



"Politehnica" University
of Timisoara



Faculty of Electronics and
Telecommunications

Annual Report

09

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1. General information

This booklet presents an overview of the activities taking place at the *Faculty of Electronics and Telecommunications* from the "Politehnica" University of Timișoara with special focus on the year 2009. Information about the structure of the faculty, its position in the "Politehnica" University, and data concerning educational and research activities are presented.

Information that is more detailed can be obtained at the faculty and department secretariates.

You can also find relevant information visiting our website:

<http://www.etc.upt.ro>

The "Politehnica" University of Timișoara was founded in 1920, with the purpose of serving the technical education and research needs in western Romania. It is a public university and consists of ten faculties.

The late Prof. Remus Răduleț, member of the Romanian Academy, introduced the study of **Electronics** at the "Politehnica" University of Timișoara in 1931. In 1970, the specialization on "*Electronics and Telecommunications*" was established within the Faculty of Electrical Engineering, and four years later, in 1974, a new department, "*Electronics, Automation and Measurements*" was founded. In 1976, the Faculty of Electrical Engineering moved its headquarters to the present building where the number of laboratories and other facilities increased substantially.

The former specialization "*Electronics and Telecommunications*" became the "*Faculty of Electronics and Telecommunications*" in 1990. Starting with the following year, a short-cycle higher education programme (College level) has been created, but its activity ended in 2007.

The *Master* degree programme was introduced in 1994.

Our Faculty provides training for engineers in Electronics and Telecommunications in two areas of specialization: *Applied Electronics* and *Telecommunications*. The College provided specialized training in the fields of *Electronics, Communications* and *Mailing Services* as well as in *Audio-Video* and *Multimedia Technologies*.

The teaching activities are organized on three levels of study:

- graduate programmes: "Diploma (Licensed) Engineer" in Romanian and English;
- postgraduate degree programmes: "Master"
- Doctoral studies leading to a "Doctor of Philosophy" degree (Ph.D.).

The graduate education level is organized in a 4-year period of studies. Students graduating from this educational form obtain the "Diploma (Licensed) Engineer" degree.

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The Master degree programme consists of a 2-year programme of studies while the Ph.D. degree must be completed in three years.

The faculty has three departments:

- **Applied Electronics;**
- **Communications;**
- **Measurements and Optical Electronics,**

and cooperates with other faculties and departments like Mathematics, Physics, Electrical Engineering, Computer Science, Mechanical Engineering, Management, etc.

Teaching and learning are based on modern methods, especially with respect to practical activities. Special attention is paid to applied computer studies.

The teaching staff is organized in several teams and devotes a considerable amount of time to research programmes lead by professors who are also Ph.D. advisors. These teams are presented in the next chapters.

The governing authorities of the Faculty of Electronics and Telecommunications are:

- The Faculty Council;
- The Executive Board of the Faculty Council;

The Administrative Officers and the Executive Board of the Faculty Council are in charge of the ordinary activities in the faculty.

2. Structure of the Faculty of Electronics and Telecommunications

The Executive Board of the faculty is composed of:

- Dean: Prof. dr. ing. Marius OTEȘTEANU
- Vice Dean: Prof. dr. ing. Dan LASCU
- Vice Dean: Prof. dr. ing. Aurel GONTEAN
- Scientific Secretary: Prof. dr. ing. Florin ALEXA

Faculty address:

Bd. Vasile Pârvan No. 2,
Postal code: 300223, City: Timișoara, Country: Romania.

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Secretariate: Chief Secretary Cecilia MOISE, secretariat@etc.upt.ro
Laura MIRICĂ, Minerva POPA, Anca TURTĂ

Secretariate of the Applied Electronics (AE) Department:

- room B101,
- phone: +40-(0)256-403331;

Secretariate of Communications (COM) Department:

- room B201,
- phone: +40-(0)256-403301;

Secretariate of the Measurements and Optical Electronics (MOE) Department:

- room B301,
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Faculty Council:

1. Prof. dr. ing. Ivan BOGDANOV, Head of Department AE
2. Prof. dr. ing. Aurel GONTEAN, Vice Dean
3. Prof. dr. ing. Vasile GUI, Head of Department COM
4. Prof. dr. ing. Alimpie IGNEA
5. Prof. dr. ing. Alexandru ISAR
6. Prof. dr. ing. Dan LASCU, Vice Dean
7. Prof. dr. ing. Ioan NAFORNIȚĂ
8. Prof. dr. ing. Marius OTEȘTEANU, Dean
9. Prof. dr. ing. Viorel POPESCU
10. Prof. dr. ing. Dan STOICIU, Head of Department MOE
11. Prof.dr.ing. Liviu TOMA, until June 2009
12. Prof. dr. ing. Aldo De SABATA, from July 2009
13. Prof. dr. ing. Radu VASIU
14. Prof. dr. ing. Florin ALEXA, Scientific Secretary
15. Conf. dr. ing. Georgeta BUDURA
16. Conf. dr. ing. Cătălin CĂLEANU
17. Conf. dr. ing. Ioan LIE
18. Conf. dr. ing. Eugen MÂRZA
19. Andrei TERNAUCIUC, Ph.D student
20. George CHILOM, student III TST
21. Cristina SERBAN, student IV TST
22. Sergiu HRISTEA, student III EA
23. Ancuta DANCI, student III TST
24. Emilia CARAGEA, student V TC

2.1. Applied Electronics Department

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Department board:

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- Prof. dr. ing. Dorina ISAR
- Conf. dr. ing. Cătălin CĂLEANU
- Prof. dr. ing. Dan LASCU
- As. ing. Mircea BĂBĂIȚĂ

Staff

- Prof. dr. ing. Ivan BOGDANOV: Industrial Robots, Computer Control of Electrical Drives;
- Prof. cons. dr. ing. Tiberiu MUREȘAN: Digital Circuits. Industrial Robot Driving. Switched Mode Power Supplies;
- Prof. cons. dr. ing. Mircea CIUGUDEAN: Conception of Analog Integrated Circuits and their Applications;
- Prof. cons. dr. ing. Mihail Eugen TĂNASE: Doppler Telemetry;
- Prof. dr. ing. Virgil TIPONUȚ: Analog Electronic Circuits. Programmable Logic Systems. Sensors and Transducers. Neural Networks;
- Prof. dr. ing. Horia CĂRSTEA: Electronic Technology. Electronic Equipment Testing;
- Prof. dr. ing. Aurel GONTEAN: Programmable Logic Systems. Digital Circuits;
- Prof. dr. ing. Sabin IONEL: DSP Applications. Statistical Signal Processing. Failure Diagnosis;
- Prof. dr. ing. Dorina ISAR: Industrial Process Control Equipment. Signal Processing for Signal/Noise Ratio Enhancement;
- Prof. dr. ing. Dan LASCU: High Frequency Power Processors. Power Factor Correction Circuits. Modelling and CAD in Power Electronics;
- Prof. dr. ing. Viorel POPESCU: Power Electronics, Switched Mode Power Supplies;
- Conf. dr. ing. Ioan-Zeno DANDEA: Materials for Electronics;
- Conf. dr. ing. Dan ANDREICIUC: Industrial Robots. Mobile Robots;
- Conf. dr. ing. Cătălin CĂLEANU: Electronic Devices and Circuits;
- Conf. dr. ing. Ioan JIVETȚ: Design of ASIC (VLSI) Circuits. Design of Digital Systems with Microcontrollers and Microprocessors. Clinical applications of Electrical Bio-impedance. Tomography;
- Conf. dr. ing. Ioan LIE: Electronics. Doppler Telemetry;
- Conf. dr. ing. Adrian POPOVICI: Industrial Electronics. Materials for Electronics;
- Conf. dr. ing. Dan NEGOIȚESCU: Industrial Electronics. Power Factor Correction Circuits;

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- S.I. dr. ing. Lucian JURCA: Analog Electronic Circuits;
- S.I. dr. ing. Marius RANGU: Electronic Technology. Electronic Equipment Testing, PCB;
- S.I. dr. ing. Valentin MARANESCU: Conception of Analog Integrated Circuits;
- As. ing. Mircea BĂBĂIȚĂ: Digital Circuits. Electrical Drives;
- As.dr.ing. Marlene DĂNEȚI: DSP Applications. Statistical Signal Processing. Failure Diagnosis. Multimedia;
- As. ing. Benjamin DRĂGOI: Conception of Analog Integrated Circuits.
- As. ing. Aurel FILIP: Analog Electronic Circuits;
- As. ing. Petru PAPAȘIAN: Digital Circuits;
- As. ing. Sorin POPESCU: Analog Electronic Circuits. Programmable Logic Systems;
- As. ing. Bogdan MARINCA: Doppler Telemetry;

Other employees: 2 chief technicians, 5 technicians and 2 secretaries.

2.2. Communications Department

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Department board:

- Prof. dr. ing. Vasile GUI - Head of Department
- Prof. dr. ing. Ioan NAFORNIȚĂ
- Prof. dr. ing. Alexandru ISAR
- Conf. dr. ing. Georgeta BUDURA
- Conf. dr. ing. Eugen MĂRZA

Staff

- Prof. dr. ing. Andrei CĂMPEANU: Telecommunications Equipment Technology. Telecommunications Circuits;
- Prof. dr. ing. Vasile GUI: Image Processing. Electronic Circuits and Devices;
- Prof. dr. ing. Alexandru ISAR: Signals, Circuits and Systems. Applications of Wavelets Theory. Time-Frequency Representations. Compression. Coding;
- Prof. dr. ing. Ioan NAFORNIȚĂ: Signals, Circuits and Systems. Adaptive Signal Processing. Time-Frequency Representations. Applications of Wavelets Theory. Microwaves;
- Prof. dr. ing. Miranda NAFORNIȚĂ: Theory of Information and Coding. Data Transmission. Signals, Circuits and Systems. Modern Communications Networks;
- Prof. dr. ing. Marius OTEȘTEANU: Television. Telephone Transmission Systems. Information Recording Techniques;

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- Prof. dr. ing. Corneliu TOMA: Television. Analog Electronics. Image Compression. Motion Analysis. Pattern Recognition. Multimedia Technologies;
- Prof. dr. ing. Radu VASIU: Telecommunications Equipment Testing. Television and Digital Television. Multimedia Applications Development;
- Prof. dr. ing. Adrian MIHAESCU: Optical Transmission and Processing of Information; Theory of Information and Coding
- Prof. dr. ing. Florin ALEXA: Television. Sound Techniques. Radiocommunications. Multimedia;
- Conf. dr. ing. Corina BOTOCA: Microwaves. Signals, Circuits and Systems. Neural Networks;
- Conf. dr. ing. Georgeta BUDURA: Signals, Circuits and Systems. Nonlinear Signal Processing. Telecommunication Circuits;
- Conf. dr. ing. Eugen MARZA: Radiocommunications. Mobile Radio. Radio Systems Engineering;
- S.I. dr. ing. Cornel BALINT: Switching Systems for Telecommunications;
- S.I. dr. ing. Muguraş MOCOFAN: Machine Vision and Pattern Recognition. Multimedia. Studio Equipment. Video Production;
- S.I. dr. ing. Horia BALTĂ: Optical Transmission and Processing of Information. Statistical Theory of Information Transmission. Theory of Information and Coding;
- S.I. dr. ing. Constantin M. BUCOS: Multimedia. Studio Equipment. Video Production;
- S.I. dr. ing. Corina NAFORNITA: Digital Signal Processing. Digital Watermarking;
- S.I. dr. ing. Nicolae MICLĂU: Optical Transmission and Processing of Information. Theory of Information and Coding;
- As. ing. Janos GAL: Signals, Circuits and Systems. Telecommunications Circuits;
- As. ing. Maria KOVACI: Statistical Theory of Information Transmission. Theory of Information and Coding. Signals Circuits and Systems;
- As. ing. Radu LUCACIU: Optical Transmission and Processing of Information;
- As. dr. ing. Ciprian DAVID: Image Processing, Audio and Video Systems;
- As. ing. Marius OLTEAN: Data Transmission on Radio Channels;
- As. ing. Mihai ONIȚA: Television. Audio and Video Compression. Streaming. Multimedia;
- As. ing. Marius SALAGEAN: Signals, Circuits and Systems;
- As. ing. Călin SIMU: Biomedical Electronics. Radiocommunications;
- As. ing. Andy VESA: Signals, Circuits and Systems. Mobile Radiocommunications;
- Prep. ing. Cristina STOLOJESCU: Digital Signal Processing.

2.3. Measurements and Optical Electronics Department

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Department board:

- Prof. dr. ing. Dan STOICIU - Head of Department
- Prof. dr. ing. Liviu TOMA, until June 2009
- Prof.dr.ing. Aldo DESABATA, from June 2009
- Prof. dr. ing. Traian JURCA

Staff

- Prof. dr. ing. Aldo De SABATA: Adaptive Methods in Measurement. Signal Processing. Microwaves;
 - Prof. dr. ing. Alimpie IGNEA: Electrical and Electronic Measurements. Electronic Measurements, Sensors and Transducers. Electromagnetic Compatibility. Antenna Calibration;
 - Prof. dr. ing. Traian JURCA: Electronic Measuring Instruments. Precision Instrumentation. Programmable Measuring Systems;
 - Prof. dr. ing. Dan STOICIU: Electronic Measuring Instruments. Metrology, Quality and Reliability, Electronic Measurements, Sensors and Transducers. General Theory of Measurement;
 - Prof. dr. ing. Liviu TOMA: Data Acquisition Systems, Microprocessor Systems Architecture. Digital Processing Systems;
 - Conf. dr. ing. Mihaela LASCU: Measurement of Electrical and Non Electrical Quantities. Sensors and Transducers. Virtual Instrumentation;
 - Conf. dr. ing. Daniel BELEGA: Electromagnetic Compatibility. Analog Integrated Circuits. Digital Processing Systems;
 - Conf. dr. ing. Septimiu MISCHIE: Electrical and Electronic Measurements. Programmable Measuring Systems. Precision Instrumentation;
 - S.I. dr. ing. Adrian VÂRTOSU: Microwaves. Microwaves and Optoelectronics Measurements. Television Channels Broadcasted Via Satellite;
 - As. ing. Emil LUZAN: Measurement of Environmental Factors. Measurement of Electrical and Non Electrical Quantities;
 - S.I. dr. ing. Robert PASZITKA: Microprocessor Systems Architecture;
 - As. dr. ing. Raul IONEL;
 - As. ing. Ciprian DUGHIR: Electromagnetic Compatibility. Antenna Calibration;
 - As. ing. Liliana MÂTIU: Electromagnetic Compatibility. Digital Processing Systems. Electronic Measuring Instruments;
 - As. ing. Cora IFTODE, Electromagnetic Compatibility, Digital Processing Systems, Electronic Measuring Instruments;
 - As. ing. Adrian MIHĂIUȚI, Antenna Calibration. Electromagnetic Compatibility. Digital Processing Systems;
- Other employees: two technicians, one secretary.

3. Educational activity

The Faculty of Electronics and Telecommunications provides education in electronic engineering, particularly in the areas of general and industrial electronics, telecommunications and measurement. The Faculty offers three educational programmes:

- A four-year programme. To obtain the degree of Diploma (Licensed) Engineer at the end of the four-year period of study, a student must pass the Licence written examination and the oral defence of the graduation thesis. Starting with the Academic year 2006/2007, the four-year graduate programme is also delivered in English.
- A two-year programme of Master Degree. A successful oral examination, which is a defence of the dissertation leads to graduation and the award of the Master degree.
- Doctoral studies programme leads to the Doctor Engineer degree.

Education is organized according to the transferable credits system (ECTS).

In agreement with the Bologna Declaration, The License-Master-Doctorate (LMD) system has been introduced in 2005.

3.1. The “Diploma (Licensed) Engineer” level

The educational goals of this level are:

- to give students comprehensive theoretical and practical knowledge in the field of electronic engineering;
- to provide students with practical skills for manufacturing electronic equipment and to introduce them to the most recently developed techniques and devices in the design of electronic equipment;
- to habituate students with permanent intellectual work;
- to accustom students to information and computer technology with the purpose of enabling them to use Computer Aided Design;
- to supply adequate knowledge in economics and business management, enabling graduates to take part directly in industrial activities or to work as managers;
- to teach students foreign languages, so as to prepare them for the mobility programmes promoted by the European Community and to foster their participation in international cooperation and research programmes;
- to provide students with knowledge in humanities for professional inter-communication skills.

