

"POLITEHNICA" UNIVERSITY OF TIMISOARA



**FACULTY
OF
AUTOMATION AND COMPUTERS**



ANNUAL REPORT

2004



- Timisoara 2005 -

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**"POLITEHNICA" UNIVERSITY OF TIMISOARA
FACULTY OF AUTOMATION AND COMPUTERS**

Address: Bd. Vasile Pârvan nr. 2,
300223 -Timișoara,
County Timiș
Romania
Phone: +40-(0)-256-40-3211
Fax: +40-(0)-256-40-3214;
E-mail: *decanat@cs.utt.ro, lcretu@cs.utt.ro, prostean@aut.utt.ro*
Web: *www.ac.utt.ro*

Editorial Board: Prof.Dr.Eng. Octavian Prostean
Prof. Dr. Eng. Stefan Preitl
Lect. Dr. Eng. Mihai Micea
Teach. Assist. Eng. Loredana Ungureanu
Iuliana Boboia

Edited in 2005, Timisoara

FACULTY OF AUTOMATION AND COMPUTERS

ANNUAL REPORT

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"POLITEHNICA" UNIVERSITY OF TIMISOARA

FACULTY OF AUTOMATION AND COMPUTERS

Faculty Address: Bd. Vasile Pârvan nr. 2, Timișoara, Timiș 1900
Phone: +40-(0)-256-40-3211
Fax: +40-(0)-256-40-3214;
E-mail: decanat@cs.utt.ro, lcretu@cs.utt.ro, prostean@aut.utt.ro
Web: www.ac.utt.ro

A. GENERAL INFORMATIONS

A.1. Brief History of the Faculty

The history of the Faculty of Automation and Computers is directly connected and influenced by the history of the Automation and Computers fields in our country. Three universities, in Timisoara, Cluj and Bucharest, are the places where the development of the mentioned fields begun.

The first computer designed and built in the Romanian academic environment, called MECIPT-1 (Masina Electronica de Calcul a Institutului Politehnic Timisoara) was build in Timisoara, in 1959. It had impressive dimensions, huge power consumption but it was the beginning of the Computers field in Romania. It was followed by MECIPT-2 (1963) and MECIPT-3 (1965) which was already a computer from third generation, including a series of advanced hardware and software concepts.

Based on the mentioned achievements and on the experience gained by several engineers the education program of the first section of Computers begun in 1964 at the Institute "Politehnica" of Timisoara (today, the "Politehnica" University of Timisoara). The leader of the section was the Prof. Alexandru ROGOJAN. The computer staff was growing which carried on to the foundation of the Department of Electronics and Computers. In 1967 it became the Department of Computers, Electronics and Automation and later, in 1981, the Department of Automation and Computers. The first graduates in Computer specialization where leaving the faculty in 1969 and the first graduates in Automation specialization finished the studies in 1979. In 1975 the Electronic Computing center of the Institute "Politehnica" Timisoara was founded as a continuation of the MECIPT group.

The Department of Automation and Computers was part of the Faculty of Electrical Engineering. In 1990 it became the Faculty of Automation and Computers as part of the University "Politehnica" Timisoara. The curricula have been completely reconsidered and adapted to the new trends in the domain.

Actually the Faculty of Automation and Computers consists of two departments: Automation and Applied Informatics Department and Computers and Software Engineering Department, ensuring, for more than 2000 students, education in the following areas of specializations:

- Automation and Applied Informatics, 5 years studies,
- Computers, 5 years studies,
- Computing Techniques, 3 years studies and
- Applied Informatics, 3 years studies.

There are also Master studies, 1 year long, in the following directions:

- Automated Systems,
- Advanced Computing Systems and
- Automotive Embedded Systems.

Conforming to the Bologna process, our system and curricula where modified and adapted to the fast evolution of the Automation and Computer fields so beginning with this academic year our faculty will offer a levered education, in three domains, the first level being:

- Computer and Information Technology, 4 years studies,
- Systems Engineering, 4 years studies and
- Informatics, 3 years studies.

The studies will be continued with the Master level, 1 year for the first two domains and 2 years for the last domain and with the third level, for Doctoral studies, which will be leaded by the 12 doctoral leaders from our faculty.

The education program was completed with a constant research activity consisting of many research contracts, grants, papers published at important conferences and in journals, books and education materials.

A.2. Structure of the Faculty

□ Executive Board of the Faculty:

Dean: Prof. Dr. Eng. Octavian PROȘTEAN
Vice Deans: Prof. Dr. Eng. Mircea POPA
Prof. Dr. Eng. Mircea STRATULAT
Scientific Secretary: Prof. Dr. Eng. Ștefan PREITL,
Head of Research Center in Automation and Computers (C.C.S.A.C.)

□ Faculty Council

Teaching staff

Prof.dr.Eng. Octavian PROȘTEAN	Assoc.Prof.dr. Eng. Ioan SILEA
Prof.dr.Eng. Vladimir CREȚU	Prof.dr.Eng. Nicolae ROBU
Prof.dr.Eng. Toma-Leonida. DRAGOMIR	Prof.dr.Eng. Vasile STOICU–TIVADAR
Prof.dr.Eng. Ștefan HOLBAN	Prof.dr.Eng. Mircea STRATULAT
Prof.dr.Eng. Ionel JIAN	Prof.dr.Eng. Mariu CRISAN
Prof.dr.Eng. Ioan JURCA	Prof.dr.Eng. Mircea VLADUȚIU
Prof.dr.Eng. Mircea POPA	Prof.dr.Eng. Daniel-Ghe ANDREESCU
Prof.dr.Eng. Radu-Emil PRECUP	Prof.dr.Mat. Octavian LIPOVAN (invited)
Prof.dr.Eng. Ștefan PREITL	Assoc.Prof.dr. Eng. Marius MINEA

Student members

Alexandru ARION	Diana DARADICI
Simona MICULESCU-DRĂGILA	Bogdan VODĂ
Lavinia OPRESCU	Lucian LAURITZ

□ Faculty Departments

Department of Automation and Applied Informatics

Head of department: Assoc. Prof. Dr. Eng. Ioan Silea
Bd. Vasile Pârvan nr. 2,
300223-Timișoara, Timiș, Romania
Phone: +40-(0)-256-40-3241
Fax: +40-(0)-256-40-3214;
E-mail: isilea@aut.utt.ro , secretar@aut.utt.ro
Web: www.ac.utt.ro

Computers and Software Engineering Department

Head of department: Prof. Dr. Eng. Vladimir Cretu
Bd. Vasile Pârvan nr. 2,
300223-Timișoara, Timiș, Romania
Phone: +40-(0)-256-40-3261
Fax: +40-(0)-256-40-3214;
E-mail: vcretu@cs.utt.ro , dmia@cs.utt.ro
Web: www.ac.utt.ro

B. EDUCATIONAL ACTIVITY

B.1. Educational Programs

Education is organized according to the Transferable Credits System (ECTS).

1. Five-year programs (Diploma Engineer level / Master level)

Enrolment of students in the first year follows an admission examination (based on Multiple – Choice Queries tests) where general knowledge in Mathematics I (Algebra and Analysis) and Mathematics II (Geometry and Trigonometry) or Physics (Mechanics, Thermodynamics and Electricity chapters) are assessed. The final score takes into account the Baccalaureate score (20%). Graduates of other faculties that were awarded a license diploma can be directly enrolled. College graduates can be enrolled in the third year of study after passing a determinate number of difference exams.

Graduation is conditioned by passing of the License examination and oral defense of the graduation project.

- Profile: **System Science and Computer Science**
Area of specialization: **Automation and Applied Informatics**
Area of specialization: **Computers**

2. Three –year short-cycle programs (College of Higher Education Level):

- Profile: **System Science and Computer Science**
Area of specialization: **Applied Informatics**
Area of specialization: **Computer Technology**

3. Postgraduate (one year study) programs, master studies (complementary):

- Area of specialization: **Control Systems**
- Area of specialization: **Computers**
- Area of specialization: **Automotive Embedded Software**

4. PhD studies:

- Fundamental Domain: **Engineering (Techniques)**
- Area of specialization: **Automatics**
- Area of specialization: **Computer Science**

5. Number of students

Five-year programs	1946
Three –year short-cycle programs	222
Postgraduate (one year study) programs	83
Total Number of students	2251

6. Number of graduated students

- ❑ **Graduates in 2004**

Five-year programs and Postgraduate programs	274
Three –year short-cycle programs	79
- ❑ **Graduates 2005**

Five-year programs and Postgraduate programs	380
Three –year short-cycle programs	96

B.2. Curricula and Syllabus

B.2.1. Automation and Applied Informatics Section

a. Curricula

Automation and Applied Informatics (5 year study)

First year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Mathematical Analysis 1	FD.I.*.1.1	6	42	28	-	-
Linear Algebra and Analytical and Differential Geometry	FD.I.*.2.1	5	42	28	-	-
Using and Programming of Computers	TG.I.*.3.1	5	42	-	28	-
Physics	FD.I.*.4.1	4	28	14	14	-
Electrical Engineering 1	FD.I.*.5.1	4	28	14	14	-
The History of the Civilization	SU.I.*.6.1	1	8	6	-	-
International Languages 1	SU.I.*.7.1	2	-	28	-	-
Applied Activities	TP.I.*.8.1	2	-	-	-	-
Sports 1		1	-	28	-	-
Mathematical Analysis 2	FD.I.*.1.2	4	28	28	-	-
Special Mathematics	FD.I.*.2.2	4	28	28	-	-
Computers Programming 1	TP.I.*.3.2	5	35	-	28	-
Electronic Devices and Circuits	TG.I.*.4.2	5	28	-	28	-
Electrical Engineering 2	TG.I.*.5.2	3	28	-	14	-
Analysis and Synthesis of Numerical Devices 1	TP.I.*.6.2	5	35	-	28	-
International Languages 2	SU.I.*.7.2	1	-	28	-	-
Applied Activities	TP.I.*.8.2	2	-	-	-	-
Sports 2		1	-	28	-	-

Second year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Computer assisted mathematics	FD.I.*.1.3	4	28	-	28	-
Mechanical System Modeling	TG.I.*.2.3	4	35	-	14	-
Computer Programming 2	TP.I.*.3.3	5	35	-	28	-
Computer Architecture 1	TP.I.*.4.3	5	35	-	28	-
Digital Integrated Circuits 1	TG.I.*.5.3	4	28	-	28	-
Analysis and Synthesis of Numerical Devices 2	TP.I.*.6.3	4	28	-	14	7
International Languages 3	SU.I.*.7.3	1	-	28	-	-
Applied Activities	TP.I.*.8.3	2	-	-	-	-
Sports 3		1	-	14	-	-
System Theory 1	FD.I.*.1.4	5	42	-	21	-
Measurements, Sensors and Transducers	TG.I.*.2.4	4	35	-	21	-
Object-oriented programming	TP.I.*.3.4	4	28	-	28	-
Computer Architecture 2	TP.I.*.4.4	4	28	-	28	-
Digital Integrated Circuits 2	TG.I.*.5.4	4	28	-	28	-
Data Structures and Algorithms	TP.I.*.6.4	5	35	-	28	-
Philosophical Doctrines	SU.I.*.7.4	1	8	6	-	-
Applied Activities	TP.I.*.8.4	2	-	-	-	-
Sports 4		1	-	14	-	-

