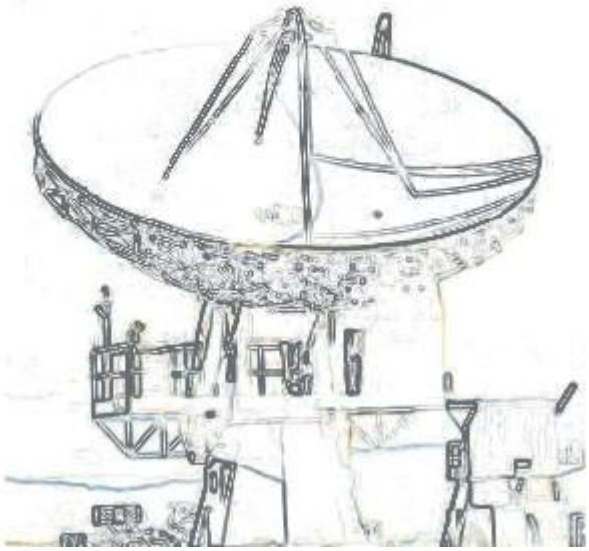
DEPARTMENT OF ELECTRONICS AND MULTIMEDIA TELECOMMUNICATIONS

Department Of
Electronics
& Multimedia Communications



Annual Report

2010

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

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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 Šťány, Ján Turán
- Associate Professors: Ľubomír Doboš, Miloš Drutarovský, Pavol Galajda, Ján Gamec, Jozef Juhár, Ľuboš Ovseník, Ján Šaliga
- Assistant Professors: Mária Gamcová, Iveta Gladišová, Zita Klenovičová, Ľudmila Maceková, Stanislav Ondáš, Radovan Ridzoň, Mária Švecová, Jozef Zavacký

- Research Assistant: Daniel Hládek, Miroslav Katrák, Martin Lojka, Michal Mirilovič, Ján Papaj, Marek Papco, Matúš Pleva, Jana Rovňáková
- Support staff: Božena Marchevská, Milan Peška, Viera Šumáková, Lenka Talpašová

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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fax: +421-55-636323989

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phone: +421-55-6022294 e-mail: Anton.Cizmar@tuke.sk

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Research Assistant: Ing. Matúš Pleva, PhD.
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Laboratory of Digital Signal Processing and Satellite Communications

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Research Assistant: Mgr. Jana Rovňáková, PhD.
phone: +421-55-6024234 e-mail: Jana.Rovnakova@tuke.sk

Laboratory of Digital Image Processing and Videocommunication
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Assistant professor: Ing. Jozef Zavacký, CSc.
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Laboratory of Optoelectronic Communications
http://los.fei.tuke.sk/
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Associated professor: doc. Ing. Ľuboš Ovseník, PhD.
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Associated professor: doc. Ing. Ján Gamec, CSc.
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Laboratory of Electronic Circuits & Measurement
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Associated professor: doc. Ing. Ján Šaliga, CSc.
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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

- Fiber optic education system:
  - ♦ Optical bench with 2 x HeNe laser,
  - ♦ Fiber optic power meter,
  - ♦ Fibre optic transmitter (7 x transmit module with LED diode – 565, 583, 635, 660, 830, 850 and 900 nm),
  - ♦ Fibre optic receiver (2 x receive module with PIN diode),
  - ♦ Optical bench (the simulate attenuation: air gap, axial displacement and angle of approach),
  - ♦ Fiber optic (plastic fibre 0.5, 5, 10, 20 and 50 m; glass fibre 1 and 20 m),
  - ♦ Coaxial cable (100 m),
  - ♦ Storage case (add-on transformer),
  - ♦ Opto-couplers.
- Unique optoelectronic devices:
  - ♦ Optical Cambridge correlators,
  - ♦ Fiber optic refractometer,
  - ♦ Optically powered system,
  - ♦ Weather sensor (measured: temperature, relative humidity, density of floating particles in the air).
- Advanced optoelectronic equipments:

- FSO system LightPointe Flight Strata 155E (Free-space wavelength 850 nm, full-duplex 155 Mbps, operational range 2000 m clear air and 1000 m extreme rain),
- FSO system FSona SONAbeam™ 155-E (Free-space wavelength 1550 nm, full-duplex 125 Mbps, operational range 3500 m clear air and 1700 m extreme rain),
- Near-Infrared Spectrometer NIRQuest256-2.1 (wavelength range: 900 to 2050 nm),
- OTDR: EXFO FTB-200 (compact platform for multilayer, multimedium testing),
- All-Fibre Handheld OTDR—AXS-110 (wavelengths: 1310/1490/1550/1625/850/1300 nm),
- Fusion splicer Fitel S178 (applicable fibers: SM, MM, DSF, NZD, EDF, BIF/UBIF (Bend insensitive fiber)),
- Fiber Power Meters KI 7600C Series (options for 600 - 1700 nm, +27 to -70 dBm, SMF, MMF and large core (0.2 - 3 mm) fiber).