Admission Requirements and Student Performance Standards

Entry requirements

Enrolment of students in the first year follows an admission examination, where candidates' general knowledge in mathematics is assessed.

Details of admission standards

The admission examinations are of the MCQ (Multiple-Choice Queries) type, with a maximum score of 100. A successful candidate must obtain a minimum score of 44. The final score is calculated by taking into account the Baccalaureate score, with a weight of 20%. The actual entrance minimum score may vary according to the number and level of the candidates. The table below presents the enrolment statistics over the last 3 years.

Academic Year	Number of candidates	Number of admitted candidates	Minimum entry score
2005/2006	377 for publicly funded places	280 publicly funded 39 self funded	7.29/10 5.04/10
2006/2007	356 for publicly funded places	295 publicly funded (67 in English) 44 self funded (5 in English)	6.437/10 5.271/10
2007/2008	385 for publicly funded places	302 publicly funded (32 in English) 38 self funded (6 in English)	6.896/10 5.174/10
2008/2009	257 for publicly funded places	257 publicly funded (36 in English)	5,070/10
2009/2010	265 for publicly funded places	255 publicly funded (32 in English)	5,010/10

Arrangements for direct entry

Graduates of other faculties that were awarded a licence diploma can be directly enrolled in an appropriate year of study, in accordance with ECTS.

College graduates that were awarded a license diploma can enrol in the second year of the 4-year cycle, after passing a number of examinations.

A certain number of candidates can follow the courses and obtain a diploma if they choose to finance their studies and obtain a minimum score of 5/10 at the admission exam.

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Number of students

2005/2006

Year of study	Specialization	Total number of students	Number of students who obtained the necessary credits	Number of students who did not obtain the required credits	Number of withdrawn students
First year	AE + TC	313	53	192	34
Second year	AE + TC	237	54	149	17
Third year	AE	119	26	66	27
Fourth year	AE	103	22	61	20
Fifth year	AE	86	70	12	4
Third year	TC	119	22	61	36
Fourth year	TC	116	44	60	12
Fifth year	TC	108	78	24	6

2006/2007

Year of study	Specialization	Total number of students	Number of students who obtained the necessary credits	Number of students who did not obtain the required credits	Number of withdrawn students
First year	AE + TC	348	91	167	90
Second year	AE + TC	291	66	130	95
Third year	AE	81	21	32	28
Fourth year	AE	102	25	71	6
Fifth year	AE	86	57	28	1
Third year	TC	134	46	63	25
Fourth year	TC	83	56	23	4
Fifth year	TC	83	80	1	2

2007/2008

Year of study	Specialization	Total number of students	Number of students who obtained the necessary credits	Number of students who did not obtain the required credits	Number of withdrawn students
First year	AE + TC	302	87	127	88
Second year	AE + TC	303	82	135	86
Third year	AE	93	19	52	22
Fourth year	AE	75	19	52	4
Fifth year	AE	85	56	28	1
Third year	TC	108	23	58	27
Fourth year	TC	98	67	25	6
Fifth year	TC	79	75	3	1

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2008/2009

Year of study	Specialization	Total number of students	Number of students who obtained the necessary credits	Number of students who did not obtain the required credits	Number of withdrawn students
First year	AE + TC	257	88	131	38
Second year	AE + TC	241	58	142	41
Third year	AE	142	32	90	20
Fourth year	AE	125	85	32	8
Fifth year	AE	109	51	53	5
Third year	TC	131	30	83	18
Fourth year	TC	81	55	20	6
Fifth year	TC	116	80	34	2

AE=Applied Electronics

TC=Telecommunications

Note: The third column in the above tables includes re-enrolled students who withdrew before completing their studies in former years.

Average duration of study:

Academic year	Specialization	Average duration of study
2004/2005	AE	5.87 years
	TC	5.57 years
2005/2006	AE	5.60 years
	TC	5.22 years
2006/2007	AE	5.78 years
	TC	5.49 years
2007/2008	AE	5.82 years
	TC	5.39 years
2008/2009	AE	6.09 years
	TC	5.54 years

Note: AE = Applied Electronics, TC = Telecommunications.

Structure of the Academic Year

The academic year consists of two 14-week semesters and three examination sessions. The license and dissertation (Master) examinations take place in June and February. The Admission examinations take place in July and September.

The holidays are:

1. Christmas holiday (two weeks);
2. After the winter session of examinations (one week);
3. Easter holiday (one week);
4. Summer holiday (two months).

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Teaching

The teaching activity is organized in: courses, seminars, laboratory and project classes. A 100 % attendance of the laboratory classes is a prerequisite for each academic year.

Examinations and continuous assessment

Each course ends with an examination or another assessment form as stipulated in the curriculum. The examination format (either written or oral) is proposed by the department and is approved by the Faculty Council.

Students can sit for their examinations and continuous assessments no more than three times, re-examination for grade improvement being included.

Dismissal and Readmission

By the end of a year, a student must have obtained a minimum number of 40 credit points from a total of 60/year, out of which a minimum number of 30 should be obtained after the summer session. If these conditions are not fulfilled, the student is removed from the faculty registers. A student who has been dismissed from the faculty is eligible to apply to that faculty for readmission the next year, having to pay for the expenses, until the missing obligations are completed.

Curriculum for the Academic Year 2009 - 2010

As mentioned above, in 2005 a new curriculum has been introduced, for the License-Master-Doctorate system, according to the Bologna Declaration. Also, since 2006, a study in English has been introduced. The Licence level curriculum in English has been designed and this year students from all years study it. These curriculums are detailed below.

Field: Electronic Engineering and Telecommunications

No	Teaching Line	C	S	L	P	Ex	Cr.
First Year - First Semester							
1	Calculus	2	2			E	4
2	Algebra and Geometry	2	2			E	4
3	Mechanical Engineering Fundamentals	2		1		DE	3
4	Computer Practice	2		2		DE	4
5	Electrical Circuits	2	1	1		DE	5
6	Materials, Components and Electronic Technology	2	1	1		E	4
7	Foreign Languages*		2			DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	12	9	5		26	29

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First Year - Second Semester							
1	Special Mathematics	2	2			E	4
2	Computer Aided Mathematics	2	1	1		DE	4
3	Physics	2	1	1		E	4
4	Optoelectronic and Electronic Devices	3		2		E	6
5	Computer Programming	2		2		DE	4
6	Electrical and Electronic Measurements	2	1	1		E	4
7	Foreign Languages*		2			DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	13	8	7		28	31
Second Year - Third Semester							
1	Digital Integrated Circuits	2		2			4
2	Computer Networks Architecture	2		2			4
3	Fields and Electromagnetic Waves	2	1	1			4
4	Signals and Systems	2	1	1			4
5	Culture and Civilization	1	1				2
6	Fundamental Electronic Circuits	2		2			5
7	Computer Aided Design	2		2			4
8	Physical Education		1				1
9	Practical Training						2
	Total	13	4	10		27	30
Second Year - Fourth Semester							
1	Microeconomics	2	1				4
2	Signal Processing	2		2			5
3	High Frequency Techniques	2	1	1			4
4	Digital Processing Systems	2,5	0,5	2			5
5	Analog Integrated Circuits	2		2			4
6	Object Oriented Programming	2		2			4
7	Electronic Circuits Project				2		2
8	Physical Education		1				1
9	Practical Training						2
	Total	13	2	9	2	26	30

*A foreign language is chosen from: English, French or German.

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Field: Electronic Engineering and Telecommunications - Specialization: Applied Electronics

Third Year - Fifth Semester							
1	Management and Marketing	2	2	0	0	DE	4
2	Electronic Measuring Instruments	2	0	2	0	E	4
3	Radio Communications	2	0	2	0	DE	4
4	Power Electronics	2	0	2	0	E	4
5	Information Theory and Coding	2	1	1	0	E	4
6	Data Acquisition Systems	2	0	2	0	E	4
7	Basics of Flexible Intelligent Systems	2	0	2	0	DE	4
8	Practical Training					C	2
	Total	14	3	11	0	28	30

Third Year - Sixth Semester							
1	Decide on a teaching line from another specialization	2	0	2	0	E	4
2	Programmable Logic Systems	2	0	1	1	DE	6
3	Electromagnetic Compatibility	2	0	2	0	E	4
4	Construction and Technology of Electronic Equipment	2	0	2	0	E	4
5	Switching Power Electronics	2	0	2	0	E	4
6	Virtual Instrumentation	2	0	1	1	DE	6
7	Practical Training					C	2
	Total	12	0	12	0	24	30

Field: Electronic Engineering and Telecommunications - Specialization: Applied Electronics

No	Teaching Line			C	S	L	P	T	Cr
Fourth Year - Seventh Semester									
1	Electronic and Telecommunications Testing Equipment			2		2		E	4
2	Software for Electronics and Telecommunications			2		1	1	DE	5
3	Modelling and Simulation			2		1	1	E	5
4	Electronic Driving Systems	Micro electronics	Sensors and Transducers	2		2		DE	4
5	Electronic Interfacing Equipments	VHDL	Signal Processors	2		2		E	4
6	Decide on a teaching line from another specialization			2		2		E	4
7	DSP Project						2	DE	4
	Total			12		10	4	26	30

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Fourth Year - Eighth Semester									
1	External course			3	1,5	1,5		E	4
2	Decide on a teaching line from another specialization			3		3	0	DE	6
3	Automation	VLSI Circuits Design	Automation	3		3		E	4
4	Biomedical Electronics	Micro Electromechanical Systems	Distributed Control Systems	3		3		E	4
5	Software project						2	E	4
6	Diploma preparation								15
	Total			12	1,5	10,5	2	26	30

Field: Electronic Engineering and Telecommunications - Specialization: Techniques and Systems for Telecommunications

No	Teaching Line	C	S	L	P	T	Cr
Third Year - Fifth Semester							
1	Management and Marketing	2	2			DE	4
2	Electronic Measuring Instruments	2		2		E	4
3	Radio Communications	2		2		E	4
4	Power Electronics	2		2		E	4
5	Information Theory and Coding	2	1	1		E	4
6	Data Communications	2		2		DE	4
7	Telecommunications Circuits	2		2		DE	4
8	Practical Training					C	2
	Total	14	3	11	0	28	30
Third Year - Sixth Semester							
1	Decide on a teaching line from another specialization	2		2		E	4
2	Decision and Estimation in Information Theory	2		1	1	DE	6
3	Television Systems	2		2		E	4
4	Telephony Transmission	2		2		E	4
5	Digital Switching Systems	2		2		E	4
6	Data Bases	2		1	1	DE	6
7	Practical Training					C	2
	Total	12	0	10	2	24	30

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Field: Electronic Engineering and Telecommunications - Specialization: Techniques and Systems for Telecommunications

Fourth Year - Seventh Semester									
1	Electronic and telecommunications testing equipment			2		2		E	4
2	Software for electronics and telecommunications			2		1	1	DE	5
3	Modelling and simulation			2		1	1	E	5
4	Radio Communications 2	Communications Protocols	Multimedia Technologies Computerized Graphics	2		2		DE	4
5	Integrated Digital Networks			2		2		E	4
6	Decide on a teaching line from another specialization			2		2		E	4
7	DSP Project		Development Project				2	DE	4
	Total			12		10	4	28	30
Fourth Year - Eighth Semester									
1	External course			3	1,5	1,5		E	3
2	Decide on a teaching line from another specialization			3		3		E	3
3	Optical communications	Network security	Audio and video production	3		3		E	4
4	Mobile communications	Networks Optimisation	Audio and video compression	3		3		E	4
5	Software project						2	DE	4
6	Diploma preparation								15
	Total			12	1,5	10,5	2	24	30

Field: Electronic Engineering and Telecommunications – in English

No	Teaching Line	C	S	L	P	Ex	Cr.
First Year - First Semester							
1	Mathematics I	2	2			E	4
2	Mathematics II	2	2			E	4
3	Physics	2	1	1		DE	5
4	Electrical Circuits	2		2		DE	5
5	Introduction to Computer Programming	2		2		DE	4
6	Culture and Civilization	1	1			E	2
7	Second Language*		2			DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	12	9	5		26	29

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First Year - Second Semester							
1	Mathematics III	2	2			E	4
2	Mathematics IV	2	1	1		DE	4
3	Materials Science	2		2		E	4
4	Mechanics	3		2		E	4
5	Electronic Devices	2		2		E	4
6	Applied Computer Programming	2		2		DE	4
7	Experimental Data Processing	1	1			DE	2
8	Physical Education		1			DE	1
9	Second Language*		2			DE	2
10	Practical Training					C	2
	Total	13	8	7		28	31

*A foreign language is chosen from: French or German.

Second Year - Third Semester							
1	Electronic Circuits	2		2		E	5
2	Electrical Engineering Fundamentals	2	1	1		DE	4
3	Signals and Systems	2	1	1		E	4
4	Digital Integrated Circuits	2	1	1		E	4
5	Computer Aided Design	2		2		E	4
6	Electrical and Electronic Measurements	2	1	1		DE	4
7	Second Language			2		DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	13	4	10		27	30
Second Year - Fourth Semester							
1	Analog Integrated Circuits	2	1	1		E	4
2	Microeconomics	2	1			DE	3
3	Computer Networks Architecture	2		2		E	4
4	Object Oriented Programming	2		2		E	4
5	Signal Processing	2		2		E	5
6	Microprocessors and Microcontrollers	2		2		E	5
7	Electronic Circuits Project				2	DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	13	4	9	2	28	30

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Third Year - Fifth Semester							
1	Electronic Instrumentation	2		2		E	4
2	Radio Communications	2		2		DE	4
3	Virtual Instrumentation	2		1	1	E	4
4	Information Theory and Coding	2	1	1		E	4
5	Data Communications	2		2		E	4
6	High Frequency Techniques	2		2		DE	4
8	Management and Marketing	2	2			DE	4
9	Practical Training					C	2
	Total	14	3	10	1	28	30
Third Year – Sixth Semester							
1	Opt.1 Electromagnetic Compatibility or Digital Switching Systems	2		2		E	4
2	Programmable Logic Systems	2		1	1	DE	5
3	Power Electronics	2		2		E	4
4	Embedded Systems	2		2		E	4
5	Digital Telephony	2		2		E	5
6	Audio and Video Systems	2		2		DE	4
7	Engineering Ethics and Communications	1	1			DE	2
8	Practical Training					C	2
	Total	13	1	11	1	26	30
Fourth Year - Seventh Semester							
1	Electronic Equipment Testing	2	0	2	0	E	5
2	Software Development	2	0	1	1	DE	5
3	Modelling and Simulation	2	0	1	1	E	5
4	Opt.2 VHDL Digital Signal Processors	2	0	2	0	E	4
5	Microelectronics	2	0	2	0	DE	5
6	Digital Integrated Networks	2	0	2	0	E	4
7	Project (Optional Topic 2)	0	0	0	2	DE	2
	Total	14	3	10	1	28	30
Fourth Year – Eighth Semester							
1	Opt.3 Digital Radiocommunications Optical Communications	3	0	3	0	E	4
2	Opt.4 Image processing Biomedical Electronics	3	0	3	0	E	5
3	Electronic Packaging	3	0	3	0	E	4
4	Wireless Communications	3	0	3	0	E	4
5	Software Project	0	0	0	3	DE	5
6	DIPLOMA PROJECT						15
	Total	12	0	12	3	27	30

3.2. The "Master" level

This programme is intended for the best graduates of the "Diploma (Licensed) Engineer" level with the purpose of training young engineers for research activities. Only graduates of the "Diploma (Licensed) Engineer" level with a final grade of 8/10 can be admitted to this level.

Thus, the teaching staff treats the educational activity at this level with increased care. From the graduates of this level, young engineers are selected to be the next generation of professors and research staff of our faculty.

