center of the research and development in the field of information and communication technologies and artificial intelligence with the stress to basic and applied research, development and technology transfer providing extensive support to all stages of the university education in the field of information and communication technologies and artificial intelligence. The Center will be build up in such a way as to be the important subject of the Technical University of Košice with regard to creation of the meaningful support and development of the research and development and university education at Technical University of Košice in the field of the Center scope.

Project title: Multimedia Communication Security

Acronym:

Number: 1/4054/07 Program/agency: VEGA

Coordinator from TU: prof. Ing. Dušan Levicky, CSc.

Project partners:

Start of project: 01/2007 End of project: 12/2009

<u>Founding in 2009:</u> 29.875,00 EUR <u>Total founding:</u> 89.610,00 EUR

Annotation: The research within project is focused on three different directions. The first direction is multimedia content protection based on digital watermarks in gray scale images and video as well as digital image steganography in DCT and DWT domain. Second direction is peoples recognition and verification by using biometric characteristics such as palms and voice and based on text- independent speaker recognition. Third direction is mobile networks security by using new routing and CAC protocols for mobile terminals with limited computational capacity.

Project title: Reconfigurable Platforms for Wireless Communication Networks

Acronym:

Number: 1/4088/07 Program/agency: VEGA

Coordinator from TU: prof. Ing. Stanislav Marchevský, CSc.

Project partners:

Start of project: 01/2007 End of project: 12/2009

<u>Founding in 2009:</u> 21.237,00 EUR Total founding: 44.556,80 EUR

Annotation: The project was aimed on the design of new algorithms suitable for their implementation based on reconfigurable architecture platforms. The new methods were designed for video concealment for wireless IP networks based on bayesian filters. There was designed road detection algorithm for driving space of automobile. There were designed new methods for MAI suppression in wireless channels and multiuser microstatistic receiver for MC-CDMA transmission system, compensating nonlinear distortion caused by high power stage of transmitter. New nonlinear iterative receiver for SC-FDMA transmission system was proposed. The set of

pseudorandom sequences with low wave ripple code words (PAPR) for transmission OFDM systems was designed and tested. The enhanced topology of TNRG generator which shows the decreased sensitivity on supply voltage change and provides FIPS 140-2 compatible random data for embedded applications (the encryption keys generating).

<u>Project title:</u> Metrological Characterisation of the Analog to Digital Interfaces and Improvement of its Properties

Acronym:

Number: 1/0103/08 Program/agency: VEGA

Coordinator from TU: prof. Ing. Linus Michaeli, DrSc.

Project partners:

Start of project: 01/2008 End of project: 12/2010 Founding in 2009: Total founding:

Annotation: Research of dynamic testing methods for ADC and DAC of various architectures using unconventional signals, which are useful in less equipped laboratories. The fast ADC testing methods based on the unified error model and exponential testing signal will be implemented. The relation between obtained testing results and results from the standardised methods will be studied. The integral part will be the study of the digital methods for signal processing for error reduction.

Research of the band-pass sigma-delta ADCs for direct conversion of the physical quantity recorded by a capacitive sensor into complex number describing real and imaginary component from the output. Research will be targeted on the new testing methods for bandpass sigma delta converters and accuracy assessment of the conversion of its real and imaginary part. Besides the physical quantity assessment the complex representation can act as the diagnostic attribute or a tool for the improvement of the measurement accuracy.

$\frac{Project\ title:}{\textbf{Exploitation}\ of\ WEB\ Technologies\ for\ Electronic\ Courses\ Requiring}}{\textbf{Laboratory}\ Exercises}$

Acronym:

Number: 3/7115/09

Program/agency: KEGA of Ministry of education of Slovak Republic

Coordinator from TU: prof. Ing. Linus Michaeli, DrSc.

Project partners:

Start of project: 01/2009 End of project: 12/2011 Founding in 2009: Total founding:

Annotation: The main objective of the project is implementation of the experiences from the existing web portal http://meas-lab.fei.tuke.sk, to create measuring laboratory with on-line access for students performing laboratory exercises from the courses "Basic electronics" and "Microelectronics". Next objective was to evaluate possibilities of information and communication technologies for the laboratory experiment in the vocational training.

5 CO-OPERATION

5.1 National co-operation

- Slovak Telecom
- VSE, Košice
- Volkswagen Slovakia a.s.
- Slovak Academy of Science
- Ingmetal s.r.o., Prešov
- Contineo s.r.o., Košice
- Elcom s.r.o., Prešov

5.2 International co-operation

- MEDAV GmbH, Germany
- Meodat Meßtechnik, Germany
- Ingenieur Büro Ralf Klukas, Germany
- Crabbe Consulting Ltd, Germany
- INESC Lisabon, Portugal
- IMEC, Netherlands
- Statens Räddningsverk, Sweden
- ŠkodaAuto Mladá Boleslav, Czech Republic
- Geozondas Ltd., Lithuania
- Vrije Universiteit Brussel, Belgium
- Technische Universität Ilmenau, Germany
- Hamburg University of Technology, Germany
- Techische Universiteit Delft, Netherlands
- Universitat Ramon Llull, Barcelona, Spain
- Technical University Budapest, Hungary
- Technical University of Ljubljana, Slovenia
- Technical University of Clju-Napoca, Romania
- University of Firenza, Italy
- University of Gent
- University of Maribor, Slovenia
- University of Sannio, Italy
- University of Reggio Di Calabria, Italy
- University of Mediteranea, Italy
- University of Bologna, Italy
- Universite Jean Monnet-Saint-Etienne, France
- University of Gävle, Sweeden

6 FACULTY ESSAYS

Čižmár Anton

Full professor

His research interests include speech processing, data compression, digital communications, project management, telecommunication technologies and services.