- Computers:
  - Server (PC Pentium III),
  - 2 x PC Pentium IV computers (2,8 GHz, HDD 200GB),
  - 2 x Laptop,
  - Switch (16 port and 8 port)
  - Web cameras, printers, scanners,…
- Software tools:
  - System RSoft's simulation software of optical communication:
    - Software OptSim (simulate single mode optical communication systems at the signal propagation level),
    - Software ModeSYS (simulate multimode optical communication systems at the signal propagation level),
  - Multimedia ToolBook software.
- Microwave measuring bench for cm waves with klystron power.

Laboratory of multimedia and network security

- Advanced equipments:
  - 6x VoIP phones,
  - 3x Wireless LAN controllers,
  - Intrusion detection system,
  - 3x Terminal server AUX,
  - Exchange for DSL,
  - Exchange for PSTN.
- Computers:
  - Server (Monitor, CD/DVD/Blue ray,…),
  - 6x Switch,
  - 9x L3 Switch distribution,
  - Wifi 802.11a/b/g Access Point (Asus WL 520g),
  - 6x Access point,
  - 6x Lightweight Access Point,
  - 12x PC Pentium IV (2,8 GHz, HDD 200GB, Windows/Linux),
  - 13x 17''-LCD monitors, LCD TV Samsung 40“ Full HD,
  - 6x Web cameras,
  - 10x Routers (3x with VoIP accessories),
  - 2x Firewall (for VoIP services).
- 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,
- Spoken language dialogue system, developed in the scope of national research project, enabling information retrieval using voice interaction between human and computer in Slovak language through telecommunication network and it finds information distributed in Internet(prototype). It serves as platform for development of speech and mobile technologies and human – computer interaction,
- 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),
- IBM DS3300/x3650 M3/x3850 X5 computing and data storage centre. The DS3300 provides scalable storage array which is used for text and speech databases, consisting of 12 SATA disk bays (3 disks – 5TB already installed) with iSCSI interface. The high performance 3x4CPU servers are used for acoustical and language modeling issues, which could be parallelized and needs also a huge storage and high performance access to the databases. These server provides also totally 84GB of memory which is necessary for this type of tasks,
- The VoIP Traffic Generator and Analyzer consisting of the Abacus 50 GigE test system and ClearSight™ Analyzer & Network Time Machine,
- TIMS (Telecommunication Instructional Modelling System) - hardware and software based platform for modelling telecoms theory and techniques within the laboratory telecommunications and signal processing courses,
- OPNET Modeller Simulator is the world leading discrete event R&D network tools, providing research environment for design, modelling, simulation and analysis of many types of communications networks,
- Hand-held Bruel & Kjaer Analyzer Type 2270 for sound and vibration measurement, analysis and recording,
- Acoustic measurement system Audiomatica (Clio FW Standard 10, Clio Pre-01 Mk2, Clio QC Box Model 5, CLIO accelerometer ACH-01, mics, notebook.

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

Undergraduate Study (Bc.) – Electronics

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

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

Undergraduate Study (Bc.) – Telecommunications

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Basics of electronics	2nd	3/2	Micheali
Circuit theory	3rd	3/2	Kocur
Signals and systems	3rd	3/2	Mihalík, Zavacký
Digital electronics	3rd	3/3	Levický
Programming environments for electronics and communications	3rd	1/2	Rovňáková, Šaliga
Electronic measurement systems	4th	2/2	Šaliga
Electromagnetic waves and antennas	4th	2/2	Ovseník
Introduction to telecommunication	4th	3/2	Levický
Electroacoustics	4th	2/2	Juhár
Semestral projects	5th	0/6	Galajda
Switching technology	5th	3/2	Marchevský
Networks architecture	5th	3/2	Čižmár
Access networks	5th	3/2	Marchevský, Maceková
High frequency and microwave technology	5th	2/2	Gamec
Microprocessor technology	5th	2/2	Drutarovský
Videocommunications	5th	2/2	Mihalík
FPGA circuits	5th	2/2	Drutarovský, Galajda
Mobile networks and services	6th	3/2	Doboš
Bachelor work	6th	0/9	Galajda
Satellite technology and services	6th	3/2	Marchevský
Network security	6th	2/2	Levický
Optoelectronic systems	6th	2/2	Turán
Smart measurement systems	6th	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	1th	3/2	Mihalík
Programmable logic Devices	1th	2/2	Drutarovský, Galajda
Optoelectronics	1th	2/2	Turán
Signal processors	1th	3/2	Drutarovský
Semestral projects	2nd	0/4	Galajda
Microwave circuits and systems	2nd	3/2	Gamec
Digital image processing and coding	2nd	3/2	Mihalík
Processing and transmission of speech and audio	2nd	3/2	Juhár
Optical communication systems	2nd	3/2	Turán
Digital filters	2nd	2/2	Kocur
Applied cryptography	2nd	3/2	Levický
Digital television	3rd	3/2	Marchevský
Photonics	3rd	3/2	Turán
Multimedia technologies	3rd	3/2	Levický
Master thesis	3rd	0/6	Galajda
Vehicle diagnostics systems	3rd	3/2	Galajda
Medical electronics	3rd	3/2	Michaeli
Mobile communications	3rd	3/2	Doboš
Satellite communications	3rd	3/2	Marchevský