Third year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
System Theory 2	TS.I.*.2.5	5	42	-	28	-
Modeling and Simulation	TS.I.*.3.5	4	28	-	21	7
Microprocessor Based Systems	TS.I.*.4.5	5	28	-	28	-
Assembly Language	TS.I.*.5.5	4	28	-	28	-
Database	TS.L.1.*.x.5	4	28	-	21	-
Introduction to process automation	TS.L.1.*.x.5	4	28	-	21	-
CAD of Complex Logical Circuits	TS.L.1.*.x.5	4	28	-	21	-
Programmable Logic Controllers	TS.L.1.*.x.5	4	28	-	21	-
Applied Activities	TS.I.*.6.5	2	-	-	-	-
Economics 1	EM.I.*.1.6	3	28	14	-	-
Control Structures and Algorithms	TS.I.*.2.6	4	28	-	28	-
System Identification	TS.I.*.3.6	4	42	-	14	-
Multiprocessor Systems	TS.I.*.4.6	5	28	-	14	14
Data Security Techniques	TS.I.*.5.6	4	28	-	28	-
Microcontrollers	TS.L.2.*.x.6	4	28	-	21	-
Data Communications	TS.L.2.*.x.6	4	28	-	21	-
Electrical Actuators	TS.L.2.*.x.6	4	28	-	21	-
Control Systems for Continuous Processes	TS.L.2.*.x.6	4	28	-	21	-
Operating Systems	TS.L.2.*.x.6	4	28	-	21	-
Applied Activities	TS.I.*.6.6	2	-	-	-	-

Fourth year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Economics 2 or Companies Finances	EM.I.*.1.7	2	20	8	-	-
Control Engineering	TS.I.*.2.7	5	42	-	14	14
Computer Networks	TS.I.*.3.7	5	28	-	28	7
Knowledge Based Systems	TS.I.*.4.7	4	28	-	28	-
Electrical Operations and Converters	TS.L.3.*.x.7	4	28	-	21	-
Fuzzy control systems	TS.L.3.*.x.7	4	28	-	21	-
Internet Applications Programming	TS.L.3.*.x.7	4	28	-	21	-
Microcontrollers Operation	TS.L.3.*.x.7	4	28	-	21	-
Advanced Computer Architectures	TS.L.3.*.x.7	4	28	-	21	-
Design WEB and XML Techniques	TS.L.3.*.x.7	4	28	-	21	-
Fuzzy and Neural Systems	TS.L.3.*.x.7	4	28	-	21	-
Applied Activities	TS.I.*.5.7	2	-	-	-	-
Marketing	EM.I.*.1.8	2	20	8	-	-
Advanced control strategies	TS.I.*.2.8	4	28	-	28	-
Concurrent Programming	TS.I.*.3.8	5	28	-	14	14
Artificial Intelligence	TS.I.*.4.8	5	28	-	14	14
Computer Aided Manufacturing	TS.P.1.y.1.8	4	28	-	28	-
Communications Skills			7	-	28	-
Computer-aided system optimization	TS.P.1.y.1.8	4	28	-	14	14
Signal Processing in Control	TS.P.1.y.1.8	4	28	-	14	14
Medical Informatics	TS.P.1.y.1.8	4	28	-	14	14
Biological Systems	TS.P.1.y.1.8	4	28	-	14	14
Medical applications programming	TS.P.1.y.1.8	4	28	-	14	14
Programming environments	TS.P.1.y.1.8	4	28	-	14	14
Languages for artificial intelligence	TS.P.1.y.1.8	4	28	-	14	14
Computer Graphics	TS.P.1.y.1.8	4	28	-	28	-
Networks with integrated services	TS.P.1.y.1.8	4	28	-	14	14
Intranet Networks	TS.P.1.y.1.8	4	28	-	14	14
Distributed System for Data Acquisition and Control	TS.P.1.y.1.8	4	28	-	28	-
Applied Activities	TS.I.*.5.8	2	-	-	-	-

Fifth year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Equipments for Motion Control	TS.P.2.y.1.9	5	28	-	28	14
Control systems based on microprocessor equipments	TS.P.2.y.1.9	5	42	-	14	14
Control Systems for Electrical Actuation	TS.P.2.y.1.9	5	28	-	28	-
Non-electrical Actuators	TS.P.2.y.1.9	5	28	-	28	-
CASE TOOLS	TS.L.4.*.x.9	5	28	-	14	14
Multimedia Systems	TS.L.4.*.x.9	5	28	-	14	14
Delphi Programming	TS.L.4.*.x.9	5	28	-	28	-
Process Automation in Flexible Manufacturing Structures	TS.L.4.*.x.9	5	28	-	28	-
Complex Automation	TS.P.2.y.2.9	5	28	-	28	14
Advanced Control Systems	TS.P.2.y.2.9	5	28	-	28	14
Norms, Standards and Quality Guarantee	TS.P.2.y.2.9	5	35	-	-	21
Measurement Systems in Process Control	TS.P.2.y.2.9	5	28	-	28	-
Virtual Instrumentation in Process Control	TS.L.4.*.x.9	5	28	-	14	14
Windows Programming	TS.P.3.y.3.9	5	42	-	14	14
E-Commerce	TS.P.3.y.3.9	5	42	-	28	-
Interactive Simulation Tools	TS.P.3.y.3.9	5	28	-	14	14
Telemedicine	TS.P.3.y.3.9	5	28	-	28	14
Software Design Management in Health Informatics	TS.P.3.y.3.9	5	28	-	28	-
Expert Systems in Medicine	TS.P.3.y.3.9	5	42	-	14	14
Biomedical Engineering	TS.P.3.y.3.9	5	42	-	14	14
Introduction in Robot Control	TS.P.2.y.2.9	5	28	-	28	14
Machine-Tool Control	TS.P.2.y.2.9	5	28	-	28	-
Control Systems for Servo-drives	TS.P.2.y.2.9	5	28	-	28	14
Computer Driving of Flexible Manufacturing Structures	TS.P.2.y.2.9	5	28	-	28	-
Java Programming	TS.P.2.y.1.9	5	28	-	28	14
Image processing	TS.P.2.y.1.9	5	28	-	28	-
Real Time Operating Systems	TS.P.2.y.1.9	5	28	-	28	14
Signal Processing	TS.P.2.y.1.9	5	28	-	28	-
Communication Skills			7	-	28	-

Master studies: Control Systems (1 year)

Sixth year	Credits	Total			
		Course	Seminar	Laboratory	Project
Complements of Systems Theory and Quality Engineering 1	5	14	14	-	-
Modern Control Theory 1	5	14	-	-	14
Genetic Algorithms	8	28	-	14	-
Neural Networks	12	56	-	28	-
Complements of systems Theory and Quality Engineering 2	3	14	-	-	14
Modern Control Theory 2	5	28	-	-	14
Adaptive Control Systems	6	28	-	-	14
Artificial Intelligence and Knowledge Eng.	6	28	-	14	-
Diploma Thesis	10	-	-	-	-

Master studies: Automotive Embedded Software (1 year)

Sixth year	Credits	Total			
		Course	Seminar	Laboratory	Project
Embedded Systems 1	8	42	-	14	-
Software Management Project	8	42	-	14	-
Software Engineering	8	42	-	14	-
Basic Applications Know How	6	28	-	-	-
Embedded Systems 2	8	42	-	21	-
Communications Skills	6	-	21	-	-
Practical Software Project Management	6	-	-	-	42
Diploma Thesis	10	-	-	-	-

Applied Informatics (3 year studies, bachelor level)

Remark: The first year of study is the same with the one of the Computer&Software Engineering Department.

Second year	Credits	Total			
		Course	Seminar	Laboratory	Project
Automatics	4	28	-	28	-
Microprocessors and microcontrollers	4	28	-	28	-
Data Security Techniques	4	28	-	28	-
Internet Operation 1	4	28	-	14	14
Robotics	4	28	-	14	-
CAD Environments	4	28	-	28	-
Digital Integrated Circuits	4	28	-	14	-
Measurement Systems in Process Control	4	28	-	14	-
Applied Activities	2	-	45	-	-
Control Systems Based on Microprocessor Equipments	4	28	-	14	-
Computer Networks Administration	4	28	-	28	-
Databases	4	28	-	28	-
Programmable Logic Controllers	4	28	-	28	-
Object Oriented Programming Languages	4	28	-	14	14
Modeling and Simulation Environments	4	28	-	28	-
Personal Computers Architecture	4	28	-	14	-
Internet Operation 2	4	28	-	14	-
Applied Activities	2	-	45	-	-

Third year	Credits	Total			
		Course	Seminar	Laboratory	Project
Applied Activities	30	-	-	-	-
Computer Graphics and Multimedia	4	28	-	21	-
Programming Environments	4	28	-	21	-
Informatics Systems	3	28	-	14	-
Companies Management	2	14	7	-	-
Informatics Standards	2	14	-	7	-
Multimedia Systems	2	14	-	7	-
Diploma Thesis	15	-	-	-	-

b. Syllabus for the Courses Taught by the Academic Staff of Automation and Applied Informatics Department

Automation and Applied Informatics Engineering Specialization (5 years)

First year of study

Using and Programming of Computers (TG.I.*.3.1, Assoc. Prof. Lăcrămioara STOICU -TIVADAR):

Objective: Study of fundamentals of programming, computer science and information technology.
Contents: general presentation of computers (hardware, software, software engineering, applied informatics), fundamentals of computer networks, Internet, WWW, basics for Pascal language (structure of a program, variables, constants), standard types (integer, real, character, logical), standard procedures, instructions, procedures and functions, structured types (table, record, string, set), structured constants.

Electronic Devices and Circuits (TG.I.*.4.2, Assist. Prof. Radu BORACI):

The aim of the course is to provide a grounding in classical methods of analysis and design of analogical, discrete and integrated electronic circuits. Discrete and integrated analog devices (structure, operation, characteristics, maximum admissible values, application). Diodes. Bipolar transistors. Thermosensibles, photosensibles and photoemissive elements. Field effect transistors (JFET, MOSFET). Thyristors. Triacs. Operational integrated amplifiers. Electronic circuits (operation analysis, synthesis). Application of electronic devices in automatics.

Analysis and Synthesis of Numerical Devices 1 (TP.I.*.6.2, Assist. Prof. Onuț LUNGU):

Offer basic knowledge in design with numerical devices to first year students. Main study area are logical functions and various methods to minimize their formulas with practical applications on several digital systems starting from simple logical gates, multiplexers, decoders, different kinds of bi-stable circuits RS, D, JK, T ending with applications of those, counters and registers. Objectives of the course are to offer to the students basic understand of how numerical devices are working and ways to improve their functionality making them cost effective.

Second year of study

Computer Assisted Mathematics (FD.I.*.1.3, Prof. Radu-Emil PRECUP):

Notions of error theory; elements of numerical matrix calculus; numerical solving of linear algebraic equations; numerical computation of eigenvalues and eigenvectors; numerical solving of nonlinear algebraic

equations and systems; approximation of functions, curves and surfaces; the discrete Laplace transform (the Z-transform); numerical solving of ordinary differential equations and systems.

Computer Programming 2 (TP.I.*.3.3, Lect. Dorina PETRICĂ):

C programming language (characteristics, set of characters, identifiers, operators and expressions, C preprocessor, functions, structure of the programs, domains for the identifiers, independent compilation, abstract data) together with some programming techniques (control of the actions' flow, ramification instructions, cycling instructions processing of the arrays, work techniques with pointers, memory classes, programmed memory allocation, functions with a variable number of arguments). Simply chained lists (structure, base operations: insertion, deletion, traversal). Double and multiple chained lists.

Computer Architecture 1 (TP.I.*.4.3, Prof. Nicolae ROBU):

The course offers an introduction to computer architecture, with details of memory structures, interfaces devices, and arithmetical and logical unit of the processor. There are presented notions about the number representation in computers (unsigned numbers, fixed point numbers and floating-point numbers), adding devices (ripple-carry adder, carry look-ahead adder, carry skip adder, and BCD adder), multiplying devices (sign magnitude multiplier, Robertson multiplier), and dividing devices (sign magnitude restoring and non-restoring divider).

Digital Integrated Circuits (TG.I.*.5.3, Assist. Prof. Radu BORACI):

The aim of the course is to provide a grounding in classical methods of analysis and design of digital discrete and integrated digital circuits. Commutation study of semiconductor devices. Integrated digital devices (structure, operation, characteristics, maximum admissible values, families, application). RTL, DTL, TTL, STTL, HTTL, LPTTL, LSTTL series of digital integrated circuits (structure, operation, characteristics, maximum admissible values, application design).