The goals of this programme are:

- to accustom the young engineers with permanent intellectual activity;
- to raise the scientific curiosity of the students, but also to get them used to the stress and accuracy of scientific research;
- to give students the opportunity to work individually, as well as in a team;
- to get students accustomed to research activity;

The structure of this programme is similar to that of the "Diploma (Licensed) Engineer" programme. Its main features are:

- deep individual study;
- 2 years starting from 2006 and for the LMD system;
- the students (young engineers) graduate this level with a dissertation.

Each of the three faculty departments offers at least one "Master" degree programme:

- **Applied Electronics:**
 - *"Electronics of Intelligent Industrial Systems" (EIIS)*,
 - *"Advanced Design and Testing Techniques in Electronics" (ADTTE)*.
- **Communications:**
 - *"Signal Processing in Telecommunications Networks" (SPTN)*
 - *"Traitement du Signal"* (Signal processing), in French (*TS*)
- **Measurement and Optical Electronics:**
 - *"Electronic Instrumentation" (EI)*

Starting from 2009 Master degree programme has been adapted to LMD system and seven Master degree programme were offered. Two of them: Biomedical Engineering and Multimedia Technology are complementary.

- **Applied Electronics:**
 - *"Electronics of Intelligent Systems" (EIS)*,
 - *"Advanced Techniques in Electronics" (ADE)*,
- **Communications:**
 - *"Communications Networks Engineering" (CN)*
 - *"Traitement du Signal"* (Signal processing), in French (*TS*)
 - *"Multimedia Technologies" (MT)*
- **Measurement and Optical Electronics:**
 - *"Electronic Instrumentation" (EI)*

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• **“Biomedical Engineering” (BE)**

Number of students 2006/2007

	Total number		Graduated	Withdrawn
	First year	Second year		
EIIS	18	-	-	-
SPTN	16	-	-	-
TS	15	-	-	-
ADTTE	16	-	-	-

Number of students 2007/2008

	Total number		Graduated (2008)	Withdrawn
	First year	Second year		
EIIS	17	18	13	5
SPTN	18	16	12	9
TS	16	13	5	11
ADTTE	18	11	8	5
EI	15	-	-	5

Number of students 2008/2009

	Total number		Graduated	Withdrawn
	First year	Second year		
EIIS	30	13	10	
SPTN	26	10	6	
TS	15	11	8	
ADTTE	26	14	8	
EI	19	10	7	

Number of students 2009/2010

	Total number		Graduated	Withdrawn
	First year	Second year		
EIIS	-	13		
SPTN	-	10		
TS	-	11		
ADTTE	-	14		
EI	-	10		
EIS	36	-		
ADE	29	-		
CN	51	-		
TS	29	-		
MT	41	-		
EI	23	-		
BE	22	-		

Curriculum for the Academic Year 2009-2010

Electronics of Intelligent Industrial Systems

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
III	Design and Testing of Embedded Systems	2	0	0	1	8
	Algorithms and Techniques for Modelling and Simulation	1	0	1	1	8
	Power Active Filters with High Reliability	2	0	1	0	8
	Flexible Systems	2	0	1	0	6
IV	Elaboration of the M.Sc. Thesis					30

Signal Processing in Telecommunications Networks

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
III	Multimedia Signal Processing	2	0	2	0	11
	Advanced Techniques in Telecommunications	2	0	2	0	11
	Biomedical Signal Processing	2	0	2	0	8
IV	Elaboration of the M.Sc. Thesis					30

Signal Processing (*Traitement du Signal - in French*)

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
III	Modern Telecommunications Techniques	2	0	2	0	11
	Neural Networks Applications	2	0	2	0	11
	Biomedical Signal Processing	2	0	2	0	8
IV	Elaboration of the M.Sc. Thesis					30

Advanced Design and Testing Techniques in Electronics

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
III	PCBA Design and Manufacturing (project)	0	0	0	2	4
	Algorithms and Techniques for Modelling and Simulation	1	0	1	1	8
	Design and Testing of Embedded Systems	2	0	1	1	8
	Electromagnetic Compatibility	2	0	1	0	8
	Management of Design and Research	1	1	0	0	6
IV	Elaboration of the M.Sc. Thesis					30

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Electronic Instrumentation

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
III	Algorithms and Techniques for Modelling and Simulation	1	0	1	1	8
	Image Processing	2	0	2	0	8
	Spectral Analysis	2	0	1	0	8
	Management of Design and Research	1	1	0	0	6
IV	Elaboration of the M.Sc. Thesis					30

Electronics of Intelligent Systems

Sem.	Course Title	Structure [hours/week]				Credit Points/ Evaluation
		C	S	L	P	
I	Bases in Signal Processing Signal and Digital Communication Systems Processors and Acquisitions Systems Modern Programming Techniques Statistic and Stochastic Modelling (2 of 5 disciplines will be chosen)	2	0	2	0	8/DE
	Optimization of Energy Converters Parameters	2	0	1	0	7/E
	Artificial Intelligence Elements	2	0	1	0	7/E
II	Real Time Systems Testing and Measuring Systems Interfacing Graphical Programming Image Processing Administration of Computer Networks (1 of 5 disciplines will be chosen)	2	0	1	0	7/E
	Expert Systems	2	0	1	0	7/DE
	Intelligent Control of Movement	2	0	2	0	8/E
	High Frequency Power Processors	2	0	2	0	8/E

Advanced Techniques in Electronics

Sem.	Course Title	Structure [hours/week]				Credit Points/ Evaluation
		C	S	L	P	
I	Signal and Digital Communication Systems Processors and Acquisitions Systems Modern Programming Techniques Statistic and Stochastic Modelling (2 of 4 disciplines will be chosen)	2	0	2	0	8/DE
	PCBA Design and Manufacturing	2	0	1	0	7/E
	Radio Rrequencies Measurements	2	0	1	0	7/E

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II	Testing and Measuring Systems Interfacing Image Processing Administration of Computer Networks (1 of 3 disciplines will be chosen)	2	0	1	0	7/E
	Statistical Methods for Systems Control	2	0	1	0	7/DE
	Graphical Programming	2	0	2	0	8/E
	IC Design Oriented on Applications	2	0	2	0	8/E

Communications Networks Engineering

Sem.	Course Title	Structure [hours/week]				Credit Points/ Evaluation
		C	S	L	P	
I	Bases in Signal Processing Signal and Digital Communication Systems Processors and Acquisitions Systems Modern Programming Techniques Statistic and Stochastic Modelling (2 of 5 disciplines will be chosen)	2	0	2	0	8/DE
	Statistical Signal Processing	2	0	1	0	7/E
	Advanced Topics in Communications Networks	2	0	1	0	7/E
II	Radio Networks Design Testing and Measuring Systems Interfacing Graphical Programming Image Processing (1 of 4 disciplines will be chosen)	2	0	1	0	7/E
	Administration of Computer Networks	2	0	1	0	7/DE
	Communications Networks Simulation	2	0	2	0	8/E
	Data, Audio and Voice Networks	2	0	2	0	8/E

Traitement du Signal (Signal Processing) in French

Sem.	Course Title	Structure [hours/week]				Credit Points/ Evaluation
		C	S	L	P	
I	Bases in Signal Processing Signal and Digital Communication Systems Processors and Acquisitions Systems Modern Programming Techniques Statistic and Stochastic Modelling (2 of 5 disciplines will be chosen)	2	0	2	0	8/DE
	Statistical Signal Processing	2	0	1	0	7/E
	Adaptive Technique in Telecommunications	2	0	1	0	7/E
II	Specific Circuits in Mobile Communications Administration of Computer Networks Biomedical Signal Processing Communications Networks Simulation (1 of 4 disciplines will be chosen)	2	0	1	0	7/E
	Neural Networks	2	0	1	0	7/DE
	Time/frequencies Representation	2	0	2	0	8/E
	Image Processing	2	0	2	0	8/E

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Multimedia Technologies

Sem.	Course Title	Structure [hours/week]				Credit Points/ Evaluation
		C	S	L	P	
I	Bases in Signal Processing Signal and Digital Communication Systems Processors and Acquisitions Systems Modern Programming Techniques Statistic and Stochastic Modelling (2 of 5 disciplines will be chosen)	2	0	2	0	8/DE
	Advanced Multimedia Technologies	2	0	1	0	7/E
	Multimedia Programming	2	0	1	0	7/E
II	Digital Media Administration of Computer Networks Graphical Programming Data, Audio and Voice Networks (1 of 4 disciplines will be chosen)	2	0	1	0	7/E
	Graphic and Animation or Interactive Data Bases	2	0	1	0	7/DE
	Interactivity and Usability	2	0	2	0	8/E
	Image Processing	2	0	2	0	8/E

Electronic Instrumentation

Sem.	Course Title	Structure [hours/week]				Credit Points/ Evaluation
		C	S	L	P	
I	Bases in Signal Processing Signal and Digital Communication Systems Processors and Acquisitions Systems Modern Programming Techniques Statistic and Stochastic Modelling (2 of 5 disciplines will be chosen)	2	0	2	0	8/DE
	Metrology and Quality Control	2	0	1	0	7/E
	Radio-Frequencies Measurements	2	0	1	0	7/E
II	Statistical Methods for Systems Control IC Design Oriented on Applications Image Processing Biomedical Signal Processing (1 of 4 disciplines will be chosen)	2	0	1	0	7/E
	Expert Systems	2	0	1	0	7/DE
	Graphical Programming	2	0	0	2	8/E
	Testing and Measuring Systems Interfacing	2	0	2	0	8/E

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Biomedical Engineering

Sem.	Course Title	Structure [hours/week]				Credit Points/ Evaluation
		C	S	L	P	
I	Bases in Signal Processing Signal and Digital Communication Systems Processors and Acquisitions Systems Modern Programming Techniques Statistic and Stochastic Modelling (1 of 5 disciplines will be chosen)	2	0	2	0	8/DE
	Biomaterials Mechanic	2	0	1	0	7/E
	Biosensors	2	0	1	0	7/E
	Concepts of Human Anatomy and Psychiology	2	0	2	0	8/DE
II	Graphical Programming Data, Audio and Voice Networks Image Processing Testing and Measuring Systems Interfacing (2 of 4 disciplines will be chosen)	2	0	1	0	7/E
	Biomedical Signal Processing	2	0	0	0	6/E
	Biomedical Signal Processing	0	0	0	2	2/DE
	Biomedical Techonologies	2	0	2	0	8/E

3.3. The "PhD Engineer" level

The Ph.D. degree in Electronics and Telecommunications is a specialized degree, the highest that can be attained in a course of study at our faculty. Its purpose is to certify the qualities of "Scientific Researcher" of the participant in this programme.

The first step of this study programme is the admission examination. After passing it, the candidate must sit for three or four further qualifying examinations in specific subjects. Having successfully passed these examinations, the doctoral candidates must present two or three essays about their research activity at the meetings of the faculty, thus giving others the opportunity to learn about their research activity and to debate upon their scientific interests. Candidates can complete the Ph.D. degree in three to six years (limited to three years in the LMD system). The last step of this programme is the elaboration and oral defence of the Ph.D. thesis.

The goals of this educational programme are:

- to familiarize the candidates with the latest results in their field of study. The thesis must provide original contributions to the research field;
- to develop the theoretical background and practical skills of the candidates with respect to the research field and their original thinking manner;
- to disseminate the preoccupations of our research staff on national and international scale.

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Since 1998, some of our Ph.D. students have been preparing their thesis in a co-tutulary system, having two Ph.D. advisors, one from our faculty and one from abroad (usually from a western European university).

PH.D. ADVISORS

1. Scientific supervisor *Prof.dr.eng. Virgil TIPONUȚ*

PhD students

- Ciprian GAVRINCEA: *Researches on a Neural Network Implementation for Processing the Signals Generated by Muscle System*
- Liviu LUCACIU: *Contributions to the Biometric Systems Development and Implementation*
- Cristian BURSAȘIU: *Contributions to the Optimization of Neural Network Applications Development*
- Alin BRÎNDUȘESCU: *Contributions to the biological signals simulation using artificial neural networks*
- Ionuț MIREL: *Methods for Digital Video Images Processing*
- Călin LAR: *Contributions to the Sensorial Data Fusion*
- Sorin POPESCU: *Optimization of the electrical welding process by means of artificial neural networks*
- Laviniu ȚEPELEA: *Human-Machine Interface.*
- Lucian BUGLEA: *Smart Transducers Array*
- Philipp ROEBROCK, *Multi Sensor Controlled Assembly and Application with Manipulators*
- Daniel IANCHIȘ
- Zoltan HARASZY
- Robert LORINCZ
- Radu MARȘU
- Sebastian MICUȚ
- David CRISTEA
- Adrian FAULHABER SFARAILA

2. Scientific supervisor: *Prof. dr. ing. Tiberiu MUREȘAN*

PhD students

- Solomon MIMIS: *Integrated Circuits for Transmission Bit Error Rate Measurement*
- Petru PAPAȘIAN: *Intelligent Subsystems for Optimal Control of Technological Processes*
- Dan Mircea ANDREICIUC: *Analysis and Correction Methods for Positioning and Orientation of Mobile Industrial Robots*

3. Scientific supervisor: *Prof. dr. ing. Mircea CIUGUDEAN*

PhD students

- Aurel FILIP: *Researches on CMOS Frequency References*

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- Marllene DANETI: *Propagation time estimation algorithms for noise sources location*
- Beniamin DRAGOI: *Researches on CMOS Integrated Digital Correlator Conception and Design*
- Iosif MUDRA: *Researches on CMOS Integrated Fast Synchronous Comparators*
- Bogdan MARINCA: *Ultrasonic Investigation Optimization by Algorithms Implemented in Dedicated Integrated Circuits.*
- Andrei PASCA
- George ROSU
- Mircea TOMOROGA (*cotutela cu prof.dr.ing. Corneliu TOMA*)

4. Scientific supervisor: *Prof. dr. ing. Viorel POPESCU*

PhD students

- Mircea BĂBĂIȚĂ: *Reaserches on a.c.–d.c. converters*
- Cornel GLISICI: *Contributions regarding improved capabilities of uninterruptible power supplies*
- Daniel ALBU: *Contributions regarding improved capabilities of switched mode converters with PFC applications*
- Lucian PĂUN: *DC/DC converters with optimized energy parameters*
- Adrian ȘCHIOP: *Contributions to theoretical and experimental study of power converters with ac motor drive applications*
- Florin PRUTIANU: *Contributions to theoretical and experimental study regarding optimization of energy converters from wind power station*
- Cristian VRÂNCILĂ: *Contributions regarding improved performance of active power filters*

5. Scientific supervisor: *Prof. dr. ing. Horia CÂRSTEA*

PhD students

- Dumitru MĂRGELOIU: *Contributions to the improvement of electronic equipment for monitting and controlling of low and medium voltage electrical network parameters*
- Ovidiu MIȚARIU: *Contributions to the improvement of autotesting equipment in digital data conditioning and transmission*
- Corneliu TRIPA: *Contributions to the development of fault diagnose and identification tests in applied electronics equipment*
- Mircea RIF: *Automated system for data acquisition, processing and management in industry*
- Mircea-Florin MIHĂESCU: *Contributions to the development of dynamical diagnose and reconfiguration tests in digital fault redundant systems*
- Liviu ION: *Contributions to the development of digital regulation in electrical driven industrial processes*
- Andy BERCOVICI: *Contributions to the increase of fiability in digital electronics equipment*
- Cornel GLĂVAN: *Contributions to increased security of digital transmissions in special applications.*

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- Liviu CHIȘ: *Contributions to pattern recognition test development in automated visual control*
- Călin SÂRBU: *Contributions to predictive test development concerning electrostatic discharge in electronic industry*
- Paul CONSTANTINESCU
- Daniela MIHET
- Silvana-Oana POPESCU