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

Graduate Study (Ing.) – Multimedia telecommunications

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Digital signal processing	1th	3/2	Mihalík
Optoelectronics	1th	2/2	Turán
Communication channel modelling	1th	2/2	Kocur
Spread-spectrum communication systems	2nd	3/2	Kocur
Semestral projects	2nd	0/4	Galajda
Communications systems theory	2nd	3/2	Čižmár
NGN networks	2nd	3/2	Doboš
Optical communication systems	2nd	3/2	Turán
Processing and transmission of speech and audio	2nd	3/2	Juhár
Digital filters	2nd	2/2	Kocur
Applied cryptography	2nd	3/2	Levický
Multimedia technologies	3rd	3/2	Levický
Mobile communications	3rd	3/2	Doboš
Satellite communications	3rd	3/2	Marchevský
Master thesis	3rd	0/6	Galajda
Photonics	3rd	3/2	Turán
Digital television	3rd	3/2	Marchevský
Interactive telecommunication systems and services	3rd	3/2	Juhár
Multimedia database	3rd	2/2	Juhár
Project management	4th	0/2	Marchevský
Master thesis	4th	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	1th	0/2	
Foreign language	1th	0/2	
Research project I.	1th	0/2	
Foreign language	2nd	0/2	
Infoelectronics systems	2nd	0/2	
Research project II.	2nd	0/2	
Specialization subject	3rd	0/2	
Research work	3rd	0/8	
Research project III.	3rd	0/4	
Research work	4th	0/8	
Research project IV.	4th	0/2	
Research work	5th	0/12	
Research project V.	5th	0/2	
Thesis - Research work	6th	0/9	

Graduate Study (PhD.) – Measurement technique

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

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

Graduate Study (PhD.) – Telecomunications

Subject	Semester	Lectures/exercises (hours per week)	Name of Lecturer
Communication system theory	1th	0/2	
Foreign language	1th	0/2	
Research project I.	1th	0/2	
Foreign language	2nd	0/2	
Advanced communication technology	2nd	0/2	
Research project II.	2nd	0/2	
Specialization subject	3rd	0/2	
Research work	3rd	0/8	
Research project III.	3rd	0/4	
Research work	4th	0/8	
Research project IV.	4th	0/2	
Research work	5th	0/12	
Research project V.	5th	0/2	
Thesis - Research work	6th	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 2010: not defined
Total founding: not defined
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. Ľubomír 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 2010: not defined
Total founding: not defined
Annotation: 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

Project title: **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. Ľubomír Doboš, CSc.
Project partners: Coordinator AGH Cracow + next 16 partners from EU countries
Start of project: 01/2009
End of project: 12/2013
Founding in 2010: 0,00 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: **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
Founding in 2010: 5.546,65 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.

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.
Project partners: 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 2010: 11.680,00 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.

Project title: **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 2010: 8.000,00 EUR
Total founding: 24.000,00 EUR
Annotation: 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

Project title: **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
Funding in 2010: 67.715,57 EUR
Total funding: 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 man-machine 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
Funding in 2010: 21.575,00 EUR
Total funding: 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.

Project title: **Complex Modular Robotic System of Middle Category with Increased Intelligence**
Acronym: KomoRob
Number: Req-00169-0001

Program/agency: Ministry of education of Slovak Republic
Coordinator from TU: doc. Ing. Jozef Juhár, CSc.
Project partners: ZŤS VVÚ Košice, a.s., SjF TU v Košiciach
Start of project: 01/2010
End of project: 08/2013
Founding in 2010: 17.580,00 EUR
Total founding: 184.797,00 EUR
Annotation: The main objective of the project is research and development of complex system of of intelligent modules for construction of robotic systems meant for using in heavy environment conditions like natural disasters, fire infernos, etc.

Project title: **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
Founding in 2010: 13.621,00 EUR
Total founding: 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
Founding in 2010: 16.327,00 EUR
Total founding: 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: **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 2010: 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: **Security of Next Generation Telecommunication Networks and Systems**
Acronym:
Number: 1/0065/10
Program/agency: VEGA
Coordinator from TU: prof. Ing. Dušan Levický,CSc.
Project partners:
Start of project: 01/2010
End of project: 12/2011
Founding in 2010: 14.102,00 EUR
Total founding: 28.000,00 EUR
Annotation: Proposed scientific project will be oriented to chosen aspect of the telecommunication network security and systems of the next generation (NGN). The main results of project are oriented into following field : development and verification of new methods for the multimedia content protection with respect to usage of the digital watermarking for still colour images, video and speech signals, design of the effective algorithm for the location determination of the mobile nodes in MANET network and design of the agent system for transmission, gathering and exchange of the location data to increase personal security and design, implementation and evaluation of the new methods and approaches for detection of the acoustic events indicating abnormal situations.