Analysis and Synthesis of Numerical Devices 2 (TP.I.*.6.3, Assist. Prof. Onuț LUNGU):

Continues study of numerical devices started with ASDN I, with focus on synthesis of sequential circuits in both forms synchronous and asynchronous. Analysis and synthesis for these circuits are studied

form different points of view: number of asynchronous inputs and different types of implementation: asynchronous and synchronous with RS, JK, D bistables, decoders, counters and PROM memories.

System Theory 1 (FD.I.*.1.4, Prof. Toma-Leonida DRAGOMIR):

The objectives of the course are: Assimilation of terminology and basic systemic concepts, Knowledge of main models of linear, non-linear, continuous and discrete time systems; Assimilation of characterization elements of systems in time and complex frequency domains; Using of stability, controllability and observability analysis techniques for linear systems. The competencies created by the course are: - Generating interpretation, design and research skills by using knowledge from other fundamental courses for modeling and analysis of physical systems.

Object-Oriented Programming (TP.I.*.3.4, Prof. Vasile STOICU-TIVADAR):

Objectives: to provide knowledge and skills about the development of medium-level complexity programs in C++, basics about object-oriented analysis and design, and Windows programming; basic knowledge and practical skills for the development of simple applications using JAVA. Content: Object-oriented paradigm, general aspects of the C++ language, classes and objects, matrix, pointers, references, overloading, inheritance, polymorphism with virtual functions, input/output operations, object-oriented development, introduction in Windows programming, basics in JAVA.

Computer Architecture 2 (TP.I.*.4.4, Prof. Nicolae ROBU):

The course offers details of processor's internal organization. The registry unit is presented, with details for CSAC 2001 processor, MOTOROLA 68000 processor and INTEL 8086. The command unit is, also, presented accordingly with von Neumann paradigm, with details of CSAC 2001 processor instruction set (instructions coding and implementation for LD, JP, ADD, CALL, RET, and OUT instructions).

Digital Integrated Circuits 2 (TG.I.*.5.4, Assist.Prof. Radu BORACI)

The aim of the course is to provide a grounding in classical methods of analysis and design of digital integrated digital circuits. Integrated digital and analog devices (structure, operation, characteristics, maximum admissible values, families, application). NMOS, PMOS, CMOS, BICMOS series of digital integrated circuits (structure, operation, characteristics, maximum admissible values, application). Integrated linear and non linear industrial circuits (types, main applications in automatics).

Operational amplifiers (types, main applications in automatics). PLL integrated circuits.

Data Structures and Algorithms (TP.I.*.6.4, Lect. Dorina PETRICĂ):

Fundamental concepts regarding the data structure and structured programming. Fundamental data types and structured data types. Notions about algorithms. Analysis of the algorithms with asymptotic notations. Sorting techniques. (direct and advanced, internal and external). Analysis of sorting algorithms. Array as abstract data type: implementation, searching techniques. Recursion. Lists: definition of the abstract data type list, implementation techniques, applications. Special lists: stacks, queues. Multi list structure. Generalized lists. 7. Trees: definition of the abstract data type tree, traversal of trees, specific operators. Binary and ordered trees.

Third year of study

System Theory 2 (TS.I.*.2.5, Prof. Toma-Leonida DRAGOMIR):

The objectives of the course are: Knowledge and using of terminology and basic concepts regarding non-linear systems; Knowledge of main analysis techniques of signal filtering in digital control systems; Handling of stability analysis techniques for non-linear systems. The competencies created by the course are: Generating interpretation, design and research skills for physical systems described by non-linear models, and analyzing of filtering problems in digital control systems.

Modeling and Simulation (TS.I.*.3.5, Prof. Octavian PROȘTEAN):

The contents of this course cover the modeling and simulation of dynamical systems. The main objectives are the study of the most important deterministic and stochastic types input signals, linear models, analytical model building approaches, problems of continuous / discrete, linear / non-linear mathematical models simulation with the aid of the digital computer and analog circuits. There are presented the MATLAB, SIMNON software package.

Microprocessor Based Systems (TS.I.*.4.5, Assist.Prof. Dan UNGUREANU)

The course is trying the creation of capacities in microprocessor based systems. In the first part it is presented the base element which is the microprocessor 8086 created by INTEL manufacturer. The study of this type of microprocessor and the way of implementation of the corresponding digital systems, were choose because 8086 is the base element of the INTEL family. In studying of 8086 are acknowledged: internal structure and functional mode; bus cycles of the microprocessor; interrupts system; connection of memories to the microprocessor. In the second part of

the course it is studied a series of peripheral circuits peculiar to the INTEL family: interrupt controller 8259A, input-output parallel port 8255 and the circuit timer-counter 8254.

Assembly Language (TS.I.*.5.5, Lect. Dorina PETRICĂ)

The characteristics of the assembly language for the 8086 family and of the MASM assembler. The structure of the registers. Directives of the assembler. The definition of the variables. Addressing techniques (register, immediate, direct, indirect, based, indexed, based and indexed). The format of the instructions. Definitions of segments (complete, simplified, initialization of the segment registers, ordering of the segments, numeric operators, the structure of the programs). Transfer instructions (memory, stack, ports, address transfers). Arithmetic and logic instructions. The processing of the arrays. Instructions for the ramification (unconditional jump, conditional jump, instructions for cycling, the subroutine mechanism, interruptions). DOS functions. Input-output operations. Macroinstructions and conditional assembly. Record data and structure data.

Database (TS.L.1.*.x.5, Assoc.Prof. Ioan FILIP):

The course presents basic elements regarding the database management systems (DBMS). There are approached two DBMS: MySQL and FoxPro. The SQL language is presented (MySQL dialect) for client-server database applications and the FoxPro language for local database applications.

Introduction to Process Automation (TS.L.1.*.x.5, Prof. Stefan PREITL):

The objectives of the course are: Process automation. Automatic control structures. Automation functions: command, control, supervision and safe functioning. Structure and realization of Automatic Control Equipments (ACE). Requirements for automatic control. Approach of an automation task. Industrial processes (plants). Disturbances. Mathematical description. Actuators, transducers and sensors. Control strategies and technical aspects of implementation. Implementation requirements. Examples for automatic control solutions in industrial and non-industrial area. Case studies.

Computer Added Design of Complex Logical Circuits (TS.L.1.*.x.5, Prof. Gheorghe-Daniel ANDREESCU):

Introduction in VHDL, goal, utility, applications; CAD design environments for: design, implementation, simulation, automatic synthesis hardware, conclusions; Entity design, libraries; Sequential states; Types; Registers and synchronizations; Finite state machine; Particularizations and applications with FPGA and ASIC - manufacturers specifications.

Programmable Logic Controllers (TS.L.1.*.x.5, Lect. Florin DRĂGAN):

This course covers PLC programming, installations, and troubleshooting. Emphasis is placed on logical thinking and efficient, logical program development. Key concepts covered in the this PLC course include: Programming AND / OR conditions, Seal / Latch instructions, Examine ON / Examine OFF instructions, PLC program scan cycle, program documentation, batch programming techniques, understanding PLC addressing, common program problems and bugs, safety considerations, programming counters and timers, comparison statements, numerical / integer operations.

Control Structures and Algorithms (TSI.*.2.6, Prof. Stefan PREITL):

Automatic control system structures. Objectives of automatic control. Criteria and performance indices: time domain, frequency domain, zeros-poles. Sensibility and robustness analysis. Conventional control algorithms(PI, PID) (continuously working and discrete time). Supplementary functions (limitation, AWR, parameter adaptation, algorithms changing). Implementation of control algorithms. Two positioning and three positioning algorithms. Steady state behavior of automatic control structures (ACS). ACS using artificial static coefficient. The functioning of ACS coupled through the output signal.

System Identification (TS.I.*.3.6, Prof. Octavian PROȘTEAN):

The aim of the course is to provide the knowledge necessary for the mathematical modeling and parameter estimation of the systems from experimental data. There are presented classical methods of identification: impulse, step and sine-wave testing, identification techniques based on correlation function, the fundamental concepts and major results of parameter estimation theory, mean-square and minimum variance methods, predictor error methods, instrumental variable methods, and maximum likelihood methods - off-line and on-line way manner.

Multiprocessor Systems (TS.I.*.4.6, Prof. Gheorghe-Daniel ANDREESCU):

Multiprocessor structures: architectures, topologies, communication principles; Multibus capability, specifications; Master-Multibus interface, Data-address block, Double port access RAM, Bus interrupts, Bus arbitration; Standard module architectures in multiprocessor applications; VME-bus: capability, specifications, particularities; P896-bus: particularities; Distributed bus arbitration with priority self-selection; Slave module; Coupling of parallel external buses – BusWindows; IEEE 488-bus: specifications and application area.

Data Security Techniques (TS.I.*.5.6, Prof. Daniel-Ioan CURIAC):

The main focus of the course will be to provide background knowledge on the field of cryptography and its applications to secure networking and electronic commerce since most of today's information technology applications require security as a central system feature. Topics include and are not limited to cryptographic primitives and protocols, key management and access control and network security. Lectures will include basic techniques to provide security, information on the current state of the art and further reading on more advanced topics

Microcontrollers (TS.L.2.*.x.6, Assist. Prof. Dan UNGUREANU)

The course is trying the creation of capacities in the microcontroller field. In the first part of the course it is studied the family INTEL MCS51: internal structure, the instructions set, addressing modes, hardware structure of the systems based on the microcontroller 8051, the interrupts system, the timer/counter system, the system of serial communication. In the second part of the course it is studied the family MOTOROLA HC11: internal structure, the instructions set, addressing modes, hardware structure of the systems based on the microcontroller 68HC11, the interrupts system, the timer/counter system, the system of serial communication.

Data Communications (TS.L.2.*.x.6, Assist. Prof. Cezar POPESCU):

Basic notions. The infrastructure of communications. Data terminals and interfaces. The structure of a communication system. The principles and techniques of modulation. The modem. The coding of information. Primary coding. channel coding. Channels of communication: cables, fiber optics, radio wave, satellite communication. GSM cellular communication. Integrated services digital networks.

Control Systems for Industrial Processes (TS.L.2.*.x.6, Assoc. Prof. Constantin VOLOŞENCU)

Symbols used in control system diagrams. Unified control systems. Level control systems. Flow control systems. Temperature control systems. Pressure control systems. Modeling of control systems for industrial processes. Sensors for process control. Actuators for process control. Applications. Introduction in LabView. Virtual instruments. Virtual level control. Virtual temperature control. Virtual pressure control.

Operating Systems (TS.L.2.*.x.6, Lect. Florin DRĂGAN):

An Operating System is the most widely used piece of software in any computer. At the end of this course the students will understand the various levels of system

and application software. They will be familiar with the major Operating System services such as file systems, memory management, process management, device control and network services. They will understand how design decisions in Operating Systems affect users of the system.

Fourth year of study

Control Engineering (TS.I.*.2.7, Prof. Stefan PREITL)

The objectives of the course are: Requirements for automatic control structures' design. Classical design methods using PI and PID controllers: -zero-pole mapping, frequency domain (Nyquist, Bode), pre-calculated diagrams and tuning relations, optimization criteria. Examples and case studies for different classes of systems (fast and slow plants). The Reswick compensator. Automatic control systems (ACS) based on disturbance compensation. Cascade ACS. State feedback ACS. State estimators. Direct design of numerical ACS. Design of two-degrees-of-freedom 2-DOF control structures. Introduction in predictive control. Introduction in multivariable control system design.

Computer Networks (TS.I.*.3.7, Assoc. Prof. Ioan SILEA):

Goals of the study discipline: The presentation of the main local networks structures. The presentation of the main equipment and problems that compete for the achievement of a wide network. The assimilation of the client-server model principles, the basis of most of the applications made through networks. The transmission of notions regarding administration, access and safety in networks. Abilities created through this discipline: Knowing the hardware components of a local network and the wiring principles. Knowing the structure of the network data packages and some data control and congestion avoidance methods. Knowing the steps and developing the abilities concerning a computer installation in a network. Competences regarding the user accounts' administration and division of the hardware devices. Abilities concerning the achievement of a client-server application. Competences necessary for the networks' extension.