Doboš Ľubomír

Associated professor

His current research interests include mobile and wireless communication systems with focus on Call Admission Control algorithms for next generation mobile systems, Routing protocols for Mobile Ad-Hoc systems, MIMO systems and Multimodal mobile systems and services (focus on Speech processing).

Drutarovský Miloš

Associated professor

His research interests include applied cryptography, digital signal processing, algorithms and architectures for embedded cryptographic architectures and sensor networks, digital signal processors, FPGAs, microcontrollers and soft microcontrollers embedded into the FPGAs.

Galajda Pavol

Associated professor

His research interests include nonlinear circuit's theory and Chaos theory, nonlinearities in digital transmission systems MC-CDMA OFDM, High Altitude Platforms (HAPs) and programmable logic devices- ALTERA and FPGA circuits.

Gamec Ján

Associated professor

His general research interests include digital signal processing, block - matching algorithm and motion estimation.

Gamcová Mária

Assistant professor

Her general research interests include one and two-dimensional processing based on the method of digital filtering.

Gladišová Iveta

Assistant professor

Her research interests are in the digital signal processing, geometric source coding and vector quantization, an algorithm for lattice and pyramid quantizers and codes.

Juhár Jozef

Associated professor

His research interests are in digital speech/audio processing and transmission, automatic speech/speaker recognition, speech synthesis, dialogue modelling and application of speech technologies in developing and deploying automatic voice services in telecommunications and Internet.

Klenovičová Zita

Assistant professor

Her research interests include digital circuits and digital picture processing.

Kocur Dušan

Full professor

His research interest is in spread spectrum communication systems; CDMA, MC-CDMA and UWB transmission systems; UWB radar signal processing, psychoacoustics and digital signal processing.

Levický Dušan

Full professor

His main interests and activities are in the multimedia communications, cryptography and watermarking.

Maceková Ľudmila

Assistant professor

Her main interests and activities are focused on both areas of channel modelling for HAP communications and access networks.

Marchevský Stanislav

Full professor

His main research interests are multidimensional digital filters, linear and non-linear digital filters for image processing, and design of multi-user detectors for CDMA signals from satellites.

Michaeli Linus

Full professor

His research interests are the pre-processing systems in the instrumentation, modelling of AD and DA converters and methods for correction of their uncertainties, industrial measurement and virtual instrumentation.

Mihalík Ján

Full professor

His current research interest includes signal and information theory, image and video coding, digital image and video processing, application the techniques of coding and processing in the standard image and video codecs, finally multimedia videocommunications in PSTN, mobile, ISDN, ATM telecommunication networks and Internet on the basis of the standards.

Ondáš Stanislav

Assistant professor

His research interests include spoken dialogue systems, dialogue processing, spoken language understanding, speech processing and conversational agents.

Ovseník Ľuboš

Associated professor

His general research interests include digital signal processing (Video Control and Video Surveillance Systems), fiber optical sensors and the fiber optics and its applications in communications (FSO-Free Space Optics, VLC-Visible Light Communication, etc.), sensing and signal processing (Optical Correlator, etc.).

Papaj Ján

Research assistant

His current research interests include mobile ad hoc networks (MANET), QoS, security and routing protocols for MANET.

Pleva Matúš

Research assistant

His research interests include speech processing, automatic broadcast news processing, digital communications, Voice over IP technologies and services, telecommunication technologies and routing backbone networks.

Ridzoň Radovan

Assistant professor

His general research interests include multimedia, digital watermarking and network security.

Rovňáková Jana

Research assistant

Her general research interests and activities are in the UWB radar signal processing.

Šaliga Ján

Associated professor

His general research interests include ADC testing, distributed measurement systems, measurement instruments, systems and methods.

Špány Viktor

Professor Emeritus

His main interests and activities are in the non-linear circuits theory, smart sensors, flip-flop sensors, integrated functional blocks and statistical sensors.

Švecová Mária

Assistant professor

Her general research interests and activities are in the UWB radar signal processing.

Turán Ján

Full professor

His main interests and activities are in the digital signal processing, Hough transform, rapid transform, fiber optics and its applications in communications, sensing and signal processing.

Zavacký Jozef

Assistant professor

His current interest includes signal and information theory, sampling of the one-dimensional and multidimensional signals.