Project title: **Advanced Signal Processing Techniques for Reconfigurable Wireless Sensor Networks**
Acronym:
Number: 1/0045/10
Program/agency: VEGA of Ministry of Education of Slovak Republic
Coordinator from TU: prof. Ing. Stanislav Marchevský,CSc.
Project partners:
Start of project: 01/2010
End of project: 12/2011
Founding in 2010: 13.522,00 EUR

Total founding: not defined
Annotation: The scientific project will be focused on both elaboration and verifying of design methods in area of Wireless Sensor Networks (WSN), satisfying the IEEE 802.15.4 recommendation. The aim is the reduction of the energy consumption in intelligent nodes of WSN with both several sensor types and several and several communication facilities. In the projects there will be elaborated advanced signal processing algorithms in WSN area focused on signal processing from video sensors, UWB and optical sensors. As well, the object will be elaboration of advanced methods of OFDM, CDMA, MC-CDM, MIMO signal processing aimed at new circuit structures of MIMO-STBC/SFBC-OFDM/OFDMA receivers. The WSN security will be realized by modification of existing cryptographic blocks and by design of new ones, based on reconfigurable nano-power FPGAs.

The project will solve also the new optoelectronic methods for signal transfer and processing in wireless optical distributed sensory networks (WODSN).

Project title: **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 2010: 7.575,00 EUR
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.

Project title: **WEBLAB - Exploitation of WEB Technologies for Electronic Courses Requiring 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 2010: 7.986,00 EUR
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.

Project title: **Centre of Excellence of the Integrated Research & Exploitation the Advanced Materials and Technologies in the Automotive Electronics**
Acronym: CE III
Number: IMTS-26220120055
Program/agency: Operational Program Research and Development
Coordinator from TU: prof. Ing. Alena Pietriková,CSc.
Project partners: KEMT FEI TUKE (Gamec J., Gamcová M., Gladišová I., Maceková L., Ovseník Ľ., Urdzík D.)
Start of project: 09/2010
End of project: 08/2013
Founding in 2010: not defined
Total founding: not defined
Annotation: The project objective is to establish the "Centre of Excellence of the Integrated Research & Exploitation the Advanced Materials and Technologies in the Automotive Electronics" as the excellency center of the research and development in the field using of the advanced materials and technologies in the automotive electronics 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.

5 CO-OPERATION

5.1 National co-operation

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

5.2 International co-operation

- Austrian Research Institute for Artificial Intelligence (OFAI) of the Austrian Society for Cybernetic Studies
- Crabbe Consulting Ltd, Germany
- FTW Telecommunications Research Center Vienna, Austria
- Geozondas Ltd., Lithuania
- Ingenieur Büro Ralf Klukas, Germany
- INESC Lisabon, Portugal
- IMEC, Netherlands
- MEDAV GmbH, Germany
- Meodat Meßtechnik, Germany
- Statens Räddningsverk, Sweden
- ŠkodaAuto Mladá Boleslav, Czech Republic
- Second University of Naples, Italy
- 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.

Hládek Daniel
Research assistant
His current research interests include natural language processing, language modelling and text processing for LVCSR language databases.

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.

Katrák Miroslav
Research assistant
His current research interests include applications of neural networks in speech recognition algorithms.

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.

Lojka Martin
Research assistant
His current research interests include speech decoding based on WFST and front-end speech processing.

Maceková Ľudmila
Assistant professor
Her main interests and activities are in area of communications in various types of 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.

Papco Marek
Research assistant
His current research interests include real time implementation of adaptation methods for large vocabulary speech recognition.

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. Denis Dupák	prof. Kocur	Infoelectronics
Ing. Patrik Gallo	prof. Levický	Telecommunications
Ing. Marek Godla	doc. Šaliga	Measurement technique
Ing. Tomáš Harasthy	prof. Turán	Infoelectronics
Ing. Ján Krekáň	doc. Doboš	Telecommunications
Ing. Jozef Vavrek	prof. Čižmár	Telecommunications
Second 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
Third year of study		
Internal form:		
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 Kažimírová Kolesárová	doc. Ovseník	Infoelectronics
Ing. Ján Staš	doc. Juhár	Infoelectronics
Fourth year of study		
External form:		
Ing. Kamil Šindlery	prof. Marchevský	Infoelectronics
Fifth year of study		
External form:		
Ing. Rastislav Kokoška	prof. Marchevský	Telecommunications
Ing. Péter Szoboszlai	prof. Turán	Infoelectronics

8 MEMBERSHIP

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

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

Čižmár Anton, Member of AES (Audio Engineering Society), New York, I.D. 44 154.