Knowledge Based Systems (TS.I.*.4.7, Prof. Daniel-Ioan CURIAC):

This course covers the underlying technologies, and the planning and implementation of knowledge based systems. It covers issues of knowledge representation and the corresponding inference engines, providing practical experience in the design and implementation of knowledge-based systems. It discusses the integration of knowledge-based systems with the operating environment and different kinds of applications.

Fuzzy Control Systems (TS.L.3.*.x.7, Prof. Radu-Emil PRECUP):

Elements of fuzzy set theory including basic notions concerning fuzzy sets, connectors and operators associated to fuzzy sets; fuzzy information treatment; basic structure and analysis of fuzzy controllers (FCs); typical and special FCs including FCs without dynamics, FCs with dynamics, Takagi-Sugeno FCs; PI-fuzzy controllers, conventional controllers with fuzzy parameter adaptation; fuzzy control structures and design aspects; applications of fuzzy control.

Internet Applications Programming (TS.L.3.*.x.7, Assoc. Prof. Ioan FILIP):

The course presents basic and advanced elements regarding the HTML language used to develop Web applications. Also, there are presented techniques of Web development applications using the PHP language. The topic is focused on database Web applications, including also the Microsoft technology Internet Database Connector.

Application with Microcontrollers (TS.L.3.*.x.7, Assist. Prof. Tiberiu-Dănuț IONICĂ):

The structure, functionality and programming in C language for 80C552 microcontroller: Internal architecture, memory organization and special functions registers, Timers and counters system, Analog/numeric converter and PWM outputs, Serial interfaces (UART and I²C), Interrupt system. The structure, functionality and programming in C language for external circuits used in embedded application: Liquid Crystal Display, Real Time Clock, Eeprom on I²C bus.

Design WEB and XML Techniques (TS.L.3.*.x.7, Lect. Florin DRĂGAN):

The course has two components. One of them is the design web one and includes some design web techniques regarding images, colors, etc. The primary focus of the XML part is the practical implementation of XML in real businesses, drawing on our experience implementing XML-based solutions on complex, high-traffic, e-commerce style web sites. It provide both a strategic overview of XML (its structure and its applications in business) and a technical introduction to its application.

Fuzzy and Neural Systems (TS.L.3.*.x.7, Assoc. Prof. Constantin VOLOȘENCU)

Fuzzy logic. Generalities. Fuzzy sets. Fuzification. Inference. Defuzification. Input-output characteristics of the fuzzy systems. Fuzzy PID controllers. PI fuzzy controllers. PD fuzzy controller. PID fuzzy controller. Fuzzy control systems. Neural networks. The neuron. Feed-forward neural networks. Back propagation. Other training methods. Neural control. Neural identification. Neural control structures.

Advanced Control Strategies (TS.I.*.2.8, Prof. Radu-Emil PRECUP):

Sliding mode control systems with commutation based on the control error and on state feedback; elements of fuzzy set theory; adaptive hybrid neuro-fuzzy control strategies including the basic model of a neuron, the single layer perceptron, the multiple layer perceptron artificial neural networks, the standard version of PI-fuzzy controller, and adaptive hybrid neuro-fuzzy control structures; elements of control system optimization.

Concurrent Programming (TS.I.*.3.8, Prof. Nicolae ROBU):

In its first part, the course emphasizes the type of applications opportune in concurrent programming and present the basics notions of this field. Then it continues with tasks states presentation and their evolution in states spaces, with task commutation and scheduling, and offers solution for conflicts problem which can appear in concurrent processing. Also, the tasks synchronization and communication notions are treated.

Artificial Intelligence (TS.I.*.4.8, Lect. Dorina PETRICĂ):

Categories of applications tackled by artificial intelligence. Principles of the knowledge based approaches. The representation of knowledge. Solving of the problems. The searching techniques (depth, level, the evaluation of the search). Heuristic search techniques (with maximum effort, with low costs). Searching for multiple solutions and for the optimal solution. The processing of the natural language. Artificial vision and forms recognition. Recognition of the 2D forms. Creating a program for a robot simulation (characteristics, specifications, the editor, teaching the robot, the use of the robot).

Computer Aided Manufacturing (TS.P.1.y.1.8, Assist. Prof. Cristian VAȘAR):

The course presents the general control structure for computer aided manufacturing systems, flexible manufacturing systems modeling based on Petri nets, ISO GM Code for CNC programming, WALLI software (Workcell Amalgamated Logical Linguistic Instructions). Several manufacturing applications will be implemented on the existing workcell.

Computer-Aided System Optimization (TS.P.1.y.1.8, Prof. Radu-Emil PRECUP):

Definition of an optimization problem (OP); one step OPs including no constraint OPs, OPs with equality/inequality constraints, parametric OPs of the dynamic regimes of continuous- and discrete-time linear systems; discrete-time optimization problems including the discrete Euler-Lagrange equation, the discrete-time optimal control problem, the discrete minimum principle for the optimal control problem,

the discrete dynamic programming and the discrete linear-quadratic regulator problem.

Signal Processing in Control (TS.P.1.y.1.8, Lect. Sorin NANU)

Signal and system concepts. Digital processing - acquisition, conversion. Convolution, correlation. Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT). Spectrum. Filtering – analogue and digital filtering. Filters in digital equipments for process control technology. Digital equipments for signal processing.

Medical Informatics (TS.P.1.y.1.8, Assoc. Prof. Lăcrămioara STOICU-TIVADAR):

Objective: Study of informatics systems applied in healthcare (design, functions, use). Contents: Informatics systems applied in healthcare, standards, codes, classification, dedicated informatics systems for: general practitioners, hospitals, laboratories; design of interfaces, client centered applications.

Biological Systems (TS.P.1.y.1.8, Assoc. Prof. Lăcrămioara STOICU-TIVADAR):

Objective: Study of the anatomical structure and the physiology of the human body systems. Contents: Biological systems of the human body, nervous system, memory, cardiac instrumentation, ECG, ECG mapping, senses, genetics, immunity

Medical Applications Programming (TS.P.1.y.1.8, Prof. Vasile STOICU-TIVADAR):

Objectives: to provide knowledge and practical skills about development of medium complexity applications in *Visual Basic* environment, and basics in *Visual C*. Content: The *Visual Basic* environment, user interface design, usual controls, graphics and databases in *Visual Basic*, special topics (client-server, Internet), *Windows* mechanisms, the *Visual C* environment, user interface design, usual classes in MFC, mobile applications on PocketPC developed with Embedded *Visual Basic*, improvements in *Visual Studio.NET*

Programming Environments (TS.P.1.y.1.8, Prof. Vasile STOICU-TIVADAR): Objectives: to provide knowledge and practical skills about development of medium and high complexity applications in *Visual Basic* environment. Content: The *Visual Basic* environment, user interface design, usual controls, graphics and databases in *Visual Basic*, special topics (client-server, Internet, API functions, files, the use of Registry), mobile applications on PocketPC with Embedded *Visual Basic*, improvements in *Visual Basic.NET*.

Languages for Artificial Intelligence (TS.P.1.y.1.8, Assoc. Prof. Lăcrămioara STOICU-TIVADAR):

Objective: Study of the characteristics of the languages used in artificial intelligence applications

and programming in Prolog. Contents: Artificial intelligence, knowledge bases, programming in Prolog - data, variables, sentences, structures, files, data bases, external data bases, trees, lists, search methods, expert systems.

Computer Graphics (TS.P.1.y.1.8, Prof. Daniel-Ioan CURIAC):

This course covers computer graphics fundamentals. The graphics pipeline; affine transformations; clipping; scan conversion algorithms; hidden object detection; illumination and shading models; color concepts; graphics APIs and hardware. At the labs the students design and programming a complete graphic system with rendering and different objects.

Networks with Integrated Services (TS.P.1.y.1.8, Assoc. Prof. Ioan SILEA):

Goals of the study discipline: Knowing the structure of a network with integrated services. The model and design of an ATM network. Main features of industrial networks (connectivity, flexibility, robust, mobility, promptitude, configurability). The assimilation of some notions about virtual networks (VPN). Abilities created through this discipline: The implementation of specific protocols in the network. The achievement of distributed applications' structures. Theoretical knowledge concerning present orientations in networks. The principles and necessary equipment for the achievement of a virtual network for a firm. Introductory notions, necessary for TCP/IP applications.

Intranet Networks (TS.P.1.y.1.8, Lect. Prof. Florin DRĂGAN):

This course is focused on the intranet networks devices and programming. We provide for the students detailed information regarding different network devices, DNS system and Perl language for programming network applications. The course insist on the devices like hub, bridge, gateway, router and at the labs to implement application in Perl programming.

Distributed System for Data Acquisition and Control (TS.P.1.y.1.8, Assist. Prof. Tiberiu-Dănuț IONICĂ):

The structure and general properties for a data acquisition system: Transducer and sensors (temperature transducer), Signal conditioning modules, Data acquisition modules and software. System for Data acquisition and Control with National Instruments modules. System for Data acquisition and Control with GPIB interfaces. The structure and functionality for an industrial network: ISO-OSI standard, physical, data link and application layers, RS-485 standard. Examples for industrial network: CAN (Controller Area Network) and AS-I (Actuator/Sensor Interface).

Fifth year of study

Equipments for Motion Control (TS.P.2.y.1.9, Lect. Sorin NANU)

Microcontroller in control of DC Motor. Chopper, controlled rectifier. Encoder, tachogenerator. Speed and position control for DC motor. Stepper motors, type, structures for controlling speed and direction. Control in open and closed loop.

Control Systems Based on Microprocessor Equipments (TS.P.2.y.1.9, Lect. Dorina POPESCU):

Goal: To show why microprocessor equipments can be used to implement PID controllers. To show how to implement (hardware and software) a digital control algorithm. Contents: Technical factors and business aspects are considered to choose a bus for control system equipments. Description (components and capabilities) of measurement and control SBC, digital and analog input/output boards. Using SBC to measure and control. System configuration. Microprocessor equipments processing capabilities: multiple control loops. Implementation using digital techniques: analog signal digitization, high frequency aliasing error, low pass filter algorithm etc. Application examples.

Control of Electrical Devices (TS.P.2.y.1.9, Assoc. Prof. Constantin VOLOȘENCU)

Topology of the electrical drives. Control of DC motors. Vector control of induction motors. Vector control of permanent magnet synchronous motors. Advanced control systems for electrical drives. Modeling and simulation of control systems for electrical drives and DC motors. Modeling and simulation of a vector control system for induction motor and for permanent magnet synchronous DC motors. Digital control system for a permanent magnet synchronous system, based on a digital signal processor and based on a ASIC for motion control.

CASE TOOLS (TS.L.4.*.x.9, Assoc. Prof. Ioan FILIP):

The course presents basic software programming engineering issues and a set of software tools used to manage the configuration of the software projects, project versioning, fault reports management, etc. So, there are described the following tools: CVS - Concurrent Versioning System, Clearcase. Also there are presented the formal language SDL and the related tool GEODE.

Multimedia Systems (TS.L.4.*.x.9, Prof. Vasile STOICU-TIVADAR)

The course create competences in use of multimedia, including facilities regarding the Internet (videoconferences), audio/video processing, multimedia presentations editing, knowledge for advanced

Internet applications programming approach, information handling and interpretation and its use to a better communication.

Delphi Programming (TS.L.4.*.x.9, Assoc.Prof. Ioan FILIP):

The course presents the Delphi development tool as a typical rapid applications development tool. There are considered database applications, Web applications, client-server programming, all implemented using the Borland Delphi tool. There are described the specific object libraries used in the Delphi programming (Standard, Data Access, Data Controls, QReport, Internet etc.)

Process Automation in Flexible Manufacturing Structures (TS.L.4.*.x.9, Assist.Prof. Onuț LUNGU)

SFF Classification. The interaction between the data flow and the material flow in SFF. The control unit hierarchy in SSF. Using of programmable controller as an integrated system in a local control unit. Use of programmable controller as local independent systems

Complex Automation (TS.P.2.y.2.9, Prof. Octavian PROȘTEAN):

The aim of the course is to provide grounding in the concepts, the main aspects of modeling, analysis and design methods of Large Scale Systems, Systems with Distributed Parameters, Robust Systems and Variable Structure Control Systems.