7 Ph.D. STUDENTS

Name	Supervisor	Degree Course
First year of study Internal form:		
Ing. Vladimír Cipov	doc. Doboš	Telecommunications
Ing. Peter Goč-Matis	prof. Levický	Telecommunications
Ing. Branislav Hrušovský	prof. Marchevský	Telecommunications
Ing. Martin Liptaj	doc. Galajda	Infoelectronics
Ing. Pavol Mišenčík	prof. Turán	Infoelectronics
Ing. Martin Sekerák	prof. Michaeli	Measurement technique
Ing. Daniel Urdzík	prof. Kocur	Infoelectronics
Ing. Peter Viszlay	doc. Juhár	Infoelectronics
Ing. Eva Vozáriková	prof. Čižmár	Telecommunications
External form:		
Ing. Daniel Fábry	doc. Šaliga	Telecommunications
Second year of study		
<u>Internal form:</u>		
Ing. Vladimír Bánoci	prof. Levický	Telecommunications
Ing. Radovan Blicha	doc. Galajda	Infoelectronics
Ing. Milan Čík	prof. Marchevský	Telecommunications
Ing. Tomáš Kanócz	prof. Levický	Telecommunications
Ing. Anna Kolesárová	doc. Ovseník	Infoelectronics
Ing. Ján Staš	doc. Juhár	Infoelectronics
Third year of study		
Internal form:		
Ing. Gabriel Bugár	prof. Levický	Telecommunications
Ing. Marián Chovanec	prof. Michaeli	Measurement technique
Ing. Peter Drotár	doc. Galajda	Infoelectronics
Ing. Martin Fifik	prof. Turán	Infoelectronics
Ing. Juraj Gazda	prof. Kocur	Infoelectronics
Ing. Pavol Kocan	prof. Marchevský	Telecommunications
Ing. Martin Lojka	doc. Juhár	Infoelectronics
Ing. Lenka Macková	prof. Čižmár	Telecommunications
Ing. Ján Mochnáč	prof. Marchevský	Infoelectronics
Ing. Marek Papco	doc. Juhár	Telecommunications
Ing. Ján Šterba	prof. Kocur	Telecommunications
Ing. Michal Varchola	doc. Drutarovský	Infoelectronics
External form:		
Ing. Kamil Šindlery	prof. Marchevský	Infoelectronics
Fourth year of study		
External form:		
Ing. Rastislav Kokoška	prof. Marchevský	Telecommunications
Ing. Péter Szoboszlai	prof. Turán	Infoelectronics

Fifth year of study

External form:

Ing. Sakhia Darjanprof. ČižmárTelecommunicationsIng. Ľubomír Horniakprof. MichaeliMeasurement techniqueIng. Miroslav Katrákdoc. JuhárTelecommunicationsIng. Henrieta Palubovádoc. GalajdaInfoelectronics

Ing. Peter Patlevičdoc. DobošTelecommunicationsIng. Milan Ruskodoc. JuhárTelecommunicationsIng. Peter Želinskýdoc. GalajdaInfoelectronics

8 MEMBERS

Čižmár Anton, Member of Technical Standardization Commission No.41 for Telecommunications.

Čižmár Anton, Member IEEE Affiliate Computer Society, No. 41237162.

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Juhár Jozef, Member of IEEE, Memb. No. 90402602.

Juhár Jozef, Member of ISCA International Affairs Sub-committee on Eastern Europe.

Juhár Jozef, Member of the editorial board "International Journal of Signal and Imaging Systems Engineering", Issued by Inderscience Publishers, Geneva, Switzerland.

Juhár Jozef, Member of Technical Standardization Commission No.55 for Electroacoustics and ultrasound.

Kocur Dušan, Executive editor of the editorial board of the journal "Acta Electrotechnica et Informatica".

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Levický Dušan, Member of the editorial board of the journal "Acta Electrotechnica et Informatica".

Levický Dušan, Member of the editorial board of the journal "Slaboproudý obzor".

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Michaeli Linus, Head of Slovak IMEKO National Committee and head of the IMEKO Technical Committee TC-4 "Measurement of Electrical Quantities".

Michaeli Linus, Member of the editorial board "Computer Standard & Interfaces", Issued by Elsevier, Amsterdam, New York.

Michaeli Linus, Member of the reviewer board "Measurement". Journal IMEKO, Issued by Elsevier, Amsterdam, New York.

Michaeli Linus, Co-ordinator of IMEKO Working Group "AD and DA metrology".

Michaeli Linus, Member of the IEEE, Instrumentation & Measurement Society.

Michaeli Linus, Member of the scientific board of Electrotechnical Faculty, University Transport and Communication, Žilina, Slovakia.

Michaeli Linus, Member of the editorial board "Measurement Science Review", Issued by SAV, Bratislava.

Michaeli Linus, Editor in Chief of the editorial board of the journal "Acta Electrotechnica et Informatica".

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Turán Ján, Member of Czech and Slovak Radioelectronics Society.

Turán Ján, Member of the editorial board of the journal "Acta Electrotechnica et Informatica".

9 PUBLICATION ACTIVITY OF THE DEPARTMENT

9.1 Books

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