Doboš Ľubomír, Member of Technical Standardization Commission No.80 for Radiocommunications.

Drutarovský Miloš, Member of the editorial board of the journal "Acta Electrotechnica et Informatica".

Galajda Pavol, Member of Czech and Slovak Radioelectronics Engineering Society.

Juhár Jozef, Member of ISCA (International Speech Communication Association).

Juhár Jozef, Member of AES (Audio Engineering Society), Memb. No. 76122.

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

Juhár Jozef, Member of EU Domain Committee COST for ICT (Information and Communication Technologies) – national delegate.

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".

Kocur Dušan, Member of the editorial board of the journal "Acta Polytechnica Hungarica".

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".

Levický Dušan, Member of the IEEE.

Levický Dušan, Member of Czech and Slovak Radioelectronics Society.

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".

Michaeli Linus, Scientific Grant Agency of Slovak Republic.

Šaliga Ján, Member of Slovak IMEKO Technical Committee TC-4 "Measurement of Electrical Quantities".

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

Turán Ján, Member of the Slovak Technical Standardization Committee No.53 for Cables, Conductors and Isolating Materials.

Turán Ján, Member of the Slovak Technical Standardization Committee No.43 for Terminology.

Turán Ján, Senior Member of the IEEE.

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

1. LEVICKÝ,D.: Kryptografia v informačnej a sieťovej bezpečnosti. In: Košice: Elfa, 2010, 286 pp.
2. ROVŇÁKOVÁ,J.: Complete Signal Processing for Through Wall Tracking of Moving Targets. In: Saarbrücken: LAP LAMBERT Academic Publishing, 2010, 125 pp.

9.2 Journal papers

1. CORRADO,M.-RAPUANO,S.-ŠALIGA,J.: An Overview of Different Signal Sources for Histogram Based Testing of ADCs. In: Measurement, Vol. 43, no. 7 (2010), 878-886.
2. DAPONTE,P.-ŠALIGA,J.: Advances in Measurement of Electrical Quantities. In: Measurement, Vol. 43, no. 8 (2010), 983-984.
3. DOBOŠ,Ľ.-CIPOV,V.: The Proposed Beacon-Based Algorithm for Outdoor MANET Environment Using RSS. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 55-60.
4. DROTÁR,P.-GAZDA,J.-GALAJDA,P.-KOCUR,D.-PAVELKA,.: Receiver Technique for Iterative Estimation and Cancellation of Nonlinear Distortion in MIMO SFBC-OFDM Systems. In: IEEE Transactions on Consumer Electronics, Vol. 56, no. 2 (2010), 471-475.
5. GAZDA,J.-DROTÁR,P.-KOCUR,D.-GALAJDA,P.: Uplink Modulation Strategies in 4G Wireless Cellular Systems. In: Acta Electrotechnica et Informatica, Vol. 10, no. 1 (2010), 37-41.
6. GLADIŠOVÁ,I.-MIHALÍK,J.-ZAVACKÝ,J.: Obrysová reprezentácia a kódovanie binárnehotvaru vizuálneho objektu. In: Slaboproudý obzor, Vol. 66, no. 3 (2010), 14-18.
7. HLÁDEK,D.-STAŠ,J.: Text Mining and Processing for Corpora Creation in Slovak Language. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 65-68.
8. KOCUR,D.-GAMEC,J.-ŠVECOVÁ,M.-GAMCOVÁ,M.-ROVŇÁKOVÁ,J.: Imaging Method: An Efficient Algorithm for Moving Target Tracking by UWB Radar. In: Acta Polytechnica Hungarica, Vol. 7, no. 3 (2010), 5-24.
9. LEVICKÝ,D.: 40 rokov Katedry elektroniky a multimediálnych telekomunikácií na FEI TU v Košiciach. In: Slaboproudý obzor, Vol. 66, no. 3 (2010), 1.
10. LEVICKÝ,D.-KLENOVIČOVÁ,Z.-RIDZOŇ,R.: Ochrana obsahu multimédií. In: Slaboproudý obzor, Vol. 66, no. 3 (2010), 2-6.
11. LOJKA,M.-JUHÁR,J.: Fast Consctruction Of Speech Recognition Network for Slovak Language. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 111-114.
12. MICHAELI,L.-RAPUANO,S.: Preface to the Special Issue on XV IMEKO TC-4 Symposium and XII International Workshop on ADC Modelling and Testing. In: Computer Standards & Interfaces, Vol. 32, no. 3 (2010), 71-72.
13. MIHALÍK,J.: Modeling of Human Head Surface by Using Triangular B-splines. In: Radioengineering, Vol. 19, no. 1 (2010), 39-45.
14. ONDÁŠ,S.-BEVACQUA,E.-JUHÁR,J.-DEMETER,P.: Towards Influencing of the Conversational Agent Mental State in the Task of Active Listening. In: Lecture Notes in Computer Science, Vol. 5967 (2010), 113-121.