Advanced Control Systems (TS.P.2.y.2.9, Prof. Radu-Emil PRECUP):

Definition of the model-based predictive control problem; models and predictors; integral quadratic objective functions; development of the unified predictive control law; predictive control of multivariable plants; structures and development of binary control systems; aspects concerning auto-tuning control systems focused on applications to dead-time and multivariable systems.

Norms, Standards and Quality Achievement (TS.P.2.y.2.9, Assoc.Prof. Constantin VOLOȘENCU)

Romanian standards. Quality system. Technical conditions for automatic installations. Technical documentation. Standards for graphics on the computers. The technical book of a product. The professional standard. Design documentations. Norms for working protection. Phases of the product development. Inventions and intellectual property. Ways of information

Measurement Systems in Process Control (TS.P.2.y.2.9, Lect. Sorin NANU):

Principles of measure in process control. Data acquisition, signal conditioning, signal conversion,

ADCs, programmable potentiometers, analogue multiplexers. Isolation, protection. Data transmission, noise, correctness of information. Study by examples of position (potentiometric, encoder), speed (potentiometric), rotational speed (encoder, tachogenerator), temperature (PT100, intelligent TMP37), N-S orientation (electronic compass), distance (SONAR) measurement.

Virtual Instrumentation in Control (TS.L.4.*.x.9, Assoc.Prof. Constantin VOLOȘENCU)

Elements of graphical programming. Basics. Characteristic elements. Virtual functions and instruments. Working commands. How to create a virtual instrument. Advanced programming. Applications in digital signal processing. Signal synthesis. Frequency analysis. Transient regime analysis. Digital controllers. Applications in process control. Level control. Flow control. Pressure control. Temperature control. Data acquisition. Basic principles. Serial interface. Parallel interface.

Windows Programming (TS.P.3.y.3.9, Prof. Vasile STOICU-TIVADAR):

Objective: to provide knowledge and practical skills about development of medium complexity applications in *Visual C* environment. Content: *Windows* mechanisms, the Visual C environment, user interface design, usual classes in MFC, templates, Document-View architecture, graphics and databases, in Visual C, mobile applications on Pocket PC developed with Embedded Visual C, improvements in Visual C.NET.

E-Commerce (TS.P.3.y.3.9, Prof. Daniel-Ioan CURIAC):

The main focus of the course are the e-commerce techniques and to provide an understanding of the major forces shaping electronic commerce, tools for thinking through the economics of change in industries and supply chains, an understanding of the challenges of change in large, established companies and habits of orderly, analytical thinking and skill in reporting conclusions.

Interactive Simulation Tools (TS.P.3.y.3.9, Assoc.Prof. Ioan FILIP):

There are presented basic knowledge about the modeling and simulation of discrete-event system. The examples are implemented using the GPSS language. GPSS, the General Purpose Simulation System, is a family of mostly-declarative languages designed for discrete-event simulation and system modeling. GPSS block types including generators, queues, selectors/routers, data collectors, timing and computational nodes, etc are describes.

Telemedicine (TS.P.3.y.3.9, Assoc.Prof. Lăcrămioara STOICU-TIVADAR):

Objectives: Study of the integration and communication between healthcare systems, data transmission, remote access at medical information. Contents: Communication, distributed information systems (client/server, peer-to-peer), videoconferences, medical data accessed from remote locations, medical distance education, medical services on the Web, security, integrity, privacy of data, DICOM & HL7 standards, telepathology, teleradiology, telecardiology, telemedicine for general practitioners, mobile applications in healthcare.

Software Design Management in Health Informatics (TS.P.3.y.3.9, Prof. Vasile STOICU-TIVADAR):

Objectives: to provide knowledge and practical skills about software development life cycle, objectives, principles and techniques, with emphasis on Health Informatics and real-time systems and object-oriented technologies. Content: Definition, objectives and principles, the software lyfe cycle, software development, configuration management, software for health Informatics (examples), real-time software design with MASCOT method, operating systems for general use and for real-time systems, safety, testing, real-time UML, issuing Health Information systems.

Expert Systems in Medicine (TS.P.3.y.3.9, Lect. Dorina PETRICĂ):

Expert systems (definitions, general characterization, structural definition elements, performances). Methodology of the development of the expert systems. The formalism of the expert systems. Analysis of inferential processes in rules based expert systems based. The medical diagnosis process. Definition of the associated models of the realization of a medical expert system (verbal model, conceptual model, logic model, functional model). Example-expert system for the diagnosis of the isolated paralysis of the exterior eye muscles. The synthesis of some implementation variants of medical expert systems.

Introduction in Robot Control (TS.P.2.y.2.9, Prof. Gheorghe-Daniel ANDREESCU):

Industrial robot generation types; Geometrical and kinematical models; Trajectory generation, 2D orthogonal interpolation algorithm; Control structure for 1 axis module; Advanced control: model reference, dynamic, force control; Main tasks - software structure; Case study: Hierarchical control for a PTP robot with 6 degrees of freedom using microcontroller multiprocessor system; Sensors, specific transducers; Observers for kinematical signals and equivalent load torque; Specific hardware interfaces, multiprocessor architectures.

Machine-Tool Control (TS.P.2.y.2.9, Assist. Prof. Tiberiu-Dănuț IONICĂ):

General properties and programming CNC equipment for machine-tool. Measurement system for machine-tool: Numerical incremental and absolute transducer, Analogical transducer. C.N.C equipment. Hardware, software, interpolation algorithms. ISO programming for C.N.C equipment: Circular and linear interpolation, Absolute or incremental programming, Tool radius compensation, Subprogram with repeat facility, Q parameter programming, Mirror imaging.

Control Systems for Servo-drives (TS.P.2.y.2.9, Prof. Gheorghe-Daniel ANDREESCU):

Requirements, specific applications; Orthogonal models for electric machines, Voltage source inverter; Permanent magnet synchronous motor and Induction motor drives; Experimental identifications of parameters; Vector control: decoupling current control, field oriented control, direct torque control; Observers for flux, electromagnetic torque, kinematical signals and equivalent load torque; Motion control with: PI, state feedback, sliding-mode, fuzzy control; Implementations using microcontroller, DSP: applications, interfaces, programming.

Computer Driving of Flexible Manufacturing Structures (TS.P.2.y.2.9, Prof. Nicolae ROBU):

The course offers an up-to-date vision over the manufacturing processes: hierarchical levels of flexible manufacturing structures, industrial solutions for networks in computer driving of flexible manufacturing structures (BRING solution, MODIAC solution, TELWAY solution, ETHERNET solution). Modeling using PETRI network is presented for some specific situation.

Software Engineering (TS.P.2.y.1.9, Prof. Vasile STOICU-TIVADAR):

Objective: to provide knowledge and practical skills about software development life cycle, objectives, principles and techniques, with emphasis on real-time systems and object-oriented technologies

Content: Definition, objectives and principles, the software lyfe cycle, software development, configuration management, software for process control, real-time software design with MASCOT method, operating systems for general use and for real-time systems, safety, testing, real-time UML, issuing process control software and systems.

Java Programming (TS.P.2.y.1.9, Prof. Nicolae ROBU):

The course present the JDK programming environment (*javac* compiler, *java* interpreter, *appletviewer*, *jdb* debugger, *javah* headers generator,

javadoc documentation generator, *jar* archives generator, standard libraries). Different types of Java programs are emphasized: standard applications, applets, beans, servlets, aglets, and handlers. The main elements of Java language, object oriented notions of Java, arrays, exceptions, threads and graphics in Java are presented. Also, the notions related to applets in Java are studied: attributes, compiling and execution, methods threads and classes loading.

Image processing (TS.P.2.y.1.9, Assist.Prof. Cezar POPESCU):

The human vision. Models of color and gray level images. The acquisition and transmission of images. The analog video signal. The geometry of images. Elementary transformations. The perspective transformation. The stereo vision. The analysis of images in the domain of space frequency. The bi-dimensional Fourier transform. The fast Fourier transform. Image enhancement. Histogram modification processing. Image filters based on spatial masks. Image segmentation. Contour detection.

Real Time Operating Systems (TS.P.2.y.1.9, Assist.Prof. Dan UNGUREANU):

The course is creating capacities to the students in the field of real time systems. Inside the course are presented the base elements of a real time operating system with a direct exemplification of RTOS QNX. It is followed: the presentation of structure and role of the microkernel; the presentation of communication devices between the processes with all its variants(message passing, proxy, signals); the presentation of the managing mode of timers; the presentation of the communication mode in network; the presentation of the managing mode of interrupts; the presentation of managing mode of files.

Signal Processing (TS.P.2.y.1.9, Assist.Prof. Tiberiu -Dănuț IONICĂ):

General properties for Digital Signal Processors, Fixed-point digital signal processors. TMS320C5X (Internal architecture, memory organization, status and control registers, Peripheral resources, Interrupt system), Floating-point digital signal processors. TMS320C3X (Internal architecture, memory organization, status and control registers), TMS320F240 – DSP-controller optimized for motor/motion control applications (Internal architecture, memory organization, status and control registers, Advanced peripheral resources, Interrupt system).

Complements of Systems Theory and Quality Engineering 1 (Prof. Toma-Leonida DRAGOMIR)

The course content: The topic of quality engineering. Elements of automatic systems dependability analysis. Design of availability and quality. Quality management- standards series ISO 9000. Evaluation and certifying systems.

Modern Control Theory 1 (Prof. Radu-Emil PRECUP):

Development of adaptation strategies for fuzzy tuning of the parameters of several controllers: control structures with fuzzy tuning of the parameters of conventional controllers; control structures with fuzzy tuning of PI-fuzzy controllers; stability analysis methods applied in fuzzy control systems: the state-space approach, Popov's theory, Lyapunov's theory, the circle criterion, the harmonic balance method; elements of optimal fuzzy control.

Genetic Algorithms (Assoc. Prof. Lăcrămioara STOICU-TIVADAR):

Objective: Study of the genetic algorithms and the application. Contents: evolutionary computation, biological terms, search space/search methods, fundamentals of genetic algorithms (GA), evolving computer programs, data analysis and prediction, GA in scientific models, theoretical foundations of GAs, implementing GAs.

Neural Networks (Prof. Nicolae ROBU):

The course offers an introduction in neural network and the main ways in neural networks learning. It presents the McCulloch-Pitts neural model, the perceptron (mononeuronal and plurineuronal), bidirectional networks. Also, some applications of neural networks are presented: image recognition, speech recognition, and neural expert systems.

Complements of systems Theory and Quality Engineering 2 (Prof. Toma-Leonida DRAGOMIR)

Course content: Knowledge based systems. Interpolative systems in process control (based on fuzzy logic, RIP method and neural networks). Hybrid systems.

Modern Control Theory 2 (Prof. Ștefan PREITL):

Advanced multivariable control design: approach methods; control objectives; criteria and performance indices; structural properties; parameter tuning methods for mv-ACS based on output feedback and on state feedback; case studies. Modern approaches in ACS design using auto-tuning of controllers. Modern approaches in predictive control. Modern approaches in 2-DOF control structures.

Adaptive Control Systems (Prof. Octavian PROȘTEAN)

Adaptive systems problematic. Adaptive control structures. Model-reference adaptive control systems. Self-tuning adaptive control systems. Self-tuning adaptive control systems synthesis. Adaptive control systems implementation.

Artificial Intelligence and Knowledge Engineering (Prof. Daniel-Ioan CURIAC)

Survey of knowledge-based artificial intelligence - the study of how to program computers, using classical symbolic methods, to behave in ways normally attributed to "intelligence" when observed in humans. Topics chosen from: history, definition, and philosophical foundations of AI; search; propositional logic; predicate logic; knowledge representation; planning; natural-language processing; agents.