6. Scientific supervisor: *Prof. dr. ing. Aurel GONTEAN*

PhD students

7. Scientific supervisor: *Prof. dr. ing. Ioan NAFORNIȚĂ*

PhD students

- Mirela BIANU, *Contributions on adaptive signal processing in telecommunications*
- Cristian IGNEA, *Contributions on finding and measurement antenna parameters*
- Adrian FILIPESCU, *Contributions on Digital Filters Optimal Design*
- Romulus REIS, *Non-Stationary Signal Description by Non-Parametrical Method*
- Janos GAL, *Contributions on Kalman Filters Use in Telecommunications*
- Marius SALAGEAN, *Non-Stationary Signal Description by Non-Parametrical Method*
- Florin VANCEA, *Data Protection in Communication Networks*
- Andy VESA, *Improvement of Digital Radio Systems Detection,*
- Mircea COSER, *Systems Optimization using TRIZ Technique,*
- Teodora PELA, *Traffic Optimization on Metropolitan Area Networks,*
- Adina DABA, *Non-Stationary Signal Description by Non-Parametrical Method,*
- Florin Dumitru CHIS, *Improving Security Level In Broadband Networks.*
- Arpad IOZSA
- Mirela MIOC

8. Scientific supervisor: *Prof. dr. ing. Miranda NAFORNIȚĂ*

PhD students

- Radu LUCACIU, *Optical communication systems with OCDMA*
- Maria KOVACI, *N-PSK multiresolution modulations in the COFDM hierarchical systems*
- Caius ULITA, *Equalizers for radio channel modems*
- Mirela VIOR, *Quality transmission improvement using turbo codes*
- Sorin POPA, *Synchronization techniques improvement for radio channel transmission systems*
- Marius OLTEAN, *Radio channel equalization using cyclic prefix*
- Florin Lucian MORGOS, *Radio channels equalization techniques improvement*
- Ioan CARLIA, *Collaborative adhoc wireless mobile networks*
- Marin MANGRI, *Optimizarea tracing-ului la protocoalele de timp real din IMS (IP Multimedia Subsystems)*

- Calin SIMU, *Acquisition of EKG signals using Bluetooth*
9. Scientific supervisor: *Prof. dr. ing. Alexandru ISAR*
- PhD students*
- Ioana FIROIU (Adam), *Despeckling of sonar images by multi-resolution filtering*
 - Cristina STOLOJESCU (first year student)
 - Victor CUTEANU, *Contributii la proiectarea unui receptor de satelit*
 - Petru LAZAR, *Protocoale utilizate in retele de comunicatii wireless*
 - Ioan ANDOR, *Tehnici de asigurare a securitatii in retele de comunicatii wireless*
 - Beatrice, ARVINTI, *Prelucrarea inteligenta a electrocardiogramelor pentru monitorizare la distanta*
 - Lucian, ARDELEAN, *Tehnici de reducere a interferentelor in tehnologia WiMAX*
10. Scientific supervisor: *Prof. dr. ing. Corneliu I. TOMA*
- PhD students*
- Ionel STANCIU: *Multimedia Communications Over Wireless Networks*
 - Andreea GĂLEANU: *Contributions at the performance improvement of the GSM system*
 - Artur MULLER: *Contributions in implementing of the multimedia databases, with local and remote access*
 - Mirela L. IOANEȘIU: *Contributions at the network security by the using of the virtual private networks (VPN)*
 - Daniel C. HAIDUC: *Contributions in the color digital reproduction field*
 - Radu TĂNASE: *Ultrasound electronic systems for the movement evaluation in the fluid environment*
 - Mihai I. ONIȚĂ: *Video communications in multimedia applications.*
 - Mircea TOMOROGA: *Contributions at the conception and design of the analogue integrated circuits in CMOS technology*
 - Florin-Josef LĂTĂREȚU: *Contributions at the intelligent telecommunication network achievement.*
 - Daniela Narcisa FUIOREA – BULUCEA: *Tehnici de aliniere a imaginilor utilizând estimare neparametrică de densitate de probabilitate*
 - Alin SCOROȘANU
11. Scientific supervisor: *Prof. dr. ing. Marius OTEȘTEANU*
- PhD students*
- Georgiana SÂRBU-DOAGĂ, *A Compositional Approach to Hand Gesture Recognition*

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- Hay BOENKE (Germania), *Hierarchical object localization for robotic bin picking*
- Daniel POPA, *Urmărirea obiectelor în secvențe video*
- Ion-Cosmin DITA, *Detecția și recunoașterea codurilor matriceale*
- Horia MUNTEAN, *Rețele de comunicații mobile 4G*
- Pross WOLFGANG (Germania), *Codarea pentru corecția erorilor la coduri matriceale,*

12. Scientific supervisor: *Prof. dr. ing. Radu VASIU*

PhD students

- Mihai I. ONIȚĂ: *Video communications in multimedia applications*
- Iasmina ERMALAI, *Contributions to the Use of New Information Technologies in e-Learning*
- Artur SRAUM, *Contributions to Interactive Web Programming*
- Cristian TECU, *Contributions to the Use of Video, Photo and Audio Applications in Professional Presentations*
- Andrei TERNAUCIUC
- Virgil ROTARU
- Bogdan DRAGULESCU

13. Scientific supervisor: *Prof. dr. ing. Sever CRIȘAN*

PhD students

- Octavian LUCA: *Spectral Analysis Of Bioelectrical Signals*
- Ovidiu VETREȘ: *Perturbations Study Of Low Frequency Electromagnetic Fields*

14. Scientific supervisor: *Prof. dr. ing. Alimpie IGNEA*

PhD students

- Liliana STOICA: *Contributions to Digital Signal Processing*
- Ciprian DUGHIR: *Contributions to antennas calibration*
- Cristina VĂLIU: *Contributions to the nonlinearities study of high-frequency circuits*
- Cora IFTODE: *Electromagnetic field effects on living organism*
- Gabriel GĂȘPĂRESC: *Perturbation monitoring in electrical networks*
- Adrian MIHĂIUȚ: *Contributions in antennas calibration*
- Doru Lucian COCOȘ, *Neural Networks and Fuzzy Logic applications to electronic meter calibration*

- Teodor PETRIȚA, *Contributions to radiofrequency disturbances monitoring*
- Michael KLEINKES (Germany): *Mathematical analysis of off-line programmed robots in industrial application cells monitoring*

PHD THESIS DEFENDED

- Ciprian George GAVRINCEA: *Contributions regarding processing of the signal generated by muscle system*, Scientific supervisor Prof.dr.eng. Virgil TIPONUȚ
- Philipp ROEBROCK, *Multi Sensor Controlled Assembly and Application with Manipulators*, Scientific supervisor Prof.dr.eng. Virgil TIPONUȚ
- Mircea-Florin MIHĂESCU: *Contributions to the development of dynamical diagnose and reconfiguration tests in digital fault redundant systems*, Scientific supervisor Prof.dr.eng. Horia CÂRSTEA
- Marllene DANEȚI: *System modelling for fluide transport and propagation time estimation algorithmes for noise sources location*, Scientific supervisor Prof.dr.eng. Mircea CIUGUDEAN
- Michael KLEINKES (Germany): *Mathematical analysis of off-line programmed robots in industrial application cells monitorings*, PhD advisor: Prof. dr. eng. Alimpie IGNEA
- Maria KOVACI: *Contributions in performances analysis and improvements of turbo codes used in flat fading channels*, Scientific supervisor Prof.dr.eng. Miranda NAFORNITA
- Mircea COSER, *Contribuții privind optimizarea sistemelor folosind tehnica TRIZ*, Scientific supervisor Prof.dr.eng. Ioan NAFORNITA
- Kay Erik BOENKE (Germania), *Hierarchical object localization for robotic bin picking*, PhD advisor: Prof. dr. eng. Marius OTEȘTEANU
- Daniela Narcisa FUIOREA – BULUCEA: *Tehnici de aliniere a imaginilor utilizând estimare neparametrică de densitate de probabilitate*, PhD advisor: Prof. dr. eng. Corneliu TOMA
- Mircea TOMOROGA: *Contributions at the conception and design of the analogue integrated circuits in CMOS technology*, PhD advisor: Prof. dr. eng. Corneliu TOMA and prof.dr.eng. Mircea CIUGUDEAN
- Georgiana SÂRBU-DOAGĂ, *A Compositional Approach to Hand Gesture Recognition*, PhD advisor: Prof. dr. eng. Marius OTEȘTEANU
- Iasmina ERMALAI, *Contributions to the Use of New Information Technologies in e-Learning*, PhD advisor: prof. dr. eng. Radu VASIU

4. Research

The research activity is performed within two Research Centres and by various research teams, as follows:

4.1 Intelligent Industrial Electronic Systems - IIES Research Centre

The director of the IIES Centre is Prof. dr. ing. Mircea CIUGUDEAN.

Web page: <http://www.etc.upt.ro/ea>

E-mail: mircea.ciugudean@etc.upt.ro

The Centre functions in accordance with the CNCSIS certificate, nr. 106/CC-C/11.05.2001.

Research Field

The Centre performs research and design activities in domains such as:

➤ **Integrated Circuits Design**

Keywords: ASIC, VLSI, DA, arithmetic coprocessor

➤ **Robotics**

Keywords: sensor, robot, transducers, industrial robot driving

➤ **Neural Computing and Intelligent Sensors**

Keywords: intelligent sensors, artificial neural networks, sensor data processing

➤ **Power Electronics**

Keywords: power converters, power quality, harmonic pollution, power factor correction, soft switching, chaos.

➤ **Electronic Packaging and Testing**

Keywords: CAE, CAD, CAM, test sequence-generation, self-testing design, test points, EMC, logic analysis, spectral analysis

RESEARCH PROJECTS, CONTRACTS AND GRANTS

INTERNATIONAL PROGRAMMES

1. LEONARDO DA VINCI Community Vocational Training Action Programme *E-learning Distance Interactive Practical Education (EDIPE) CZ/06/B/PP-168022*

<i>Programme:</i>	LEONARDO DA VINCI CZ/06/B/PP-168022
<i>Total value:</i>	25,000 EURO.
<i>Director:</i>	Prof.dr.eng. Dan LASCU
<i>Members:</i>	Prof.dr.eng. Viorel POPESCU Assoc.prof.dr.eng. Mihaela LASCU Assoc.prof.dr.eng. Adrian POPOVICI Lect.dr.eng. Dan NEGOIȚESCU Assoc.prof.dr.eng. Adrian POPOVICI Assist.eng. Mircea BĂBĂIȚĂ
<i>Partners:</i>	Technical University of Brno, SK Technische Universiteit Delft, NL

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Technische Universität Wien, AT
Institut für Elektrische Antriebe und Maschinen, Wien,
AT
Ruhr Universität Bochum, D
National Technical University of Athens, GR
Institut National Polytechnique de Lorraine, FR
Budapest Muszaki es Gazdasagtudomanyi Egyetem, HU
Fakulta elektrotechniky a informatiky Technická
univerzita V Košiciach, SK
Trencianska Univerzita Alexandra Dubceka v Trencine,
SK
University of Maribor FERI, SL

Contact person:

Prof.dr.eng. Dan LASCU
Tel: +40 256 403343
E-mail: dan.lascu@etc.upt.ro

FIELD AND PROGRAM DESCRIPTION

So far the E-learning and Distance-learning via the Internet, is focusing on information delivery where typically multi-media rich web pages are offered to the student sitting at home in front of the computer, taking lessons in a certain subject, while keeping contact to other students and teacher via e-mail, chat-rooms, on-line tests, etc.

Other issues focus on the style of teaching under the impression of extensive usage of multi-media like videoclips, audio or "slide shows" in the classroom or via distance (Internet). Advanced material use interactivity and combination of text explaining the theory with interactive programs that allow student to do little experiments via a simulator or solving some engineering problems. The rapid changes in society and technology have also generated a demand for more flexible engineers having many more qualifications than just a high level of technical or scientific specialisation. The drawback of a pure theoretical approach in undergraduate electrical engineering (EE) curriculum is that there is paid less attention to the phenomena that loom by laboratory experiments and exploration of system components. The result of this, in combination with the rapid development of computer applications, is that hands-on and laboratory experience vanished and computer simulations are getting more and more attention.

However, it is crucial to let students have some real practice. The real experiment gives the students a sense of practical testing and they can also see the influence of the second/higher order effects, real time effects, effect of parasitics which are difficult or impossible to be simulated perfectly. The reason is that the simulation is always based on more or less simplified model. Therefore it is important to give to the students a real world experience.

However, to build an experiment is expensive and it is impossible for an educational institute to have the complete scale of experiments. From the learner point of view, there is a need for easy accessible hardware experiment. The hardware experiment should therefore be redesigned such that they also can be accessed on the Web. This way the advance in ICT will be combined with the real practical experience.

The proposed virtual or distance laboratory does not present any web-based simulation. It is a real electro-technical experiment conducted in the laboratory but remotely accessed, controlled and monitored by web-based tools. The experiment is either conducted online or based on recorded valued (virtual experiment). It allows students to perform experiment safely, without a guidance and official working hours in the laboratory are not limiting the users. The students can also experience the appearance of the measurement instrument, the electronic components and many more factors such as lay-out. The facility is useful for today's requirement of teaching in the Internet.

The experiments should be not only analysis oriented (to measure and see the results) but also synthesis oriented. It should involve a design aspect. Therefore the measurements are designed as a project with educational philosophy. The technology of such integration is planned to be realised within framework of the project. First of all the technology of such an integration and guidelines to achieve distance Interactive Practical Education will be defined. With this new e-learning tool this technology will be applied to the basic fields of applied electrical engineering starting from fundamentals of EE, through electronics, power electronics, applications of power electronics, dynamics of electro-mechanical systems, including industrial application of electrical drives, motion control and also complex drive systems will be addressed. A complete set of 18 different interactive design oriented virtual or distance laboratories will be prepared with the active participation of the educational expert. This technology will enable us to transfer results of different sectors of education and it will revolutionize education as it is today.

During the kick-off meeting hold in Vienna on November 30th – December 1st the project web page, evaluation group, dissemination plan, financial management, contents of the materials, selection of software for distance practicals management and a workshop on profect oriented and design oriented education were established.

RESEARCH PROJECTS

1. PN II, IDEI, Proiecte de cercetare exploratorie, cod 945/2008, nr. contract UEFISCSU 599/19.01.2009 New methods for facial analysis and recognition

Value: 932 222 Total (102 416 on 2009)

Director: Assoc.prof.dr.eng. Cătălin CĂLEANU,

Members: Prof. dr. ing. Vasile GUI,

Prof. dr. ing. Virgil TIPONUȚ,

Lect. dr. eng. Valentin MARANESCU,

Drd. eng. Daniel IANCHIȘ,

Drd. eng. Zoltan HARASZY

FIELD AND GRANT DESCRIPTION

The aim of the research project is investigation and development, trough fundamental research, of new facial expression recognition methods and principles. The research is focused on finding robust solutions for the following subsystems: face representation, face detection, feature selection and extraction, classification.

Bioinspired implementation principles, mainly advanced architectures for neural networks, fuzzy systems and genetic algorithms will serve as tools for attaining the project goals.

ACTIVITIES AND RESULTS

During the project's first year, the following activities were performed: defining the management & research teams, activities & research planning, equipment acquisition, literature survey, overview regarding the available databases, proposal regarding the system structure, proposal regarding acquisitions, representing and coding 2D and 3D information, the study, implementation and testing of preprocessing methods, the study, implementation and testing of feature selection and extraction, analyze the available hardware solutions, defining the electronic schematics, EDA simulations, project achievements checking (monthly), reporting the obtained results, creating the project website.

As the results of the research activity we could mention the dissemination of scientific information through articles, e.g., YuLi Xue, Xia Mao, C.D. Căleanu, ShanWei Lv., "*Layered Fuzzy Facial Expression Generation of Virtual Agent*", Chinese Journal of Electronics (Thomson Reuters SCI), Vol. 19, No.1, pag. 69-74, 2010 and YuLi Xue, Xia Mao, C.D. Căleanu, ShanWei Lv., "*Robust Facial Expression Recognition Under Occlusion Condition*", Journal of Beijing University of Aeronautics and Astronautics, (in Chinese, accepted, EI source journal).