15. OVSENÍK,Ľ.-KAŽIMÍROVÁ KOLESÁROVÁ,A.-TURÁN,J.: Object Detection in Video Surveillance Systems. In: Carpathian Journal of Electronic and Computer Engineering, Vol. 3, no. 1 (2010), 137-143.
16. PAPAJ,J.-ČIŽMÁR,A.-DOBOŠ,Ľ.: New Integration Model of QoS and Security as a One Parameter in MANET via Crosslayer Interface CLI. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 163-168.
17. PAPAJ,J.-ČIŽMÁR,A.-DOBOŠ,L.: Model integrovania bezpečnosti a QOS pre mobilné AD-HOC siete. In: Slaboproudý obzor, Vol. 66, no. 3 (2010), 7-13.
18. PAPCO,M.-JUHÁR,J.: Comparison of Acoustic Model Adaptation Methods and Adaptation Database Selection Approaches. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 147-150.
19. PATLEVIČ,P.-DOBOŠ,Ľ.: Markov Model Based CAC Algorithms for Cellular Networks. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 169-172.
20. ROVŇÁKOVÁ,J.-KOCUR,D.: TOA Estimation and Data Association for Through-wall Tracking of Moving Targets. In: Eurasip Journal on Wireless Communications and Networking, Vol. 2010 (2010), 1-11.
21. STAŠ,J.-HLÁDEK,D.-JUHÁR,J.: Language Model Size Reduction by Quantization and Pruning. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 205-208.
22. ŠALIGA,J.-MICHAELI,L.-SAKMÁR,M.-BUŠA,J.: Processing of Bidirectional Exponential Stimulus in ADC Testing. In: Measurement, Vol. 43, no. 8 (2010), 1061-1068.
23. ŠALIGA,J.-SEKERÁK,M.-CHOVANEC,M.: Pásmový sigma delta AČP implementovaný na obvode PSOC a obvodmi MSI. In: Slaboproudý obzor, Vol. 66, no. 3 (2010), 19-23.
24. ŠTERBA,J.-GAZDA,J.-DEUMAL,M.-KOCUR,D.: Iterative Algorithm for Channel Re-estimation and Data Recovery in Nonlinearly Distorted OFDM Systems. In: Acta Polytechnica Hungarica, Vol. 7, no. 1 (2010), 103-118.
25. ŠVECOVÁ,M.-KOCUR,D.: Taylor Series-Based Tracking Algorithm for Through-Wall Tracking of a Moving Person. In: Acta Polytechnica Hungarica, Vol. 7, no. 1 (2010), 5-21.
26. TURÁN,J.-OVSENÍK,Ľ.-VÁSÁRHELYI,J.: Optically Powered Industrial Barometric System Design. In: Carpathian Journal of Electronic and Computer Engineering, Vol. 3, no. 1 (2010), 131-136.
27. VARCHOLA,M.-DRUTAROVSKÝ,M.: New High Entropy Element for FPGA Based True Random Number Generators. In: Lecture Notes in Computer Science, Vol. 6225 (2010), 351-365.
28. VARCHOLA,M.-DRUTAROVSKÝ,M.: High Performance Measuring Equipment. In: International Research Cooperation, International Scientific Herald, Vol. 1 (2010), 21-24.
29. VARCHOLA,M.: CAD for Modern Electronic Digital Circuits. In: International Research Cooperation, International Scientific Herald, Vol. 1 (2010), 25-27.
30. VOZÁRIKOVÁ,E.-PLEVA,M.-VAVREK,J.-ONDÁŠ,S.-JUHÁR,J.-ČIŽMÁR,A.: Detection and Classification of Audio Events in Noisy Environment. In: Journal of Electrical and Electronics Engineering, Vol. 3, no. 1 (2010), 253-258.

9.3 Conference papers

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of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 758-764.