Master studies: Automotive Embedded Software (one year)

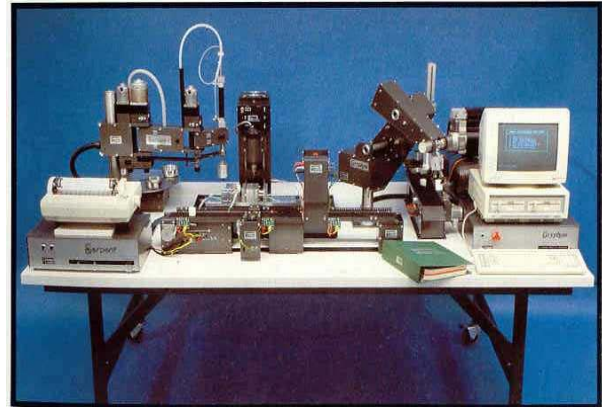
Software Engineering (Prof. Vasile STOICU-TIVADAR:)

Objectives: to provide knowledge and practical skills about software development life cycle, objectives, principles and techniques, with emphasis on real-time systems and object-oriented technologies. Content: Definition, objectives and principles, the software life cycle, software development, configuration management, software for process control, real-time software design with MASCOT method, operating systems for general use and for real-time systems, safety, testing, real-time UML, issuing process control software and systems.

Embedded Systems 2 (Prof. Nicolae ROBU):

The course presents: An introduction to Embedded Systems Multitasking, Processes and Multiprocessing, Threads and Multithreading, Scheduling, Synchronization, Intertask Communication (pipes, message queues, shared memory, remote procedure calls), Interrupt

Handling, Choosing an RTOS, An Embedded Oriented Real-Time Operating System — OSEK, Development Methodologies for Embedded Real Time Systems, OCTOPUS, ELLISON, OBJECTGEODE, ROOM, SHLAER-MELLOR, K-FLOW AND GOO, Development Tools for Cross-Development and Testbench: EVA-board, A Small Application.



c. Syllabus for the Courses Taught by the Academic Staff of Other Departments for the Automation and Applied Informatics Department

First year of study

Mathematical Analysis 1 (FD.I.*.1.1, Prof. Octavian LIPOVAN)

Metric spaces. Topological spaces. Banach spaces. Sequences in metric spaces. Principle of contraction. Infinite series in a vector space. Limits and continuity of vector functions. Infinite sequences and series of functions. Differential Calculus of vector functions. Partial derivatives. Jacobians. Directional derivative. Differentials of different orders. Euler's Theorem on homogeneous functions. Taylor's formula for a function of several variables. Maxima and minima. Applications to errors. Maximum and minimum of a function at several variables related by given equations. Implicit functions. Transformations. Theorem on Jacobians.

Linear Algebra and Analytical and Differential Geometry (FD.I.*.2.1, Prof. Dorina RENDI)

Linear spaces. Subspaces. Linear transformations. Matrices. Linear operators: eigenvalues and eigenvectors. Linear, bilinear, quadratic forms. Vector spaces. Orthogonal and symmetric

transformations. Orthogonal bases. Affine spaces: the line and the plane. Conics. Quadratics. Differential geometry of curves and surfaces. Oriented and non-oriented graphs. Hamiltonian paths. Optimal paths in a graph. Fundamentals numbers in graph theory.

Physics (FD.I.*.4.1, Prof. Ioan LUMINOSU)

Mechanics (frames of reference, Newton's laws, conservation laws, mechanical systems). Oscillations (free, damped and forced oscillations, summation of harmonic oscillations, Fourier analysis). Waves (wave's equation, interference, diffraction, polarization, attenuation, reflection, refraction, Maxwell's equations, birefringence). Thermodynamics and statistical physics (equilibrium states and processes, principles of thermodynamics, entropy, irreversible processes, principles of statistical physics). Quantum mechanics (experimental bases, Schrodinger's equation, atomic models, quantum transitions, lasers). Solid state physics (crystalline state, amorphous state, Kronig-Penney model). Semiconductors (electrons and holes, intrinsic,

extrinsic, p-n junction, transistor, electrical, thermal, magnetic and optical properties).

Electrical Engineering 1 (FD.I.*.5.1, Prof. Dumitru RADU)

Basic concepts about electrical circuits. Basic electrical quantities. Ideal passive and active elements of circuits. Linear and nonlinear d.c. circuit analysis. Kirchhoff's theorems. Nodal and loop analysis techniques. Thevenin's and Norton's theorems. Another useful theorems. Sinusoidal steady-state circuit analysis. Circuit equations in complex forms. Complex impedance and admittance. Electrical powers in sinusoidal steady-state. Resonant circuits. Three-phase circuits. Electrical circuits in transient state. Initial conditions theorems. Applications of the Laplace transform to circuit analysis.

Mathematical Analysis 2 (FD.I.*.1.2, Prof. Octavian LIPOVAN)

Integral calculus. Riemann – Stieltjes integrals. Improper integrals. Integrals of unbounded functions. Integrals dependent on parameter. Line integrals. Conditions for a line integral to be independent of the path integration. Multiple integrals: Double integrals, Triple integrals. Change of variable in a double and triple integrals. Surface integrals and Integral Theorems; The Divergence Theorem, Stoke's Theorem. Field Theory. Scalar Field. Vector Field. Gradient of scalar Field. Divergence and Rotation of Vector Field. Directional Derivative. Circulation and Flux of Vector Field. The Hamiltonian operator. Operations with Vector ∇ . Integral Theorems; Ostrogradsky Theorem and Stokes' Formula in Vector Notation. Potential Field. Solenoidal Field.

Special Mathematics (FD.I.*.2.2, Assoc.Prof. Pavel NĂSLĂU)

Differential equations and systems of differential equations. Laplace Transform and Z transform. Partial differential equations. Probabilities and statistics.

Computer Programming 1 (TP.I.*.3.2, Professor Dr. Horia CIOCĂRLIE)

Keywords: Data structures, programming techniques, recurrence, pointers, queues, algorithms, files, abstract data, sorting, objects.

Content: Advanced data structures. Hierarchic organization of subprograms. Parameters, functions and procedures. Designing large programs. Recurrent procedures and functions. Dynamic data structures. Dynamic memory allocation. Queues. General algorithm design methods. Files. Sorting techniques. Program modularity. Abstract data types. Introduction to object oriented design.

Electrical Engineering 2 (TG.I.*.5.2, Prof. Nicolae BOGOEVICI)

Two-port electrical circuits. Parameters. Interconnection of two-port circuits. Equivalent networks. Electrical filters. Elements of vector analysis. Gradient, divergence, curl and Laplacean. Divergence and Stoke's theorems. The static electric field. Physical quantities. Laws. Dielectrics and conductors in electric field. Electrical capacitors. Energy and forces in electric field. The static magnetic field in vacuum and magnetic materials. Linear and nonlinear magnetic circuits. Energy and forces in magnetic field. The electromagnetic field. Magnetic circuit law and electromagnetic induction law. Power flow in electromagnetic field. The Poynting vector. Maxwell's equations. Electromagnetic waves.

Second year of study

Mechanical System Modeling (TG.I.*.2.3, Prof. Doina DRĂGULESCU)

Kinematics modeling of rigid bodies general and particular motions: translation, rotation with fixed axis; relative motion of rigid body. Array representation of rigid body motions. Modeling the complex motion of rigid bodies systems. Static modeling of rigid bodies systems: mechanical torques as model of forces systems, mass distribution, modeling joints constraints and theirs reactions, equilibrium of rigid bodies systems. Dynamics modeling: fundamental characteristics, modeling dynamic behavior by using general theorems of dynamics, dynamic modeling of rigid body motions, modeling dynamic behavior by using analytical mechanics principles.

Measurements, Sensors and Transducers (TG.I.*.2.4, Prof. Dan STOICIU)

Metrology basics. Measurement error and uncertainty. Accuracy, confidence limits, confidence level. Measuring methods. Characteristics of measuring instruments. Voltage and current measurement. Frequency measurement. Oscilloscopes, analog and digital. Signals and noise. Signal conditioning: instrumentation amplifiers, sample and hold circuits, filters, current to voltage conversion, analog multiplexers, isolation amplifiers. A/D and D/A conversion: parallel, successive approximation and dual slope A/D converters. Data acquisition systems. Virtual instrumentation. Sensors and transducers: temperature, geometric displacement, force, torque, vibration.

Third year of study

Management (EM.I.*.1.5, Lect. Gabriela PROȘTEAN)

The objective of the discipline is to provide knowledge about initiating small and medium business. The discipline curricula include the concept of management, the scientific, human and quantitative approach, and the steps in creating a company, alternatives of businesses. The five functions of management (forecast / planning, organizing, ordering, leading and controlling) are presented in the context of nowadays realities

Economics 1 (EM.I.*.1.6, Prof. Septimiu POP)

The main objective of this course is to provide information and knowledge concerning the basics in economy for engineering students. The curricula includes titles such as: the system of the socio-economic activities, the contemporary market, the economic agents, the production factors, price and market mechanisms, competition, supply and demand, money and inflation. All of these concepts and mechanisms are taught so that they can be applicable under the conditions of the existing economy system in Romania.

Electrical Actuators (TS.L.2.*.x.6, Prof. Marius BABESCU)

Fourth year of study

Economics 2 (EM.I.*.1.7, Prof. Septimiu POP)

The income theory. The salary as a main form of income. The salary. Theories regarding its nature and content. The labor market, labor supply and demand. Labor market equilibrium. The establishment of salary dimension in a market economy. The profit – a specific way of income. The notion of profit. Profit indicators. Profitability. The interest. Monetary market and credit. The interest. Concept, indicators and forms. The rent. Evolution regarding the rent concept from the market economy. Rent in the neoclassical and contemporary theory. New forms of rent.

Companies Finances (EM.I.*.1.7, Prof, Septimiu POP)

The course of Finances of trading companies offers information about the patrimonial and financial structure of enterprises, as well as the existing possibilities for a financial equilibrium and the share capital growth. Also, it analyses the enterprises possibilities to be financed by bond loans, banking credit, leasing. The risk, investment decisions, taxes and synthesis documents for trading companies activities are some of the other topics

the students have the possibility to study when taking this course.

Electrical Operations and Converters (TS.L.3.*.x.7, Lect. Sorin MUȘUROI)

This course tries to present driving systems, emphasizing their basic element - the electric converter, embodied with power electronics components. It also deals with complex control – systems for AC motors fed by static frequency-converters. The converter-motor-control circuits' system is studied by means of unitary space phasors' theory. Thus the method presented is compatible with dynamic performances, required by the control-systems.

Marketing (EM.I.*.1.8, Prof. Anghel TĂROATĂ)

The main objective of Marketing discipline is to provide knowledge about principles, techniques and specific models of marketing, as much to the conceptual level and to the level of them application in the real conditions of market. The discipline curricula include: the concept of marketing, the stages of marketing evolution in the market economy, the marketing-mix, the management of marketing. The marketing curricula also include: the information systems for market research and de marketing strategic planning.

Fifth year of study

Non-electrical Actuators (TS.P.2.y.1.9, Prof. Victor BĂLĂȘOIU)

Hydraulically and pneumatically working systems. Definition. Classification. Structure. Symbols. Uses fluids. Hydraulically and pneumatically volume machine. Hydraulically and pneumatically pumps and motors. Hydraulically and pneumatically distributing elements. Classification. Symbols. Selection. Hydraulically and pneumatically operated valves. Classification. Symbols. Selection. Hydraulically and pneumatically measurements elements. Symbols. Selection. Hydraulically and pneumatically flow controller. Classification. Symbols. Selection. Hydraulically and pneumatically auxiliary equipment: reservoirs, filters, accumulators, pipes, measurements and controls equipment. Hydraulically and pneumatically function schemes.

Biomedical Engineering (TS.P.3.y.3.9, Prof. Mirela TOTH-TAȘCĂU)

The aim of the module is to offer fundamental knowledge in biomedical engineering. This course presents both the modeling problems of several biological systems and medical equipments. There are studied different medical equipments - for diagnosis, therapy and laboratory equipments and

their methods of use; medical imaging based on computer tomography, methods and techniques used in Röntgendiagnosis, ultrasound equipments, mechanical characteristics of biological fluids, blood and vascular tissue rheology, artificial kidney and haemodialysis.