Contact person: catalin.caleanu@etc.upt.ro

2. PN II, CAPACITATI, Modul III, proiecte de cercetare bilaterale, România-China, cod 39-5/2008, nr. contract ANCS 222/15.04.2009 Research on Emotional Facial Expression recognition in Complicated Environment

Value: 55 000 Total (10 549 on 2009)

Director: Assoc.prof. dr. eng. Cătălin CĂLEANU,

Members: Prof. dr. ing. Radu VASIU,

Prof. dr. ing. Virgil TIPONUȚ,

Prof. dr. ing. Vasile GUI,

Prof. dr. ing. Florin ALEXA,

Assoc.prof. dr. eng. Corina BOTOCA,

Drd. eng. Dan IANCHIȘ,

Drd. eng. Zoltan HARASZY.

FIELD AND GRANT DESCRIPTION

Study of emotional facial expression recognition represents an advanced research topic in the fields of affective computing and human-computer interaction. It is important to improve the emotion intelligence of the machine and to implement an affective human-machine communication. However, current researches over the emotional facial

expression recognition are usually limited to simple environments, thus cannot be successfully applied in human-computer interaction. Aiming at the above limits and considering the requirements for robust and automatic emotional facial expression recognition in real life, this project proposes the study of emotional facial expression recognition in complicated environment.

ACTIVITIES AND RESULTS

During the project's first year, the following activities were performed: research methods for robust face and facial feature recognition (e.g. eyes, mouth) in complicated environment (e.g. light and pose variation), modelling of emotional facial expression recognition in complicated environment, research methods for robust emotional facial expression recognition in complicated environment.

An agreement of collaboration between University POLITEHNICA Timișoara, Romania and Aeronautic and Astronautic University BEIHANG, Beijing, China has been signed. Also the collaborative framework between the research team lead by dr. Căleanu from the Faculty of Electronics and Telecommunication and the research team lead by dr. Mao from the School of Electronic and Information Engineering has been established.

In June 2009 four members of the Chinese research team has visit our university. During the one week staying fruitful discussions regarding various research topics took place.

Contact person: catalin.caleanu@etc.upt.ro

3. Intelligent three phase ac power supply, 104/ 28.09.2007, ANCS – ID1178

<i>Total value:</i>	816,611 RON
<i>Director:</i>	Prof. dr. ing. Viorel POPESCU
<i>Members:</i>	Prof. dr. ing. Dan Lascu Conf. dr. ing. Adrian Popovici S.I. Dr. ing. Dan Negoïtescu As. ing. Mircea Băbăiță

4. Convenție cadru Universitatea “Politehnica” Institutul Kathrein - Fachhochschule Rosenheim – S.C. Kathrein Romania S.R.L./24.08.2006 ***Berührungslose Temperaturüberwachung und damit einhergehender Regelung der Lötprozesse – speziell bei spiegelnden Oberflächen von Mobilfunk – Baugruppen*** ***(Controlul temperaturii fără contact și reglarea on-line a procesului de lipire pe suprafețe lucioase la elementele constructive utilizate în comunicațiile mobile)***

Value: 25,000 EUR (3600 for 2009)
Director: Prof.dr.eng. Ivan BOGDANOV
Members: Prof.dr.eng. Alimpie IGNEA
Prof.dr.eng. Horia CÂRSTEA

Prof.dr.eng. Dan LASCU
Lect.dr.eng. Adrian AVRAM
Lect.dr.eng. Marius RANGU
Ing. E. Lovasz

5. Code2Mob, Application for coding / de-coding 2D bar codes to access Web services on mobile telephones / platforms

Programme: The project represents a **contribution to the implementation of the National Strategy for Research, Development and Innovation (RDI)** and it corresponds to the aim and objectives of Program 4 of The National Plan for Research, Development and Innovation II for 2007-2013

Total value: 500,000 EURO (48% SIPS, 30% UPT, 28% ATS). (71,986 LEI for 2009)

Director: Prof.dr.eng. Horia Calin CARSTEA

Lecturer.dr.eng. Marius RANGU

Members: Drd.eng. Daniela Mihet

Drd.eng. Paul Constantinescu

Dr.eng. Marian Bucos

Conf.dr. Romeo Negrea

Partners:

- SIPS Design SRL, Deva, Romania, Coordinator of project
- Polytechnic University of Timisoara(UPT), Romania, Partner 1
- Advanced Technology Systems SRL (AST), Targoviste, Romania, Partner 2

FIELD AND GRANT DESCRIPTION

Creating and implementing a platform for mobile telephony. By the Code2Mob application a platform will be implemented which will use the 2D bar codes to access Web Services in SOA architecture, on the mobile telephone. The 2D bar codes will be read with the help of the video camera of the mobile phone. The innovation consists exactly in porting SOA and the Web Services on mobile phones, thus opening unlimited uses of these services. Through the project the platform for Mobile telephony and two demonstrative applications will be created, in two different fields: m-Learning and m-Marketing.

ACTIVITIES AND RESULTS

➤ Several studies were conducted, regarding the 2D barcodes, their applications to mobile computing and server oriented application (SOA) architectures that would support barcode identification of web services.

➤ A DataMatrix decoder was designed, implemented and tested, currently being operational on mobile phones running Symbian platforms.

➤ An mLearning application was designed and is now being implemented. It will be integrated in the "Multimedia History" itinerant exhibition organized by a consortium of several Romanian museums.

Contact person: marius.rangu@etc.upt.ro

Research in INTEGRATED CIRCUITS DESIGN

The research group in this domain is lead by prof. dr. eng. Mircea CIUGUDEAN and also includes an associate professor, one lecturer, three assistants, and three graduate students. The group will grow further by four graduate students and three PhD students per year.

Research in *ROBOTICS*

The Research Team in Robotics (RTR) is lead by prof. dr. eng. Tiberiu MURESAN and prof. dr. eng. Ivan BOGDANOV. The team includes one more professor, associate professors, three lecturers and one assistant professor.

The members of the RTR are members of the Robotics Association from Romania which is part of the International Federation of Robotics with the headquarters in Stockholm, Sweden.

In the last years the main research subjects were:

- Pilot intelligent production systems
- Research on passive systems and active intelligent systems interaction
- Microcontroller based control of electrical drives
- Interpolation in robot control
- Mobile robots control
- Sensors for robotics
- Equipment for leading the welding heads.

The Robotics Research Team uses six PC computers and simulation software.

Research in *NEURAL COMPUTING AND INTELLIGENT SENSORS*

The research group is coordinated by Prof. dr. ing. Virgil TIPONUȚ and includes three assistant professors from the Department of Applied Electronics, eight post-graduates from other universities in Romania and industrial companies (Romania, Canada, USA), who are developing their PhD thesis.

FIELD DESCRIPTION

- VLSI Implementation of Cellular Neural Networks (CNN)
- Applications of CNN in Intelligent Sensors
- Applications of CNN in Robotics (Mobile Robots and Colony of Interacting Robots)

The research activities are also focused in the field of Computational Intelligence (CI) applications. Using CI paradigms, problems like biometrics - face detection and recognition, time series prediction or autonomous mobile robot navigation are tackled. For coding purpose, mainly MATLAB and C are employed.

Hardware/Software resources:

- General purpose PC compatible computers
- DSP boards from Texas Instruments
- Microconverter boards from Analog Devices

- Software development tools
- Prototyping facilities

RESEARCH TEAM

Prof. dr. ing. Alexandru GACSADY
S.l. dr. ing. Catalin CALEANU
S.l. ing. Aurel FILIP
S.l. ing. Calin LAR
S.l. ing. Ioan GAVRILUT
As. ing. Laviniu TEPELEA

Contact person

Prof. dr. ing. Virgil TIPONUT
Tel: +40 256 403337
E-mail: virgil.tiponut@etc.upt.ro

Research in *POWER ELECTRONICS*

The main research themes investigated are:

- Improvement and development of new high-frequency PWM and resonant DC-DC converter topologies,
- Elaboration of new power factor correction circuits,
- New control techniques for power factor correction circuits, using classical solutions or neuro-fuzzy controllers,
- Research on AC-AC matrix converters and the corresponding control methods,
- Improvement of electrical drives using active power filters and fuzzy regulators,
- Research regarding topologies and operation improvement of active power filters,
- Development of experimental prototypes for different circuits derived from theoretical research.

As technical support, the research team uses six PCs, design and simulation software for power electronics, two power analyzers and many other power electronic devices.

At present, the research team efforts are focused on creating a power quality test centre, according to European regulations.

RESEARCH TEAM

Prof.dr.eng. Viorel POPESCU – head of the group
Prof.dr.eng. Tiberiu MURESAN
Assoc.prof.dr.eng. Dan LASCU
Lect.dr.eng. Adrian POPOVICI

Lect.dr.eng. Dan NEGOITESCU
Lect.eng. Mircea BABAITA

Contact person

Prof.dr.eng. Viorel POPESCU
Tel: +40 256 403344
E-mail: viorel.popescu@etc.upt.ro

Research in *ELECTRONIC PACKAGING AND TESTING*

The research group in this domain is coordinated by Prof. dr. ing. Horia CÂRSTEA, and includes two assistants and three graduated students. The group established relationships with several regional powerful companies in the electronic packaging field, like SOLECTRON, ABB, TELCO and NOVAR. Also, the group has preferential relations with ALCATEL Network Systems, Romania in the field of testing electronic equipment.

4.2 The Research Center on Instrumentation, Measurement and Electromagnetic Compatibility (IMCEM)

The director of the IMEMC research center is Prof. dr. ing. Alimpie IGNEA.

Web page: <http://www.meo.etc.upt.ro/imcem/>

E-mail: alimpie.ignea@etc.upt.ro

The Centre functions in accordance with The CNCSIS certificate, nr. 102/CC-C/11.05.2001.

IMCEM belongs to the Department of Measurements and Optical Electronics, Faculty of Electronics and Telecommunications. For the Electromagnetic Compatibility field, IMCEM is part of the Multi-User Research Base “National Interuniversity Centre for High Voltage Engineering and Electromagnetic Compatibility”.

The main research and development areas are:

- *Electric and Electronic Measurement and Instrumentation*: improving measurement methods, sensors and transducers;
- *Electromagnetic Compatibility*: EMC measurements and tests at high frequencies, electromagnetic supervision;

Main activities since the creation of the centre:

- IMCEM endowment with high specialized equipment for measurements, tests, and education through a TEMPUS programme, a Multi-User Research Base grant and other sources;

- the achievement of scientific and development research objectives through grants and scientific research contracts, consulting activities, technical expertise, technical assistance, design; ANTSI, CNCSIS grants were obtained and local collaboration with Siemens VDO Automotive and Solectron exists, to be continued and extended;
- Identification of new partners and research programmes.

Research in SIGNALS SPECTRAL ANALYSIS AND SYNTHESIS WITH APPLICATIONS TO DIGITAL MEASURING SYSTEMS

KEYWORDS: Data acquisition, spectral estimation, neural networks, digital synthesized AC calibrators.

FIELD DESCRIPTION

The standardization of digital measuring systems is one of the basic operations in measuring techniques. The standardization problem is more difficult when a higher resolution measuring device is used. Consequently, digital processed signals for standardization are used frequently. Their spectral content is revealed through spectral analysis.

RESEARCH TEAM

- Prof. dr. ing. Liviu TOMA: *Data Acquisition Systems. Microprocessor Systems Architecture, Digital Processing Structures*
- Prof. dr. ing. Traian JURCA: *Electronic Measuring Instruments. Precision Instrumentation. Programmable Measuring Systems*
- Prof. dr. ing. Dan STOICIU: *Electronic Measuring Instruments. Metrology, Quality and Reliability. Electronic Measurements, Sensors and Transducers*
- Prof. dr. ing. Aldo De SABATA: *Adaptive Methods in Measurements. Signal Processing*
- S.I. dr. ing. Septimiu MISCHIE: *Electrical And Electronic Measurements. Programmable Measuring Systems. Precision Instrumentation*
- As. dr. ing. Robert PASZITKA: *Microprocessor Systems Architecture. Data Acquisition Systems*

Research in ELECTROMAGNETIC COMPATIBILITY

KEYWORDS: Electromagnetic compatibility, EMC directives, immunity to electromagnetic interferences, conducted and radiated emissions, shielding, grounding, site surveys.

FIELD DESCRIPTION

The main directions in research-development are: improving measurement methods, sensors and transducers, EMC measurements and tests at high frequencies, electromagnetic supervision.

ACTIVITIES AND RESULTS

The research in this field provides means and equipment for EMC and educational improvement in EMC design. It intends to minimize conducted and radiated emissions and to suppress electromagnetic interferences, performing the tests and verification in connection with the electric, electronic and radio equipments in accordance to EMC directives.

Research Contracts and Grants

1. Platform for the Study of Electrical, Electronical and Chemical Concurrent Phenomena that Occur in the Thermo-Solar Conversion Process and in the Photo-Voltaic Effect. Automation of Functioning and Exploitation of Solar Assets Based on Thermo-Solar and Photo-Voltaic Conversion

Granted by the Ministry of Education and Research

Director: Prof.dr.eng. Nicolae ROBU, Rector of the "Politehnica" University

Chief of the Electronics Laboratory: Prof.dr.eng. Aldo DE SABATA

Duration: three years, 2006-2008

Total value: 4,232,764 RON

PROJECT OUTLINE

Researches on the use of new sources of energy and quality of the environment are developing at a high pace in the European Union in the present. For example, a 5,5 million EURO Energetically Independent Solar House has been built in Germany, at Freiburg. In all countries of the EU, an intense campaign is directed for drawing attention and education of the public on energy problems such as decrease of home and industrial consumption and economy of classical energy resources.

In order for the know-how and experience gained at the "Politehnica" University of Timisoara in the field of alternate sources of energy to be effectively applied, it is necessary to educate students and staff in solar techniques. In this way, our research in this inter- and multi-disciplinary field can be further developed, by taking advantage of opportunities provided by accessing the European Union.

The efficiency of solar pannels varies between 30 and 50%, and it is considered good, the efficiency of photovoltaic pannels is between 9 and 24%, and it is considered satisfactory, the efficiency of thermal stocking is about 60%, the efficiency of electrical stocking is approximately 80%. The efficiency of stocking as hydrogen reaction heat is larger than 96%, and the efficiency of nanostructured cells is about 4%.

Consequently, it is necessary to create diatherman materials with very high transmittance in the visible domain, atherman materials with very high absorbtion properties on a large wavelength spectrum, insulating materials with very low thermal

conductivity, selective layers, antireflection layers, semiconductor materials with efficiency of 30%, nanostructured cells with efficiency of about 12%.

The "Politehnica" University of Timisoara has built its Solar House as an energetic system in 1982-1986. The asset, built by self funding, has been designed by specialists from the Civil Engineering Faculty, and it contains two floors and underground. The best construction materials that could be found at that time have been used, in order to minimize thermal losses.

We want to create a platform of five integrated, electronically connected laboratories around the Solar House, at five faculties: Energetics, Automatics, Electronics, Architecture and Civil Engineering, and Physics. The purpose is to create, study, and measure new materials, measure solar radiation in our region, design new structures of solar architecture, find new ways of thermal and electrical stocking of solar energy, design and built home and industrial solar energy systems. We propose to introduce new subjects for license, master, and doctoral students.

These objectives can be realized by the rehabilitation of the Solar House and of its energetic chain based on thermo-solar conversion and photo-voltaic effect, by the creation and connection of the five laboratories, and acquisition of modern equipment.

The University might have financial benefits by providing spectro-photometric measurements and customized solar design.

We can introduce now 12 new license laboratory subjects, e.g. *Solar Energy Supplied Electrolysis*. We can introduce at this moment 14 master laboratory subjects, e.g. *Study of an Integrated Thermal-Photovoltaic System*. For the PHD school we can introduce now 4 themes, e.g. *Complete Analysis of the Energy Chain in a Photovoltaic Pannel*. We have now 13 research subjects pending by lack of financement, e.g. *Creation of New, High Transmittance Materials*. We have 12 new chapters to be introduced for the master/PHD school.

The Platform facilities will be used for research, design of solar systems and buildings, publishing of books and papers in journals, organization and participation at national and international conferences and exhibitions, license, master, and doctoral schools on alternative sources of energy, public demonstrations, home and industrial solutions and design.

2. Partnership grant for projects execution Nr.3/21039/2007, Researches concerning the elaboration and promotion for solar architectural solar solutions for PV systems integrated in buildings.