2. BALOGH,L.-KOLLÁR,I.-MICHAELI,L.-ŠALIGA,J.-LIPTÁK,J.: Extracting Full Information from Measured ADC Data. In: IMEKO TC 4: 17th Symposium Measurement of Electrical Quantities; 15th International Workshop on ADC Modelling and Testing; 3rd Symposium IMEKO TC 19 - Environmental Measurements: Instrumentation for the Information and Communication Technology Era; Košice, Slovakia, September 8-10, 2010, 1-6.
3. BÁNOCI,V.-BUGÁR,G.-LEVICKÝ,D.: A Novel Method of CDMA Approach in Spread Spectrum Steganography. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 740-745.
4. BÁNOCI,V.-BUGÁR,G.-LEVICKÝ,D.: Information Hiding Using Pseudo-random Number Sequences with Error Correction. In: Radioelektronika 2010: Proceedings of 20th international conference, Brno, Czech Republic, April 19-21, 2010, 1-4.
5. BÁNOCI,V.-BUGÁR,G.-LEVICKÝ,D.-KLENOVIČOVÁ,Z.: Modern Methods in Image Steganography. In: Research in Telecommunication Technologies 2010: The 12th International Conference, Velké Losiny, Czech Republic, September 8-10, 2010, 119-122.
6. BÁNOCI,V.-BUGÁR,G.: Spread Spectrum Steganography with Error Correction. In: SCYR 2010: Proc. 10th Scientific Conference of Young Researchers of Faculty of Electrical Engineering and Informatics Technical University of Košice , Košice, Slovakia, May 19, 2010, 24-27.
7. BIČUŠ,L.-DRUTAROVSKÝ,M.: Spracovanie video signálov pomocou signálových procesorov Blackfin. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 828-833.
8. BLICHA,R.-GAZDA,J.-ŠTERBA,J.: Introduction to Single Carrier Frequency Division Multiple Access (SC-FDMA). In: SCYR 2010: Proc. 10th Scientific Conference of Young Researchers of Faculty of Electrical Engineering and Informatics Technical University of Košice , Košice, Slovakia, May 19, 2010, 31-33.
9. BUGÁR,G.-BÁNOCI,V.-LEVICKÝ,D.-KANÓCZ,T.: Steganografia s využitím detektorov hrán v krycom obraze. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 751-757.
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11. CIPOV,V.-DOBOŠ,Ľ: Comparative Study of Proposed Localization Methods for Mobile AD-HOC Networks. In: AEI ´2010: International Conference on Applied Electrical Engineering and Informatics 2010, Venice, Italy, September 7-10, 2010, 80-87.
12. CIPOV,V.: The Proposal of Beacon-based Localization Algorithm for Mobile Ad-Hoc Networks. In: SCYR 2010: Proc. 10th Scientific Conference of Young Researchers of Faculty of Electrical Engineering and Informatics Technical University of Košice , Košice, Slovakia, May 19, 2010, 174-177.
13. DOBOŠ,Ľ.-CIPOV,V.: Beacon-based Localization Algorithm for MANET Using Received Signal Strength Measurement. In: MCSS 2010: Multimedia Communications, Services and Security; Proceedings IEEE International Conference, Krakow, Poland, May 6-7, 2010, 1-6.

14. DOBOŠ,Ľ.-PAPAJ,J.-ČIŽMÁR,A.: The New Integration Model of Security and QoS in Manet Impact Analysis. In: AEI ´2010: International Conference on Applied Electrical Engineering and Informatics 2010, Venice, Italy, September 7-10, 2010, 42-48.
15. DROTÁR,P.-GAZDA,J.-DEUMAL,M.-GALAJDA,P.-KOCUR,D.: Receiver Based Compensation of Nonlinear Distortion in MIMO-OFDM. In: RF Front-ends for Software Defined and Cognitive Radio Solutions: IEEE International Microwale Workshop Series, Aveiro, Portugal, February 22-23, 2010, 1-4.
16. DRUTAROVSKÝ,M.- VARCHOLA,M.: Analysis of Randomness Sources in Transition Effect Ring Oscillator Based TRNG. In: CryptArchi 2010: 8th International Workshop on Cryptographic Architectures Embedded in Reconfigurable Devices, Paris - Gif sur Yvette, France, June 27 - 30, 2010, 102-107.
17. FÁBRI,D.-SEKERÁK,M.-CHOVANEC,M.-SANCIN,CH.-RICCIO,M.: IN. TRA. NET. - Project for Distance Vocational Education. In: SCYR 2010: Proc. 10th Scientific Conference of Young Researchers of Faculty of Electrical Engineering and Informatics Technical University of Košice , Košice, Slovakia, May 19, 2010, 195-198.
18. FIFIK,M.-TURÁN,J.-OVSENÍK,Ľ.-FAZEKAS,K.: Experiments with a Tansform Based Traffic Sign Recognition System. In: IWSSIP 2010: 17th International Conference on Systems, Signals and Image Processing, Rio de Janeiro, Brazil, June 17-19, 2010, 227-230.
19. FIFIK,M.-OVSENÍK,Ľ.-TURÁN,J.: Videoasistenčný systém vodiča. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 679-682.
20. FIFIK,M.-TURÁN,J.-OVSENÍK,Ľ.: Experimentálne výsledky videoasistenčného systému vodiča. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 674-678.
21. FIFIK,M.-TURÁN,J.-OVSENÍK,Ľ.: Real Time Recognition System for Traffic Sign Detection and Classification. In: MIPRO 2010: 33rd International Convention on Information and Communication Technology, Electronics and Microelectronics, Opatija, Croatia, May 24-28, 2010, 284-287.
22. FIFIK,M.-TURÁN,J.-OVSENÍK,Ľ.: Traffic Signs Recognition Experiments with Transform Based Traffic Sign Recognition System. In: IMEKO TC 4: 17th Symposium Measurement of Electrical Quantities; 15th International Workshop on ADC Modelling and Testing; 3rd Symposium IMEKO TC 19 - Environmental Measurements: Instrumentation for the Information and Communication Technology Era; Košice, Slovakia, September 8-10, 2010, 1-5.
23. FIFIK,M.: Slovak Traffic Signs and Their Preprocessing in HSV Color Space. In: SCYR 2010: Proc. 10th Scientific Conference of Young Researchers of Faculty of Electrical Engineering and Informatics Technical University of Košice , Košice, Slovakia, May 19, 2010, 52-53.
24. GALAJDA,P.-LEVICKÝ,D.: Chaotic-based Electronics and Telecommunication Systems. In: AEI ´2010: International Conference on Applied Electrical Engineering and Informatics 2010, Venice, Italy, September 7-10, 2010, 117-122.
25. GALAJDA,P.-GUZAN,M.-ŠPÁNY,V.: The State Space Description of the MVL Memory Circuits. In: Education, Science and Economics at Universities: International conference Integration to international educational AREA, Plock, Poland, September 20-25, 2010, 351-359.
26. GAMEC,J.-KOVÁČ,J.-GAMCOVÁ,M.: Vehicle detection based on entropy. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and

Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 807-814.

27. GAZDA,J.-DROTÁR,P.-KOCUR,D.-GALAJDA,P.: Refined Iterative Detection of Coded SC-FDMA Based Transmission Systems. In: Radioelektronika 2010: Proceedings of 20th international conference, Brno, Czech Republic, April 19-21, 2010, 1-4.
28. GAZDA,J.-DROTÁR,P.-GALAJDA,P.-KOCUR,D.: Comparative Evaluation of OFDMA and SC-FDMA Based Transmission Systems. In: SAMI 2010: 8th International Symposium on Applied Machine Intelligence and Informatics, Herľany, Slovakia, January 28-30, 2010, 177-181.
29. GAZDA,J.: Iterative Receiver for Nonlinearly Distorted SC-FDMA Transmission. In: SCYR 2010: Proc. 10th Scientific Conference of Young Researchers of Faculty of Electrical Engineering and Informatics Technical University of Košice , Košice, Slovakia, May 19, 2010, 54-57.
30. GERMAN,R.-TURÁN,J.-OVSENÍK,Ľ.: FSO system simulator - štatistický model. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 694-699.
31. GLADIŠOVÁ,I.-MIHALÍK,J.: Mriežkový vektorový kvantizátor so sústrednými pyramídami a entropickým kódovaním. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 770-774.
32. GLADIŠOVÁ,I.-KOCUR,D.: SC-FDMA: Základné princípy. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 765-769.
33. GOČ-MATIS,P.-KANÓCZ,T.-RIDZOŇ,R.-LEVICKÝ,D.: Comparison of Two Watermarking Methods Based on DWT. In: Radioelektronika 2010: Proceedings of 20th international conference, Brno, Czech Republic, April 19-21, 2010, 1-4.
34. GOČ-MATIS,P.-KANÓCZ,T.-RIDZOŇ,R.-LEVICKÝ,D.: DWT in Video Watermarking. In: Research in Telecommunication Technologies 2010, The 12th International Conference, Velké Losiny, Czech Republic, September 8-10, 2010, 219-222.
35. GOČ-MATIS,P.-KANÓCZ,T.-RIDZOŇ,R.: DWT Based Video Watermarking. In: SCYR 2010: Proc. 10th Scientific Conference of Young Researchers of Faculty of Electrical Engineering and Informatics Technical University of Košice , Košice, Slovakia, May 19, 2010, 199-202.
36. GUZAN,M.-ŠPÁNY,V.-GALAJDA,P.-BUČKO,R.: Vizualizácia hraničnej plochy viac-hodnotovej pamäťovej bunky použitím Matlab-u. In: Technical Computing Bratislava 2010: Zborník príspevkov 18. ročníka konferencie, Bratislava, Slovakia, October 20, 2010, 1-8.
37. HANKOVSKÝ,P.-OVSENÍK,Ľ.-TURÁN,J.: FSO system simulator - statický model. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 700-705.
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40. HRUŠOVSKÝ,B.-MOCHNÁČ,J.-MARCHEVSKÝ,S.: Temporal-spatial Error Concealment Algorithm for Intra-Frames in H.264/AVC Coded Video. In: Radioelektronika 2010: Proceedings of 20th international conference, Brno, Czech Republic, April 19-21, 2010, 1-4.
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53. KAŽIMÍROVÁ KOLESÁROVÁ,A.-TURÁN,J.-OVSENÍK,Ľ.: Videodohľadové systémy. In: Electrical Engineering and Informatics: Proceeding of the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Košice, Slovak Republic, September 2010, 689-693.
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