Master Studies: Automotive Embedded Software (1 year)

Embedded Systems 1 (Prof. Virgil TIPONUȚ)

Structures and general characteristics of an “embedded” system. Mycroarchitectures for numerical processing. Interfaces and standard buses used in automotive field. General terms regarding real time “embedded” operating systems. Sensors and transducers used in automotive field.

Software Project Management (Prof. Vladimir CREȚU)

Key Words: Planning, Project Plan, Specifications, Management, Scheduling, Estimation. Course Objectives: The course has as objective to provide the software engineers with knowledge and usage of project management methods and technologies. Content: Introduction, SW Project Management, System Test Phase, The Acceptance Phase, The Installation and Operation Phase, Special Considerations, Case Study, A Project Plan Outline

Communications Skills (Prof. Anghel TĂROATĂ)

“Communication skills” provide one of the most important adeptness in life. The discipline curricula include skills for developing a center of security, guidance, wisdom and power in behavior, skills in thinking “win to win” solutions, principles of personal management, skills in listening/understanding and then to be understood, principles of empathic communication, principles of creative cooperation (synergies).

2. COMPUTER SCIENCE AND ENGINEERING

a. Curricula

Computer and Software Engineering (5 years)

First year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Mathematical Analysis 1	FD.I.**.1.1	6	42	28	-	-
Linear Algebra and Analytical and Differential Geometry	FD.I.**.2.1	5	42	28	-	-
Computer Using and Programming	TG.I.**.3.1	5	42	-	28	-
Physics	FD.I.**.4.1	4	28	14	14	-
Electrical Engineering 1	FD.I.**.5.1	4	28	14	14	-
History of Civilization	SU.I.**.6.1	1	8	6	-	-
International Languages 1	SU.I.**.7.1	2	-	28	-	-
Applied Activities	TP.I.**.8.1	2	-	-	-	-
Sports 1		1	-	28	-	-
Mathematical Analysis 2	FD.I.**.1.2	4	28	28	-	-
Special Mathematics	FD.I.**.2.2	4	28	28	-	-
Computers Programming 1	TP.I.**.3.2	5	35	-	28	-
Electronic Devices and Circuits	TG.I.**.4.2	5	28	-	28	-
Electrical Engineering 2	TG.I.**.5.2	3	28	-	14	-
Analysis and Synthesis of Numerical Devices 1	TP.I.**.6.2	5	35	-	28	-
International Languages 2	SU.I.**.7.2	1	-	28	-	-
Applied Activities	TP.I.**.8.2	2	-	-	-	-
Sports 2		1	-	28	-	-

Second year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Computer assisted mathematics	FD.I.**.1.3	4	28	-	28	-
Mechanical System Modeling	TG.I.**.2.3	4	35	-	14	-
Computer Programming 2	TP.I.**.3.3	5	35	-	28	-
Computer Architecture 1	TP.I.**.4.3	5	35	-	28	-
Digital Integrated Circuits 1	TG.I.**.5.3	4	28	-	28	-
Analysis and Synthesis of Numerical Devices 2	TP.I.**.6.3	4	28	-	14	7
International Languages 3	SU.I.**.7.3	1	-	28	-	-
Applied Activities	TP.I.**.8.3	2	-	-	-	-
Sports 3		1	-	14	-	-
System Theory 1	FD.I.**.1.4	5	42	-	21	-
Measurements, Sensors and Transducers	TG.I.**.2.4	4	35	-	21	-
Object-oriented programming	TP.I.**.3.4	4	28	-	28	-
Computer Architecture 2	TP.I.**.4.4	4	28	-	28	-
Digital Integrated Circuits 2	TG.I.**.5.4	4	28	-	28	-
Data Structures and Algorithms	TP.I.**.6.4	5	35	-	28	-
Philosophical Doctrines	SU.I.**.7.4	1	8	6	-	-
Applied Activities	TP.I.**.8.4	2	-	-	-	-
Sports 4		1	-	14	-	-

Third year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Computer Engineering 1	TS.I.**.2.5	5	42	14	14	
Large Scale Integrated Circuits	TS.I.**.3.5	5	42		28	
Data Structures and Algorithms Analysis 1	TS.I.**.4.5	5	42		28	14
Assembly Language Programming	TS.I.**.5.5	5	42		28	
Digital Microsystems Design (opt.)	TS.L.1.*.1.5	5	28		14	14
Measurement electronic equipments(opt)	TS.I.1.*.2.5	5	28		28	
System Theory 2 (opt.)	TS.I.1.*.3.5	5	42		28	
Economics 1	EM.I.**.1.5	2	28	14		
Applied Activities	TS.I.**.6.5	2				
Computer Engineering 2	TS.I.**.2.6	4	42		14	
Microprocessor Based Systems	TS.I.**.3.6	5	42		14	14
Data Structures and Algorithms Analysis 2	TS.I.**.4.6	1				
Elements of Computer Graphics	TS.I.**.5.6	5	42		28	
Theory of computation (opt.)	TS.L.2.*.1.6	5	35	14	14	
Fundamental Concepts of Programming Languages (opt.)	TS.L.2.*.2.6	5	35		28	
Semiconductor Memories (opt.)	TS.L.2.*.3.6	5	35		28	
Embedded Microcontroller Systems (opt.)	TS.L.2.*.4.6	5	35		14	14
Industrial Robots' Dynamics (opt.)	TS.L.2.*.5.6	5	35		14	14
Systems identification (opt.)	TS.L.2.*.6.6	5	35		28	
Economics 2 / Finances	EM.I.**.2.6	3	28	14		
Applied Activities	TS.I.**.6.6	2				

Fourth year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Input-output systems	TS.I.**.2.7	5	42	-	28	-
Databases	TS.I.**.3.7	4	28	-	28	-
Operating systems 1	TS.I.**.4.7	5	42	-	28	-
Compiling techniques	TS.I.**.5.7	4	28	-	14	14
Introduction to Digital Signal Processing (opt.)	TS.L.3.*.1.7	4	28	-	28	-
Software Engineering 1(opt.)	TS.L.3.*.2.7	4	28	-	28	-
Automated Speech Processing (opt.) *	TS.L.3.*.3.7	4	28	-	28	-
Computer Aided Design Techniques	TS.L.3.*.4.7	4				
Quality in Information Technology (opt.)	TS.L.3.*.5.7	4	28	-	14	-
Human-Computer Interfaces (opt.)	TS.L.3.*.6.7	4	28	-	28	-
Computing Systems Structure (opt.)	TS.L.4.*.1.7	4	28	-	14	-
Internet technologies (opt.)	TS.L.4.*.2.7	4	28	-	28	-
Complex Computing Systems (opt.)	TS.L.4.*.3.7	4	28	-	28	-
CASE Tools (opt.)	TS.L.4.*.4.7	4	28	-	28	-
Management	EM.I.**.1.7	2	28	14	-	-
Applied Activities	TS.I.**.6.7	2				
Local Computer Networks	TS.I.**.2.8	5	42	-	28	-
Artificial Intelligence Bases	TS.I.**.3.8	5	42	-	28	-
Modern Digital Telecommunications (opt.)	TS.P.1.1.1.8	4	41	-	14	-
Peripheral Equipments (opt.) *	TS.P.1.1.2.8	4	28	-	14	14
Digital Data Acquisition and Processing (opt.)*	TS.P.1.1.3.8	4	28	-	14	14
Databases Design (opt.) *	TS.P.1.2.1.8	4	28	-	14	14
Operating systems 2 (opt.) *	TS.P.1.2.2.8	4	28	-	14	14
Systems of Programs for Computer Networks (opt)*	TS.P.1.2.3.8	4	28	-	28	-
Marketing	EM.I.**.1.8	2	28	14	-	-
Applied Activities	TS.I.**.6.8	2				

Fifth year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Computer Network Design *	TS.P.2.1.1.9	5	42	-	14	14
Fault tolerant digital systems *	TS.P.2.1.2.9	5	42	-	14	14
Parallel Architectures *	TS.P.2.1.3.9	5	42	-	28	
Data Coding Techniques *	TS.P.2.1.4.9	5	42	-	28	
Distributed Computing Systems **	TS.P.2.2.1.9	5	42	-	14	14
Digital Systems Reliability **	TS.P.2.2.2.9	5	42	-	14	14
Image Processing and Recognition**	TS.P.2.2.3.9	5	42	-	14	14
Artificial Intelligent Systems**	TS.P.2.2.4.9	5	42	-	28	
Software Engineering 2***	TS.P.2.3.1.9	5	42	-	14	14
Real Time Programming Systems ***	TS.P.2.3.2.9	5	42	-	14	14
Computing Systems Modeling and Simulation ***	TS.P.2.3.3.9	5	42	-	28	-
Translator Design ***	TS.P.2.3.4.9	5	42	-	14	14
Artificial Intelligence ****	TS.P.2.4.1.9	5	42	-	28	
Expert Systems ****	TS.P.2.4.2.9	5	42	-	14	14
Distributed Data Bases ****	TS.P.2.4.3.9	5	42	-	14	14
Parallel Computing Algorithms ****	TS.P.2.4.4.9	5	42	-	14	14
Computing Systems Testing (opt)	TS.L.*.1.9	5	42	-	14	-
High-End Interfaces and Equipments (opt)	TS.L.*.2.9	5	42	-	14	-
VLSI Design (opt)	TS.L.*.3.9	5	42	-	14	-
Multiprocessor Systems (opt)	TS.L.*.4.9	5	42	-	14	-
Optical Fiber Transmissions (opt.)	TS.L.*.5.9	5	42	-	14	-
Computer Graphic Systems (opt.)	TS.L.*.6.9	5	28	-	28	-
Computer Aided Integrated Production Systems (opt.)	TS.L.*.9.9	5	28	-	28	-
Machine Learning (opt)	TS.L.*.10.9	5	28	-	28	-
Advanced Digital Signal Processing (opt)	TS.L.*.11.9	5	28	-	-	28

☐ Master studies: Computers (1 year)

Sixth year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Embedded Systems		9	35	-	-	21
Mobile Communication Systems		8	35	-	-	21
Advanced Artificial Intelligence and Cognitive Models		8	35	-	-	21
Emerging Systems		5	28	-	-	14
Distributed Systems Design		5	28	-	-	14
Software Project Management		5	28	-	-	14
Component-Based Software Engineering		5	28	-	-	14
Formal Verification		5	28	-	-	14
Heuristic Models		5	28	-	-	14
Software Quality Assurance		5	28	-	-	14

□ Computer Technology (3 years)

First year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Mathematics 1			42	28		
Mathematics 2			42	28		
Electric and Electronic Measurements			28		28	
Physics			28	14	14	
Electrical Engineering			14		14	
Numerical computers			28		28	
Using and Programming of Computers 1,2			42		70	
Computers Programming 1			42		28	
Electronic Devices and Circuits			28		28	
Analysis and Synthesis of Numerical Devices 1			28		28	
Management and marketing			28	14		
International Languages 1				56		
International Languages 2				56		
Sports 1						
Sports 2						
Applied Activities						
Applied Activities						

Second year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Integrated circuits 1,2			56		56	
Microprocessors systems 1,2			56		42	14
Operating systems 1			28		28	
Peripheral equipments 1,2			56		56	
Data structures and algorithms 1,2			56		42	
Databases 1,2			56		56	
Computer engineering			28		14	
Programming techniques			28		28	
Computer aided design			14		14	
Sports				56		
Applied Activities (112 ore)						

Third year of study	Code	Credits	Total hours			
			Course	Seminar	Laboratory	Project
Computers networks			24,5		21	
Systems of Programs for Computer Networks			24,5		21	
Data acquisition systems			24,5		21	
Object oriented design			24,5		21	
Applied Activities			468			

b. Syllabus for the Courses Taught by the Academic Staff of Computer Science and Engineering Department

First year of study

Computer Using and Programming (TG.I.*.3.1, Teaching Assist. Liliana JIAN)

Keywords: Logical diagrams, algorithms, operators, data type, instructions, functions, procedures, structured data types.