<i>Funding:</i>	State Budget – Ministry of Education, Research and Youth, Partnership Programmes in Priority Domains
<i>Duration:</i>	36 months
<i>Total value:</i>	360,000 RON <i>Value 2008 for UPT: 49,551 RON</i>
<i>Director:</i>	Prof. dr. ing. Traian JURCA
<i>Contraction:</i>	Trading Society for Research, Design and Equipment Production and Automation

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<i>Partnership::</i>	P3 "Politehnica" University of Timișoara
<i>Members:</i>	Prof.dr.eng. Alimpie IGNEA Prof.dr.eng. Liviu TOMA Prof.dr.eng. Aldo DeSabata Prof.dr.eng. Dan Stoiciu Prof.dr.arhitect. Smaranda BICA Conf. dr. eng Mihaela LASCU Lector dr. Ioan LUMINOSU As. eng. Ciprian DUGHIR As. arh. Claudiu SILVASAN As. arh. Razvan OPRITA As. dr. eng. Robert PAZSITKA As. eng. Gabriel VASIU As. eng. Cora IFTODE

FIELD AND GRANT DESCRIPTION

The major purpose of the project is to demonstrate the efficiency of integrating various PV elements in buildings, to test them and to make them known so that they can be used on a large scale. The project is focused on the promotion of new architectural concepts which include active solar systems (photovoltaic generators) or passive solar systems (lighting systems). The proposed actions will contribute to the sustainable development of the national energy system by promoting the distributed photovoltaic systems, in accordance with the Government global objective to promote renewable energy sources in Romania. The advantages of using the distributed solar architecture are more conspicuous in the case of large network-connected PV systems, such as the PV systems in the urban area, installed on the buildings façades or roofs. These are complex installations with a high number of PV modules and they are incorporated under various angles and directions.

ACTIVITIES AND RESULTS

1. Development of surveys and solution analyses on the technical aspects of solar photovoltaic architecture in Romania;
2. Research, measurements and technical solutions for pilot integrated PV system installations, including: setting up meteorological parameters measurement centres (in Timisoara); sizing integrated PV systems and preparing the technical documentation; planning and monitoring the integrated PV systems (a dedicated software); developing the project website (<http://solar.physics.uvt.ro/srms/>)
3. Implementing and testing demonstrative/experimental integrated PV systems; Analysing the monitored parameters; Designing models in order to calculate irradiation in tilted surfaces;

Contact person: Prof.dr.eng. Traian JURCA
Tel: +40-256-403359, E-mail: traian.jurca@etc.upt.ro

3. Contract 19496/18.11.08 Study of the renewable energy potential in the Department of Timiș, in the framework of PHARE CBC RO-HU 2006, contract RO-2006/018-446.01.01.07

Value: 17017 RON

Members of the research group:

Prof. Dr. Eng. Aldo De Sabata, director

Prof. Dr. Eng. Ivan Bogdanov

FIELD AND GRANT DESCRIPTION

A document containing requirements for a correct evaluation of renewable energy potential in the Department of Timiș have been devised. This work has been performed for the Town of Jimbolia Mayor's office, under the PHARE CBC Ro-Hu 2006, contract RO-2006/018-446.01.01.07.

ACTIVITIES AND RESULTS

The document has been used for the selection between the participants to a public bid. The winner has been Fraunhofer AG, Germany, and the results of the evaluation have been published.

Contact person: Aldo De Sabata, aldo.desabata@etc.upt.ro

RESEARCH TEAM

- Prof. dr. ing. Alimpie IGNEA: *Electrical And Electronic Measurements. Measurements In Industrial Processes. Measuring Systems In Electromagnetic Compatibility. Antenna Calibration. Nonlinearities study of high frequency devices*
- Prof. dr. ing. Mircea CHIVU: *Electrical And Electronic Measurements. Measurement of Electrical and Non Electrical Quantities. Television Channels Broadcasted Via Satellite*
- Prof. dr. ing. Aldo De SABATA: *Microwave and Optoelectronics Measurements. Antenna Calibration*
- Conf. dr. ing. Mihaela LASCU: *Measurement of Electrical and Non Electrical Quantities. Measurement in Industrial Processes. Virtual Instrumentation*
- Conf. dr. ing. Daniel BELEGA: *Measuring Systems in Electromagnetic Compatibility. Instruments for Measurement. Digital Processing Systems*
- As. ing. Ciprian DUGHIR: *Electromagnetic Supervision of Sites. Antenna Calibration*

Research in SENSORS AND TRANSDUCERS

KEYWORDS: Piezoelectric sensors, optical crystals, optical effects, piezoelectric crystals, bulk waves, surface waves, sensor arrays

FIELD DESCRIPTION

Optoelectrical and piezoelectric crystals are frequently used in practice. Due to their property of converting optical and mechanical signals, these materials are suitable for manufacturing transducers.

Theoretical and experimental approaches have been made on current measuring and magneto-optic and piezoelectric sensors. An I²C interface has been experimented.

RESEARCH TEAM

- Prof. dr. ing. Sever CRIȘAN: *Optical Electronics, Electrical Measurement, Sensors and Transducers*
- As. ing. Emil LUZAN: *Measurement of Environmental Factors, Measurement of Electrical and Non Electrical Quantities*
- S.l. dr. ing. Adrian VÂRTOSU: *Microwaves, Microwaves and Optoelectronics Measurement, Television Channels Broadcasted Via Satellite.*

INTERNATIONAL PROGRAMMES

1. COST 2100 International Program

Prof. Dan STOICIU is representative of the "Politehnica" University of Timișoara.

2. Socrates/Erasmus mobility program 2006/2009

Director: Prof. dr. eng. Dan STOICIU

Members: Prof. dr. eng. Aldo DE SABATA

Assoc prof. dr. eng. Mihaela LASCU

Lecturer. dr. eng. Lucian JURCA

Partners : IUT Rennes 1, France

3. Socrates/Erasmus mobility program 2006/2009

Director: Aldo DE SABATA

Partners : Politecnico di Torino, Italy

4.3 Other research groups

Research group in Signal Processing

Research fields

- Adaptive signal processing
- Image processing
- Digital watermarking
- Time-frequency representations
- Wavelets theory applications
- Multiresolution analysis
- Nonlinear signal processing
- Neural networks

- Coding
- Compression
- Communication networks

Keywords

Signals Circuits and Systems, Adaptive Signal Processing, Time-Frequency Representations, Wavelets Theory and Applications, Nonlinear Signal Processing, Neural Networks, Image Processing, Microwave Technique, Theory of Information and Coding, Data Transmission, Modern Communication Networks, Telecommunication Circuits, Digital Signal Processing, Digital Watermarking, Data Transmission on Radio Channels, Mobile Radio Communications

Research and Educational Projects, Contracts and Grants

1. Program ANCS 77/CP/I/13.09.07

Improvement of research & development facilities in the field of communications at the Faculty of Electronics and Telecommunications, Politehnica University of Timisoara, CDC

Value: 1,312,842 RON

Director: Prof.dr.eng. Ioan NAFORNITA

Members: Prof. dr. ing. Corneliu TOMA
Prof. dr. ing. Miranda NAFORNIȚĂ
Prof. dr. ing. Alexandru ISAR
Prof. dr. ing. Andrei CĂMPEANU
Prof. dr. ing. Marius OTEȘTEANU
Prof. dr. ing. Vasile GUI
Prof. dr. ing. Radu VASIU
Prof. dr. ing. Adrian MIHĂESCU
Conf. dr. ing. Eugen MĂRZA
Conf. dr. Florin ALEXA
Conf. dr. ing. Lorin FORTUNA
Conf. dr. ing. Corina BOTOCA
Conf. dr. ing. Georgeta BUDURA
Asist. drd. ing. Călin SIMU
S.l. dr. ing. Cornel BALINT.
S.l. dr. Ing. Muguraș MOCOȘAN
S.l. dr. ing. Horia BALTĂ
As. drd. ing. Maria KOVACI
As. drd. ing. Radu LUCACIU
As. dr. ing. Nicolae MICLEĂU
As. drd. ing. Janos GAL
As. drd. ing. Gheorghe-Daniel POPA
As. drd. ing. Marius OLTEAN
As. drd. ing. Andy VESA
S.l. dr. ing. Corina NAFORNIȚĂ

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As. drd. ing. Marius SĂLĂGEAN
S.I. dr. ing. Marian BUCOS
As. dr. ing. Ciprian DAVID
As. drd. ing. Mihai ONIȚĂ

The goal of this project is the endowment of the research & development laboratories of the Communications Department, Faculty of Electronics and Telecommunications (Politehnica University of Timișoara) with modern equipment. These laboratories have as objective the main branches of this particular important R&D domain from the National Strategy entitled *Information Technology and Communications*. This is one of the most dynamical fields of R&D at the present moment in Romania; it has a contribution of over 10% in the Gross National Product (GNP). The level of development from the west region of the country tends to be closer in this case to the global medium level. An important trend in the field is the development of integrated systems that transmit and process all types of data and information. Both the technology and the technical standards organizations are driving toward integrated public systems that make virtually all data and information sources around the world easily and uniformly accessible. Such a system allows integration of services such as telephony, television, and data communications. Computer networks are being widely used as architecture of a communications system. From an R&D point of view, we have seen a trend of designing and making 3G equipment described by UMTS or WiMAX standards. These standards integrate the newest results obtained in fundamental sub-domains with advanced technologies, developed in applications sub-domains. For instance, some of this equipment uses OFDM transmission – which is derived from a fundamental sub-domain – Signals Circuits and Systems, and/or turbocoding (Theory of Information Transmission). Such an association ensures high performance at the physical layer (1st level from the OSI model), as described by Claude Shannon at the beginning of XXth century. Implementing of functions from superior layers of the OSI model is adapted to new performance obtained at the physical layer with the use of protocols like Mobile IP or IPSec. With this project, improvement of the equipment will be made in eight research labs, where the following disciplines are developed: Signal Circuits and Systems, Theory of Information Transmission, Computer networks architecture, Data communications, Telecommunications Circuits, Network Protocols, Telecommunications Traffic, Optimizing telecommunications networks, Software for Telecommunications, Internet Data Security, Integrated digital networks, Systems for Digital commutation, Radio Communications, Multimedia.

We have in our research team specialists and researchers in the field. The Scientific Secretary of the Politehnica University of Timisoara, Prof. Radu VASIU, the Dean of the Faculty of Electronics and Telecommunications, Prof. Marius OTEȘTEANU as well as the Head of Department from the Communications Dept., Prof. Ioan NAFORNITA are a part of this team.

The team has seven Ph.D. advisors.

Estimation of the results from this program:

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1. New investments in the infrastructure of Research-Development-Innovation 2576,455 thousands RON
2. Medium usage of equipment: 75%
3. Value of investment in infrastructure and communications services 1717,6 thousands RON
4. The number (percentage) of research members to have access at online scientific resources 100%
5. The number of supported entities needed for improvement of offered services capacity = 8.

ACTIVITIES AND RESULTS

New investments in the infrastructure of Research-Development-Innovation were made. The value of the contract for the year 2008 was 1312842 RON.

The lab of Signals and Systems developed a contract with a telecommunications industry leading firm, Alcatel-Lucent, with a value of 54000 RON. The acquisitions for the entire department of Communications, made throughout 2008, consisted of:

- System for controlled access for eight laboratories, using card access, card access and PIN code or only PIN code, memory of 1000 transactions, Qty: 1, 8800 RON
- Scanner/copy machine/printer HP/LaserJet 3035, format A4, resolution 1200x1200 dpi, interface USB 2.0, volume 75000 pages/month, Q 7051A, 6885, Qty: 1, 6885 RON
- Smart boards with intelligent screen CCD, Panasonic UB5315-G, diagonal 61", Qty: 6, 27833 RON
- Equipment for video-conference, POLYCOM, connected to PC, ImageShare II, maximum transfer via IP – 2 Mb/s, integrated video camera video, Qty: 7, 172200 RON
- Video camera Canon DM-XM2, resolution 3 CCD, optical zoom 20x, digital zoom 100x, Qty: 1, 8476 RON
- Printers HP LaserJet P2015N, monochrome, resolution 1200x1200, Q7553A/X, Qty: 6, 6613 RON
- Desktop PC, CPU INTEL - Intel Core2 Duo E6400, 2,13 GHzx1066 MHz, Qty: 32, 72582 RON
- Monitors, 19" YAKUMO XPT, LCD, TFT, 500:132 pieces, 27187 RON
- Antivirus software, NOD 32 Antivirus, Qty: 32 licenses, 4576 RON
- Laptop, Intel Mobile Pentium 4, 2.8 GHz, 128 KB L2 cache I, Memory RAM-1x512 MB, Hard disk-40 GB, Qty: 32, 128000 RON
- PDA, OS: Microsoft Windows Mobile 2003, memory slots SD, Mini SD, touch-sensitivity display-minimum 3,0", USB 1.1 Client, Integrated IrDA (SIR) , Serial RS232, integrated GSM/GPRS, integrated GPS, receiver Bluetooth, integrated camera Built-in SXGA, 1.3 MP, resolution 1280x1024, Qty: 32, 73600 RON.
- Scanner, HP ScanJet 5530, resolution 2400 dpi, Qty: 6, 6029 RON.

The acquisitions for the laboratory of **Information Theory and Coding (room B219)** made throughout 2008 consisted of:

- Desktop PC, CPU INTEL - Intel Core2 Duo E6400, 2,13 GHzx1066 MHz, 2M, LGA, 15 pieces, 34023 RON
- Monitor, 19" YAKUMO XPT, LCD, TFT, 500:1, Qty: 16, 13600 RON

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- Server IBM System X3400-797514G, Qty: 1, 4800 RON
- Antivirus software, NOD 32 Antivirus, Qty: 16 licenses, 2290 RON
- License software Matlab/Simulink Classroom, Qty: 10 licenses, 7811 RON
- Laptop Intel, Processor-Intel Mobile Pentium 4, 2.8 GHz, 128 KB L2 cache I, Qty: 1, 4000 RON
- Video projector, NEC VT-47, Microportable, SVGA 800x600, 1500 ANSI lumen, contrast 400:1, weight 2.9 kg, Qty: 1, 3700 RON
- Tripod projection screen 1,25*1,25 m, Qty: 1, 250 RON
- USB wireless adaptor, AirLive Turbo G USB adaptor, 2X speed of 11g, 802.11e&WMM, Qty: 16, 944 RON
- Microwave Technology Training System (8090), Qty: 1 license, 50000 RON



The laboratory of Information Theory and Coding (room B219)

The acquisitions for the laboratory of **Radio communications (room B714)** made throughout 2008 consisted of:

- Programmable Oscilloscope OD582, Qty: 3, 29998 RON
- Programmable frequency generator 2GHz, GR205, Qty: 1, 19999 RON
- Spectrum analyzer, AE967, Qty: 1, 32371 RON
- Radiofrequency analyzer, AC725, Qty: 1, 24928 RON
- Equipment for studying the systems of telecommunications, EC796, Qty: 1, 8970 RON



The laboratory of Information Theory and Coding (room B219)

- Systems for studying TV antenna, EA815G, Qty: 1, 25904 RON
- Dipole antenna, AM03, Qty: 2, 1195 RON
- Equipment for research in digital telecommunications, EF970E, OP97001, OP97002, Qty: 1, 42672 RON
- Equipment for research in analogue telecommunications, KL900A, Qty: 1, 13382 RON
- Equipment for research in analogue telecommunications, KL900B, Qty: 1, 10581 RON
- Equipment for studying the systems of emission reception AM/FM, KL900C, Qty: 1, 5977 RON



The laboratory of Radiocommunications (room B714)

- Equipment for research in Bluetooth transmission, BT2001, Qty: 1, 17986 RON
- AM/FM 108 radiokit, Qty: 20, 7900 RON
- Matlab/Simulink Classroom, 10 users, software license, Qty: 1, 9000 RON

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- LabView software license, Qty: 1, 9000 RON.



The laboratory of Radiocommunications (room B714)



B712b-The research laboratory

Expected/estimated Profit:

1. Each lab will develop a contract with a telecommunications industry leading firm for instance, Alcatel-Lucent, with expected value of 5000 euro per year;
2. Each lab will win one CNCSIS funded research grant with an expected value of at least 30000 RON/year



B712a-Research laboratory

Potential beneficiaries:

- Post-university courses – Matlab: Alcatel-Lucent, Solectron, Siemens, Kathrein
- Conferences, workshops, summer schools – teaching staff from other technical universities
- Equipments – suppliers, service
- Publishing houses where books will be edited
- Partner laboratories
- Ph.D. students that will successfully complete their doctoral studies.

2. CNCISIS IDEI, ID_930, 667/19.01.2009, Using Wavelets Theory for Decision Making

Director: Alexandru Isar

Value: 999,000 RON (87448 on 2009)

Members: Prof.dr.eng Ioan Nafornta,
Assoc.prof.dr.eng Sorin MOGA (Telecom Bretagne)
Prof. Andrei Campeanu,
Lect. Dr. eng. Corina NAFORNITA,
drd. Ioana FIROIU
prep.drd. Cristina STOLOJESCU

Web site: http://www.tc.etc.upt.ro/cercetare/CNCISIS_Idei/cncisisID.htm

FIELD AND GRANT DESCRIPTION

Making decisions is a branch of artificial intelligence that is more and more used in complex applications like medicine (using a diagnostic a treatment decision is made), geology (using images of a region some hypotheses regarding the underground composition and some decision about extraction are made) or communications (using

information about the functioning of each element of a communication network some decisions about the resources allocation are made, for example of the frequency bandwidths). According to Bob Colwell, any machine can have artificial intelligence. This must be developed on the basis of understanding and imitation of the human brain. The intelligence results from the action of a large group of specialized neurons that use a world model based on memory to make a continuous series of predictions of future events. The neural networks of the cortex must be interpreted like a distributed memory of pattern sequences stoked in an invariant form, hierarchically arranged, accessed in an associative fashion. Between the neural network applications already known we can find applications in decision making for medicine, geology and communications. To make a correct decision, the decider must have the information in an appropriate form. This is the reason why frequently are used alternative representations of information. A very interesting representation is in this respect the wavelet decomposition. In this project we want to associate the wavelets theory with the neural network theory to solve problems of decisions making in medicine, in geology and in communications. To do this we associated the competences of two senior researchers in the field of neural networks with the competences in the wavelet theory of all six members of our research team.

ACTIVITIES AND RESULTS

Activity: The study of intelligent segmentation techniques for SONAR images based on the association of wavelets with neural networks.

Results:

Papers published.

In journals:

- Firoiu I., Naforniță C., Boucher J.M., Isar A., Image Denoising Using a New Implementation of the Hyperanalytic Wavelet Transform, IEEE Transactions on Instrumentation and Measurements, vol. 58, Issue 8, August 2009, pp. 2410-2416, ISI Web of Knowledge, Digital Object Identifier 10.1109/TIM.2009.2016375, ISSN: 0018-9456, Impact factor: 0,978 (2008), <http://ieeexplore.ieee.org/xpl/tocresult.jsp?Isnumber=5159565&isYear=2009>.
- I. Buciu, I. Naforniță, [Feature extraction through phase congruency for facial expression analysis](#), International Journal of Pattern Recognition and Artificial Intelligence, Special Issue on Facial Image Processing and Analysis, Volume 23, Issue 3, 617 - 635, 2009, ISI Web of Knowledge,
- Alexandru Isar, Sorin Moga, Dorina Isar, A New Denoising System for SONAR Images, EURASIP Journal on Image and Video Processing, Hindawi Publishing Corporation, Volume 2009 (2009), Article ID 173841, doi: 10.1155/2009/173841 <http://www.hindawi>, INSPEC

In proceedings of the international conferences organized abroad the country:

- Corina Naforniță, Alexandru Isar, Maria Kovaci, Increasing Watermarking Robustness using Turbo Codes, Proc. WISP 2009, 6th IEEE International Symposium on Intelligent Signal Processing, 26–28 August, 2009 Budapest, Hungary, 113-118, ISBN: 978-1-4244-5058-9, ISI Proceedings,

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➤ Ioana Firoiu, Dorina Isar, Jean-Marc Boucher, Alexandru Isar, Hyperanalytic Wavelet Packets, Proc. WISP 2009, 6th IEEE International Symposium on Intelligent Signal Processing , 26–28 August, 2009 Budapest, Hungary, 67-72, ISBN: 978-1-4244-5058-9, ISI Proceedings.

In the proceedings of international conferences organized in our country:

➤ Ioana Firoiu, Alexandru Isar, Jean-Marc Boucher, An Improved Version of the Inverse Hyperanalytic Wavelet Transform, Proceedings of IEEE International Symposium SCS'09, Iași, Romania, July 9-10, 2009, ISBN 1-4244-0968-3, 13-16, ISI Proceedings,

➤ Marius Oltean, Alexandru Isar, On the Time-Frequency Localization of the Wavelet Signals with Application to Orthogonal Modulation, Proceedings of IEEE International Symposium SCS'09, Iasi, Romania, July 9-10, 2009, ISBN 1-4244-0968-3, pp. 173-176, ISI Proceedings,

➤ Cristina Stolojescu, Alina Cușnir, Sorin Moga, Alexandru Isar, Forecasting WiMAX BS Traffic by Statistical Processing in the Wavelet Domain, Proceedings of IEEE International Symposium SCS'09, Iasi, Romania, July 9-10, 2009, ISBN 1-4244-0968-3, pp. 177-180, ISI Proceedings,

➤ Corina Naforniță, Alexandru Isar, On the Choice of the Mother Wavelet for Perceptual Data Hiding, Proceedings of IEEE International Symposium SCS'09, Iasi, Romania, July 9-10, 2009, ISBN 1-4244-0968-3, pp. 233-236, ISI Proceedings,

➤ Ioan Buciu, Ioan Naforniță, Non-negative Matrix Factorization Methods for Face Recognition under Extreme Lighting Variations, Proceedings of IEEE International Symposium SCS'09, Iasi, Romania, July 9-10, 2009, ISBN 1-4244-0968-3, pp. 125-128, ISI Proceedings.

Contact person: alexandru.isar@etc.upt.ro

3. CNCSIS grant No. 403, CODE TD-403, type Grant for young Ph.D. Students,

Title: Optimization Techniques for Radio Channels Transmission

Director: Marius Oltean

Value: 42,500 RON (1,770 RON on 2009)

FIELD AND GRANT DESCRIPTION

The project is focused on modern multi-carrier approaches based on wavelet functions. The investigated technique is referred to as Wavelet OFDM. It is shown that this method mitigates some of the traditional OFDM drawbacks (high sensitivity to frequency and time synchronization errors, insufficient out of band rejection, efficiency reduced by the cyclic prefix).

ACTIVITIES AND RESULTS

1. PhD thesis finalized

M. Oltean, *Contribution to the optimization of data transmission through radio channels, using wavelet functions*, ISBN 978-606-554-050-7, Editura POLITEHNICA Timisoara.

2. Two papers presented at IEEE conferences

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M. Oltean, A. Isar, *On the time-frequency localization of the wavelet signals, with application to orthogonal modulations*, Proceedings of ISSCS'09, Iași, July 2009, pp.173-177.

M. Oltean, M. Naforniță, *Errors per Scale Statistics for a Wavelet OFDM transmission in Flat Fading Channels*, Proceedings of WISP'09, Budapesta, August 2009, pp. 119-124.

Contact person: marius.oltean@etc.upt.ro

Research group in Image Processing and Multimedia technologies

Research Fields

- Television and Digital Television
 - Image Compression
 - Digital Image Processing
 - Motion Analysis
 - Pattern Recognition
 - Interactive Multimedia Techniques
 - Media Streaming
 - Multimedia Databases
 - Internet Security Techniques
 - E-learning
 - Advanced learning technologies
- WWW, Hypermedia and Internet

Keywords

Image Processing, Sound Processing, Multimedia, Image Compression, Interactive Applications, Web Services, E-learning

Research and Educational Projects, Contracts and Grants

1. CNCSIS IDEI, ID_930, 667/19.01.2009 *Title: Fuzing Statistic and Semantic Modeling in Image Sequences Analysis*

Director: prof.dr.eng Vasile GUI

Value: 82,286 RON

Members: prof.dr.eng. Florin ALEXA

Assoc.rof.dr.eng. Cătălin CĂLEANU

Teach assist. dr. eng. Ciprian DAVID

Teach assist. eng. Gheorghe POPA

Dr.eng. Georgiana SIMION

FIELD AND GRANT DESCRIPTION

Probabilistically oriented approaches for image sequence analysis have difficulties in modeling complex situation encountered in real world applications. To alleviate this problem, we propose a new theoretical framework for fusing the statistical thinking level with the semantical level in the benefit of both. We will test the effectiveness of the concept on object tracking and motion estimation tasks, related to human body motion analysis. We define three main research objectives. The first one is the development of a semantically guided kernel tracker. The best method to exploit semantic information extracted from the image sequence through inference in the tracking performance improvement will be investigated. Our second research objective is to find effective use of the new sparse representation in motion modeling and semantic inference. The third research objective is to enhance a foreground/background segmenter by higher level information extracted from the processed image sequence.

ACTIVITIES AND RESULTS

Development of a semantically guided tracker
Robust background estimation

Contact person: vasile.gui@etc.upt.ro

International Projects

1. LLP project: “VICADIS – Virtual Campus for Digital Students”, Agreement 2007-2611/001-001, Project number 134039-LLP-1-2007-1-RO-ERASMUS-EVC

Director: Prof.dr.eng. Radu VASIU

Value: 365.747 EURO

Members: Assoc.lect.eng. Diana ANDONE
Lect.dr.eng. Mugur MOCOFAN
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Eng. Marius CONDREA
Lucia RAZMERITA, journalist
Cristian TECU, PhD student
Iasmina ERMALAI, PhD student
Andrei TERNAUCIUC, PhD student
Bogdan DRAGULESCU, PhD student

Partners: University of Palermo, Italy
Baltic Education Technologies Institute, Lithuania
University of Miskolc, Hungary
Oulu University of Applied Sciences, Finland
University of Brighton, UK
VISIONI Di Caro arch. Ernesta, Italy
Euro-Contact Business School, Hungary
BRIDGEMAN SRL, Romania
JME Associates Ltd, UK

FIELD DESCRIPTION

The main objective is to build a virtual campus for digital students aimed at providing open educational resources and tools available and accessible for all students and ensuring the interoperability between the different eLearning environments used in the partner universities.



Aims of the project:

- To overview and implement emerging tools and technology commonly referred to as "social software" that can create personal as opposed to institutional learning environments, as well as the mobile learning tools
- To support practitioners in becoming aware of the new features of the digital students, to learn to effectively use and develop resources with new digital technologies and new communication tools in ways that are aligned with what they want to achieve educationally.
- To provide the organisational and technical framework for the development of an interoperable virtual campus
- To make available a virtual campus based on Open Educational Resources which will offer a free, open personal learning environment
- To improve the quality of education in eLearning by international co-operation and by new methodological approach to learning. The project intends to develop an interoperable virtual campus, not a new one to replace the existing ones used in the universities, and to provide a new methodology based on modern techniques of education such as open sources, adaptability and interactive learning.
- To evaluate, test and transfer the ICT tools, pedagogical methodology and the Set of Guidelines to other education and training areas and throughout Europe.

The main scope of ViCaDiS is to provide an accessible and attractive environment for all students within the Member States, using already existing tools which will be enhanced with new tools wanted by the new generation of students. By providing

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students the tools which they use anyway extensively outside the institutional framework of learning (wiki, blogs, forums, IM, podcasting, RSS) ViCaDiS will support the learning attractiveness of the university curricula, will improve the quality of the learning process by encouraging the exchange of information/knowledge between students from different universities, and will reduce university drop-out or student demotivation for learning. It will also produce an instructional or pedagogical shift inside the universities eLearning moving the focus from the education materials and technology to the user- student, to user generated content.

In ViCaDiS, a wide range of ODL actors from EU

and CEE countries will focus on developing an innovative approach for enhancing international eLearning by moving the strength from the institutional learning environment to the personal learning environment (PLE) which focuses on students. It will also produce an instructional or pedagogical shift inside universities eLearning moving the focus from the education materials and technology to the user-student, to user generated content.

The main objective is to build a virtual campus for digital students aimed at providing open educational resources and tools available and accessible for all students and to ensure the interoperability between the different eLearning environments used in the partner universities.



The goal of ViCaDiS is to create an attractive environment for all students within the Member States, using already existing tools which will be enhanced with new tools wanted by the new generation of students. An innovative multilingual ICT-based environment unique in Europe (as an international virtual campus), it will incorporate several open educational resources (library, glossary, external links, student projects, course activities), open educational tools (wiki, blog, forum, calendar, podcasting, instant messaging communication, audio-video conferencing over IP,

RSS, mobile text messaging, mobile accessibility to ViCaDiS) and will promote social networking as an instructional method.



The project **workpackages** are:

- Developing and testing of the ViCaDiS scenario
- ViCaDiS tools design and implementation
- Piloting/testing and evaluation of ViCaDiS
- Evaluation and elaboration of the Set of Guidelines
- Exploitation of ViCaDiS
- Dissemination and Awareness raising of ViCaDiS
- Project management of ViCaDiS

The main **outcomes** of the project are:

- open personal learning environment methodology
- ViCaDiS scenarios
- ViCaDiS multilingual virtual campus: online environment and mobile environment based on Open Educational Resources
- Multilingual web portal
- Multilingual Set of Guidelines (on paper, CD and online)
- ViCaDiS evaluation

Promotional and multiplication materials

2. Leonardo da Vinci II project “Creative Trainer”, Agreement LLP/LdV/TOI/2007/AT/19

Director: Prof.dr.eng. Radu VASIU
Value: 20.082 EURO
Members: Assoc.lect.eng. Diana ANDONE
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Cristian TECU, PhD student
Iasmina ERMALAI, PhD student
Andrei TERNAUCIUC, PhD student
Partners: University of Graz, Austria

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SFG Graz, Austria
University of Wien, Austria
University of Marburg, Slovenia
College Drenthe, Netherlands
Innova Venice, Italy

FIELD DESCRIPTION:

The main aim of the project is to disseminate the creativity technique „idea machine“ via developing a training course on this topic, to train partners from Europe and to carry out national training courses in the partner countries.

The methodology of the „idea machine“ is based on:

- Working out a mass of ideas
- Including insiders and outsiders in the idea finding process

The second requirement of the Leonardo programme is to transfer results from projects, especially via training projects to Europe.

The project phases are:

- Project management
- Development of a training course
- Pedagogical concept
- Web-based learning materials
- TTT- course
- Company projects
- National training courses
- Certification
- dissemination

The training course will consist on 3 modules:

Module 1: Ideamachine

Module 2: creativity and youth

Module 3: idea evaluation



3. Leonardo da Vinci II project “ESIL - European Sustainable Innovation License (for SME’s)”, Agreement LLP/LdV/TOI/2008/AT/23

Director: Prof.dr.eng. Radu VASIU
Value: 11.157 EURO
Members: Assoc.lect.eng. Diana ANDONE
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Cristian TECU, PhD student
Iasmina ERMALAI, PhD student
Andrei TERNAUCIUC, PhD student
Partners: Cleaner Production Centre Graz, Austria
Stenum GmbH, Austria
Bit Media E-Learning Solution, Austria
University of Maribor, Slovenia
Enviros, Czech Republic
AREA Science Park, Italy
Insin, Germany
LTC, Sweden
Cork Institute of Technology, Ireland
Hess Innovation, Switzerland

FIELD DESCRIPTION:

Aims of the project:

1. **Uniform understanding and model of an innovation training** (innovation & sustainability)
2. Creating a **Standard of Quality for Training of Innovationmanagement**, incl. an **examination and a certificate „Innovation Licence“** (especially for SME’s)
3. Setting up a **European Network & regular conferences for SME’s**
4. Creating an **E-Learning platform**

Estimated results of the project:

- An **integrated Training Concept for "Sustainable Innovation Management"**, combining existing and successfully proved training materials. Considering the main barriers for adult education and training of people from industry. (time, availability, costs, lack of competences in structured problem solving)
- An **ESIL – Training Concept** with an clear, given structure: introduction module and continuing, advanced training modules
 - **2 days introduction training module** (overview of innovation management and sustainability) and
 - **4 to 8 2-days advanced training modules** (innovation strategy and sustainable development, innovation and creativity, tools for analysis of problems, tools for generation ideas, tools for assessment and protection of ideas, r&d-project management,...)
- Consolidated Course Materials (slides, working materials, text, ...)

Coordinated **Concept for Examinations and Certification** (Model: ECDL)

5. Publications

5.1 Papers

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106. Onita Mihai, Ermalai Iasmina, Ternauciuc Andrei, Dragulescu Bogdan, *Media Streaming in Higher Education*, Iadis International Conference, "Cognition and Exploratory Learning in Digital Age", Celda 2009 Rome, Italy, 20 - 22 noiembrie, pp. 373 - 377, ISBN: 978-972-8924-95-9
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5.2 Books

1. Valentin-Ioan MARANESCU, *Intelligent sensors. Applications*, Politehnica Publishing House, 106 pages (published in Romanian), ISBN 978-973-625-756-5
2. Ionel Sabin, *Electronic Circuit and Devices*, Politehnica Publishing House, 2009, 280 pages, ISBN 978-973-625-124-1 (published in Romanian)
3. Varga S., Maniu I., Radulescu C., Dolga V., Ivan Bogdanov, Ciupe V., *Robotics. Vol 1. Mechanic system*, Politehnica Publishing House, 2009, 302 pages (published in Romanian), ISBN 978-973-625-610-3
4. Dolga V., Maniu I., Ciupe V., Ivan Bogdanov, Rădulescu C., Varga S., *Robotics. Vol 2. Operation system*, Politehnica Publishing House, 2009, 399 pages (published in Romanian), ISBN 978-973-625-996-8
5. Ivan Bogdanov, Maniu I., Dolga V., Rădulescu C., Varga S., Ciupe V., *Robotics. Vol 3. Drivingn system*, Politehnica Publishing House, 2009, 217 pages (published in Romanian), ISBN 978-973-625-903-6
6. Maniu I., Rădulescu C., Varga S., Dolga V., Ivan Bogdanov, Ciupe V., *Robotics. Vol 4. Applications*, Politehnica Publishing House, 2009, 297 pages (published in Romanian), ISBN 978-973-625-842-8
7. Ioan JIVET, *Design Digital Systems using HDL Description*, Orizonturi Universitare Publishing House 2009, 138 pages, ISBN 978-973-638-418-9 Dan Negoïtescu, *Power Electronics. Applications*, West Publishing House, Timisoara, 2008, 184 pages, ISBN 978-973-36-0465-5 (published in Romanian)
8. Jurca Traian, *Măsurări electrice și electronice*, "Politehnica" Publishing House, Timisoara, 2009, 107 pages, ISBN 978-606-554-028-6 (published in Romanian)
9. Vârtosu Adrian, *Tehnica frecvențelor înalte*, manual pt. studenți, "Politehnica" Publishing House, Timisoara 2009, 139 pages (published in Romanian)
10. Andrei Câmpeanu, János Gál, *Adaptive method for signal processing*, Politehnica Publishing House, 407 pages (published in Romanian), ISBN 978-973-625-605-9
11. Kovaci Maria, *Contributions in performances analysis and improvements of turbo codes used in flat fading channels*, Ph.D Thesis, Politehnica Publishing House, 160 pages, ISBN, 978-973-625-994-4
12. Isar Alexandru, Kovaci Maria, *Network security*, Politehnica Publishing House, Distance Learning course, 151 pages
13. Balta Horia, Kovaci Maria, *Teoria Informației și a codării. Indrumător de lucrări de laborator*, <http://www.tc.etc.upt.ro/teaching/tic/Indrumator%20TIC.pdf>, 48 pages, published online

14. Balta Horia, Kovaci Maria, Lucaciu Radu, *Teoria Informației și a codării. Culegere de probleme vol.1*, <http://www.tc.etc.upt.ro/teaching/tic/Culegere%20TIC%201.pdf>, 65 pages, published online
15. Corina Naforniță, *Signals and Systems, vol. 1*, Politehnica Publishing House, 355 pages, ISBN 978-606-554-013-2 (978-606-554-014-9 vol I)

6. Other activities

Our Faculty and its staff are deeply interested in maintaining the existing relationships with other Universities and promoting new ones.

6.1 Scientific Bulletin of the Politehnica University of Timisoara, Transactions on Electronics and Communications

*Scientific Bulletin of the "Politehnica" University of Timișoara
Transactions on Electronics and Telecommunications
Vol. 54 (68), No. 1, 2009, ISSN 1583-3380*

Beniamin Dragoi - Procedural Design of a CMOS Current Conveyor 3

Abstract - This paper presents a new procedural design sequence for the design of a CMOS current conveyor. It is based on the structured design approach and consists in circuit partitioning, derivation of the specifications for each basic analog structure, and step-by-step design. BSIM2EKV converter is presented and EKV model is used for hand calculations. PAD (Procedural Analog Design) tool is used for validation. CCII step-by-step design is presented. Simulations (for verification and fine-tuning) using Mentor Graphics tools are presented. Keywords: current conveyor, EKV model, PAD tool.

Keywords: *current conveyor, EKV model, PAD tool*

János Gál, Andrei Câmpeanu, Ioan Naforniță – Estimation of Chirp Signals by Extended Kalman Filtering 11

Abstract – The paper addresses the problem of estimating the parameters of chirp signals embedded in Gaussian noise. We consider an estimation method based on an approximate linear state space representation of the polynomial phase signal. This approach offers the opportunity to use a nonlinear but exact measurement equation and guides the estimation of the states of these signals to an extended Kalman filtering algorithm. Procedure simulations were made on linear and quadratic phase modulation signals with time-varying amplitude and are consistent with the theoretical approach. The results given by this new algorithm are compared with the performances of a standard Kalman technique.

Keywords: *Extended Kalman Filtering, chirp signal, state-space representation, polynomial phase*

- Alexandru Cristian Mugioiu* – LDA versus PCA Followed by a Neural Classifier for Facial Image Recognition 17
- Abstract – We present a comparison of two feature selection methods for face recognition: Linear Discriminant Analysis (LDA) and Principal Component Analysis (PCA). We assume that the classifier is a neural system called Concurrent Self-Organizing Map (CSOM). The ORL Database of Faces is used for testing the above mentioned cascade. The experimental results are given.
- Keywords: *pattern recognition, facial recognition, CSOM, PCA, LDA*
- Andrei Paşca* – Negative Impedance Converter Circuits for Integrated Clock Transmission Lines Loss Compensation 23
- Abstract – The present article presents a Negative Impedance Converter (NIC) circuit that can be used for loss compensation of lossy transmission lines integrated with standard deep submicron CMOS processes. The use of standard CMOS processes places several constraints on the required performances of the NIC circuit such as the use of low supply voltages coupled with high signal swings (which limits the number of stacked transistors in circuit branches) or the appreciable working frequency (from about 1GHz to several GHz for clock signals in modern standard CMOS technologies).
- Keywords: *Negative impedance converter, NIC, transmission lines loss compensation*
- Wolfgang Proß, Franz Quint* - Decoding performance of Turbo-Codes and LDPC-Codes with short blocklength 29
- Abstract – In this paper the decoding performance of a Turbo-Code and a LDPC-Code are compared. Both exhibit a binary blocklength of 504 and a coderate of 0.5. After an explanation of the several channel code's construction methods the results of the simulations are depicted in terms of the Bit Error Rate (BER). For a channel model the Additive White Gaussian Noise Channel (AWGNC) has been used. The decoding was done with the iterative Belief Propagation (BP)-decoding algorithm. If carefully constructed, the LDPC-Code is clearly favorable over the applied Turbo-Code.
- Keywords: *Turbo-Code, LDPC-Code, GF(q), PEG*
- Andy Vesa* – Space Time-Block Coding for Wireless Communications 35
- Abstract – Wireless communication is one of the most resonant areas in the communication field today. Wireless communication domain is very interesting on account of the phenomenon of fading (the time variation of the channel) and wireless users communicate over the air and there is significant interference between them. In this article, I will analyze the performance of space-time code block used in wireless communication. This analysis is making for a system with two antennas for transmission and two antennas for receptions.
- Keywords: *multiantenna systems, MIMO communications, Alamouti coding.*

Barna Keresztes¹, Bogdan Belean², Monica Borda², Olivier Laviolle¹ – Microarray Image Segmentation Using Marked Point Processes..... 3

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Abstract – This paper presents a new method dedicated to unsupervised segmentation of spots in cDNA type microarray images. The framework relies on a marked point process algorithm. We shall create random circular objects to fit the spot distribution in the image. The interaction rules between the objects complete the model. Using a Markov Chain Monte Carlo (MCMC) method, the algorithm converges to a configuration which is close to the spot distribution in the images. At each step, the configuration is evaluated considering its proximity to the target distribution. In order to achieve this task, we propose a data model using a Gaussian gray level distribution and gradient detection to evaluate the likelihood of the current configuration. Finally, the results on the microarray images illustrate the efficiency of the segmentation and suggest that the marked point processes can be a promising tool for spot detection.

Keywords: face recognition, eigenvectors, eigenface, feature vector, training set, supervised classification, text-independent speaker recognition, mel-cepstral analysis.

Stefan Simion¹ - Simple and fast method to develop design formulas for the microwave three port unequal power divider..... 11

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Abstract: A simple and fast method to analyse and to obtain design formulas for the microwave three-port unequal power divider is proposed. The method is based on the equivalence of the isolation resistance with a two-port consisting of two transmission lines and a resistance parallel connected between them, such as a generalized ring coupler is obtained. Therefore, analysing this coupler, the all design formulas are obtained for the three-port unequal power divider..

Keywords: unequal power divider, ring coupler.

Ciprian Răcuciu, Dan Laurentiu Grecu, Florin Medeleanu - Evaluating noise resistance and speed for the new generation of symmetric-key encryption algorithms 15

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Abstract - In some appliances speed and noise resistance of the cryptographic algorithms are critical. This is the reason we analyzed these properties of some modern block ciphers, for the declared purpose of implementing the best algorithm in hardware modules (FPGA) in order to use it as high-speed

encryption device. For in depth analysis only AES, Shacal and Trivium were processed. This article presents testing, evaluation procedures and results for the above analyzed block ciphers.

Keywords: symmetric-key encryption algorithm, Advanced Encryption Standard (AES).

Patricia-Lidia Cevei, Ioan Jiveț – Wrist Pulse Determination Using Electrical Impedance Measurements 19

Abstract – The present paper presents the results of a study to determine the feasibility of the determination of pulse at the wrist level using electrical impedance measurement method. In the cross section of the hand at wrist level the pulsating artery was modeled by a generic unit area conductivity change. The dipole model of the electric field change by a unit area of increased conductivity was used for a 2D electric field simulation. The field changes by geometry deformation and shifting bone position in the cross section as a result of hand motion is shown to be on the same order of magnitude as the blood related changes. The electric simulation data are encouraging for practical application of the method. More research is necessary to reliably separate motion artifacts from pulse data.

Keywords: pulse determination, wrist electrical impedance, geometry deformation induced field changes.

Beniamin Drăgoi, Mircea Ciugudean – Current-Mode Double-Simulation Sine Oscillator 23

Abstract – Researches on the conception and theory of an original high frequency stability and harmonic purity sine oscillator are presented. It is based on a resonant parallel circuit $L \parallel C$, whose components are simulated by the help of first-generation current conveyers (CCI). Negative impedance converter (NIC) and negative admittance/impedance converter (NAIC) are presented. Simulation results based on ideal CCIs are shown.

Keywords: current conveyor, NIC, NAIC, oscillator.

6.2. Student Research Activities

Besides the teaching activities, our students are participated in students science competitions. In 2009, the faculty team, consist of Ionel BUTAR, Paul HARFAS, Mihail-Octavian CERNAIANU, Calin CRISAN, and coached by prof.dr.ing. Virgil TIPONUT won first place in the sixteenth edition of HARD and SOFT contest held at "Stefan cel Mare" University of Suceava. The 2009 edition was attended by 13 teams of four students' from 11 academic centers: Bucharest, Chernivtsky (Ukraine), Chisinau (Moldova), Cluj-Napoca, Galati, Moscow (Russia), Novi-Sad (Serbia), Oradea, Suceava, Timisoara and Vinnytsia (Ukraine). More information you find out at: <http://www.etc.upt.ro/ro/studenti/concursuri-studentesti/50-main/260-concurs-international-hard-a-soft-editia-a-xvi-a-2009>



The following graduation projects received maximum qualification:

Graduation projects

1. Neagu Adrian, *Designing a distributed sensing system based on a multidrop sensor network with RS 485 interface*, Diploma advisor Prof. dr. ing. Ivan Bogdanov and Prof. Thomas Anna, FACHHOCHSCHULE WILHELMSHAVEN.
2. Rusnac Ruxandra-Ioana, *Eletrochemical impedance spectroscopy data analysis for the modeling of polymer electrolyte fuel*, Diploma advisor Prof. dr. ing. Ivan Bogdanov and dipl.ing. Sandra Koch Fraunhofer IPA Institute.
3. Carstea Comin, *Robust terrain detection systems for the control of active limb prosthesis*, Diploma advisor Prof. dr.ing. Ivan Bogdanov and dipl.ing. Bernhard Kleiner, Fraunhofer IPA Institute.
4. Vataman Radu Andrei, *Online sensor analysisi for automatic paint recycling*, Diploma advisor Prof. dr.ing. Ivan Bogdanov and dipl.ing. Christian Hager, Fraunhofer IPA Institute.
5. Tunea Andrei-Vasile, *Fusion of Color of 3D images*, Diploma advisor assoc. prof.dr.ing Ioan Jivet and prof.dr.ing. Axel Graeser, Institute of Automation, Bremen
6. Popa Mihai, *Sistem cu cost scazut pentru monitorizarea starii acumulatorilor auto*, Diploma advisor assoc. prof.dr.ing Cătălin Căleanu and ing. Andrei Cimponeriu, Continental.
7. Negrea Cătălin, *Analiza discontinuitatilor de impedanta prin reflectometrie in domeniul timp*, Diploma advisor sl.dr.ing. Marius Rangu
8. Trifan Alexandru, *Video-microscop cu cursoare de masura*, Diploma advisor sl.dr.ing. Marius Rangu

9. Ionici Cristian Valentin, Senzor de temperatura. Implementate EDK, Diploma advisor assoc. prof.dr.ing Ioan Lie

10. Kuhn Alex Michael, Sistem de comanda si control realizat cu placa de dezvoltare Spartan 3E, Diploma advisor assoc. prof.dr.ing Ioan Lie

6.3 Social life

Our students have free access to the Central Library of the "Politehnica" University and to the library of the Electronics and Telecommunications Faculty. They can also consult each Department's Library.

The Central Library contains over 600,000 volumes and 2,800 subscriptions to technical publications.

We publish the Scientific Journal of the "Politehnica" University of Timișoara, being in charge with the section: "Transactions on Electrical Engineering, Electronics and Communication".

Our University, and the Library, too are connected to the Internet:

- <http://www.upt.ro> = The University Web site,
- <http://www.library.upt.ro> = The Library Web site.

The students can get accommodation in a student hostel under certain conditions. The accommodation offer consists of:

- one-room apartments,
- rooms with 4 beds, including bathrooms,
- rooms with 2 beds.

Our students have various offers of recreation, health and welfare such as:

- The Students' House with several departments for different activities, artistic groups and a writers' club.
- The "Politehnica" Sport Association which always reached high sports performance.
- Two sports arenas with: tennis courts, basketball, football and handball grounds, gym, nautical and horse racing bases.
- Medical assistance is provided in a consistent number of consulting rooms.

In our town there are also several social and cultural institutions, namely:

- The National Theatre with three sections: Romanian, German and Hungarian,
- The Opera House,
- The Philharmonic Orchestra.

For further information on leisure opportunities offered by the town of Timișoara, please visit: <http://www.romaniatourism.com/timisoara.html>