Content: Computing systems structure. Pascal programming language fundamental elements. Input-output operations. Instructions. Subprograms. Structured data types.

Analysis and Synthesis of Digital Devices 1 (TP.I.*.6.2, Teaching Assist. Adrian MIHĂILESCU)

Keywords: Boolean algebra, minimization, logic functions.

Content: Introduction to Boolean algebra and Boolean functions. Synthesis of Boolean functions using logic gates. Decoders, multiplexers, PROM memories, PLA circuits, static and dynamic hazards of combinational circuits.

Computer Programming 1 (TP.I.*.3.2, Professor Dr. Horia CIOCĂRLIE)

Keywords: Data structures, programming techniques, recurrence, pointers, queues, algorithms, files, abstract data, sorting, objects.

Content: Advanced data structures. Hierarchic organization of subprograms. Parameters, functions and procedures. Designing large programs. Recurrent procedures and functions. Dynamic data structures. Dynamic memory allocation. Queues. General algorithm design methods. Files. Sorting techniques. Program modularity. Abstract data types. Introduction to object oriented design.

Second year of study

Computer Programming 2 (TP.I.*.3.3, Assoc. Professor Dr. Marius MINEA)

Keywords: programming languages, C language, advanced programming, system programming.

Content: Introduction. Comparing C and PASCAL. Types. Operators. Expressions. Declarations. Instructions. Input-output functions. Pointers. Dynamic allocation. User defined data types. Files. Abstract data types. Recurrence. Dynamic allocation implementation. Dynamic programming. Hash tables. Exercises.

Computer Architecture 1 and 2 (TP.I.*.4.3, TP.I.*.4.4, Professor Dr. Mircea VLĂDUȚIU)

Keywords: IEEE 754 Standard, Carry look-ahead adders.

Content: Computer internal representation of numbers. Adders. Binary multipliers. Binary dividers. Data processing unit organization. Computing systems command and control. Central processing unit organization. Input-output systems.

Digital Integrated Circuits 1 (TG.I.*.5.3, Professor Dr. Mircea STRATULAT)

Keywords: Repetition cycle, logic levels, logic circuits, bipolar transistor switching regime, unipolar transistor, propagation time, power consumption, noise margin, transfer characteristics, load factor.

Content: Analysis methods for numeric circuits. Circuits for linear transformation. Semiconductor diode switching regime. Bipolar transistor switching regime. Unipolar transistor. Base parameters definition for integrated circuits. Integrated circuits with diodes and transistors.

Analysis and Synthesis of Numerical Devices 2 (TP.I.*.6.3, Teaching Assist. Adrian MIHĂILESCU)

Keywords: synchronous finite state machines, sequential circuits MEALY, MOORE

Content: Finite state machines MEALY, MOORE. Reducing the number of states for a synchronous FSM, complete or incomplete specified. FSM synthesis using ASM diagrams. Synthesis method using PROM memories.

Object-Oriented programming (TP.I.*.3.4, Professor Dr. Ioan JURCA)

Keywords: Object Oriented Programming, class, Java, UML, interface, inheritance, polymorphism, program design.

Content: Programming evolution and OOP position. Classes, objects, constructors, accessing object fields, methods. Inheritance and polymorphism, classes interrelations, UML elements. Program designing using interfaces. Exceptions handling. Program modularity. Concurrent programming using objects. Collections of objects. Introduction to design patterns. Graphic interfaces in Java.

Digital Integrated Circuits 2 (TG.I.*.5.4, Professor Dr. Mircea STRATULAT)

Keywords: logic levels, propagation time, power consumption, noise margin, transfer characteristic curves, load factor, TTL, CMOS, BiCMOS.

Content: Static parameters for TTL integrated circuits. Dynamic parameters for TTL integrated circuits. Other types of TTL integrated circuits. TTL integrated circuits family. NMOS integrated circuits family. CMOS integrated circuits family.

Data Structures and Algorithms (TP.I.*.6.4, Professor Dr. Vladimir CREȚU)

Keywords: Data structures, abstract data types, algorithms, algorithm analysis, algorithms complexity, recurrence, sorting, lists, tables.

Content: Fundamental data type. Structured data types. Algorithms. Asymptotic notation. Algorithms execution time assessment. Sorting techniques. Vectors. Recurrent algorithms.

Third year of study

Computer Engineering 1 and 2 (TS.I.*.2.5, TS.I.*.2.6, Professor Dr. Mircea VLĂDUȚIU)

Keywords: CPU execution time, MIPS, MFLOPS, benchmark programs, cache mapping and replacement, cache writing methods, pipeline control, hazard types and their removal.

Content: Memory metrics and hierarchies: metrics used in computer systems, memory hierarchies, characteristics of memorization technologies, parameters for memory hierarchies. Medium access times, cache-main memory step, virtual memory system mechanisms; second part: pipeline control, interconnection in computer systems: pipeline control, central processing unit classification, the structure of a sample machine, with general registers, analysis of parameters which influence the performance of pipeline control, hazard types, interconnection in computer systems, interconnection types. Classifications, intersystem interconnection, terminal based networks, computer based networks.

Large Scale Integrated Circuits (TS.I.*.3.5, Professor Dr. Mircea STRATULAT)

Keywords: I²L, ECL, PECL, ETL, CCD, TTL flip-flop circuits, CMOS, BiCMOS.

Content: ECL integrated circuits, ECL family of integrated circuits, other types of ECL integrated circuits, I²L integrated circuits, flip-flop bistable integrated circuits, integrated Schmitt triggers, flip-flop monostable circuits, flip-flop astable circuits, family of integrated circuits.

Data Structures and Algorithm Analysis 1 & 2 (TS.I.*.4.5, TS.I.*.4.6, Professor Dr. Vladimir CREȚU)

Keywords: special trees, set abstract data type, graph abstract data type, algorithms analysis, algorithms complexity, algorithms performance

Content: tree data structure, design and analysis of specific algorithms; set data structure, implementation of set ADT with higher level data structures; graphs, weighted graphs, oriented graphs, NP complex problems.

Assembly Language Programming (TS.I.*.5.5, Professor Dr. Ionel JIAN)

Keywords: assembly language programming, 80x86 microprocessor, DOS functions, subroutines, macroinstructions, mathematical coprocessor 8087

Content: Structure of the 8086 microprocessor, program debugging with Advanced Full Screen Debugger (AFD) and CodeView; 8086/286/386 assembly language: MASM86 macro assembler, program structure, data definition, addressing modes, move instructions, arithmetical and logical instructions, decimal variable length computation, branch and cyclic programs, jump instructions, arrays, text processing, character instructions, data structures.

Microprocessor Based Systems (TS.I.*.3.6, Professor Dr. Mircea POPA)

Keywords: Microprocessor, memory handling, serial and parallel ports

Content: General characteristics of 16 and 32 bits microprocessors, x86 microprocessors, 680x0 microprocessors, external application command with PC microcomputer.

Elements of Computer Graphics (TS.I.*.5.6, Teaching Assist. Sorin BABII)

Keywords: Picture, graphical primitives, graphical transformations, windows, curves, surfaces, visualization techniques

Content: Picture generation, graphical primitives, windows and clipping, transformations, 3D visualization techniques, curves and surfaces.

Theory of Computation (0.AC.02.TS.L.2.*.1.6, Professor Dr. Marius CRIȘAN)

Keywords: P-complete and NP-complete problems, Turing machines, FSM, PDA, RAM machines, computational complexity

Content: role of theory in computer science, general models of computation, finite state machines, computability, computational complexity, algorithmically complexity, physical models of computation, applications in cryptography

Digital Microsystems Design (0.AC.02.TS.L.1.*.1.5, Professor Dr. Mircea POPA)

Keywords: digital micro system, microprocessor, microcontroller, programmable dedicated circuit

Content: introduction, Z80 microprocessor, buses, connection of memories to the central unit of a digital micro system, connection of input/output ports to the central unit of a digital micro system, programmable dedicated circuits, digital micro systems with microcontrollers, applications.

Fundamental Concepts of Programming Languages (0.AC.02.TS.L.2.*.2.6, Professor Dr. Horia CIOCĂRLIE)

Keywords: Software product, formal representation, entities, parameters, data types, abstract data types, inheritance, dynamic linking, control structures, exceptions, lambda calculus

Content: Introduction, formal representation of programming languages, programming languages entities' attributes, passing of data as parameters, data types, abstract data types, object oriented languages, programming languages' control structures

Semiconductor Memories (0.AC.02.TS.L.2.*.3.6, Professor Dr. Mircea STRATULAT)

Keywords: Fixed memories, operative memories, ROM buffer memories, EPROM, EEPROM, RAM memories, DRAM, SRAM, RDRAM, SDRAM, SSRAM, PLD

Content: Large scale integrated circuits, fixed semiconductor memories, programmable logic devices (PLD), RAM memories, extending memory capacity, other types of semiconductor memories.

Embedded Microcontroller Systems (0.AC.02.TS.L.2.*.3.6, Professor Dr. Mircea POPA)

Keywords: Microcontroller, emulator, development systems

Content: Place and role of microcontrollers, microcontroller structure, microcontroller and microprocessor-programmable dedicated circuit relation, microcontroller-DSP relation; microcontroller with 80C51 kernel: 80C51 microcontroller, 8xC552 microcontroller; PIC microcontrollers, PIC 16F8X microcontrollers; Motorola m68HC11 microcontrollers, M68HC11 microcontroller family; Siemens SAB8xC166 microcontrollers; external memories connection: external memories connection for PIC 16F8X microcontrollers, external memories connection for M68HC11 microcontrollers.

Industrial Robot Dynamics (0.AC.02.TS.L.2. *.5.6, Professor Dr. Doina DRĂGULESCU)

Keywords: Direct and reverse cinematic model, differential model, position and orientation correction, Lagrange equations, dynamic model

Content: Analytical mechanics principles, d'Alembert principle, virtual mechanical work principle, Lagrange equations, the study of random body systems, cinematic robot modeling, direct geometric model, reverse geometric model, differential robot modeling, elementary movements of robots, positioning errors of the final effector, position and orientation correction of the final effector, robot dynamic modeling.

Fourth year of study

Computer Input-Output Systems (TS.I.*.2.7, Professor Dr. Crişan STRUGARU)

Keywords: Keyboard, printer, flexible and rigid disks, TV monitor.

Content: General considerations about organizing the input-output subsystem. Interrupts controller. DMA controller. Keyboard interface. Printers. Flexible disk: driving unity, information's organization on the disk, controller 8272 based interface. Hard disk. Video interface: basics of radio-television, generating the video complex signal, organizing and accessing the video memory, color viewing, viewing through color tables.

Digital Databases (TS.I.*.3.7, Professor Dr. Ionel JIAN)

Keywords: databases, relational DB, Visual dBase, SQL

Content: introduction, dBASE relational model, database structure design, hierarchical structure implementation, database normalization, elements of relational algebra, relational querying language SQL.

Operating Systems 1 & 2 (TS.I.*.4.7, 0.AC.02.TS.P.1.2.2.8, Professor Dr. Ioan JURCA)

Keywords: Operating Systems, UNIX, processes, files, commands, system programming, system calls, system administration.

Content: Definition of the operating system. Historical development of different systems. Presenting the main parts of an operating system. UNIX operating system. The main system organization with respect to file system structure and executable programs. The main commands and shell's facilities. System calls. Utility programs.

Compiling Techniques (TS.I.*.5.7, Professor Dr. Horia CIOCĂRLIE)

Keywords: Translator programs, compiler, formal languages, grammars, lexical analysis, finite machines, syntactical analysis.

Content: Introduction. Basics of formal languages. Lexical analysis. Syntactical analysis. Translation with respect to syntax. Semantic analysis. Compiler structure and basic operation.

Introduction to Digital Signal Processing (0.AC.02.TS.L.3.*.1.7, Lecturer Dr. Mihai V. MICEA)

Keywords: Discrete time signals and systems, convolution, correlation, Z and Fourier transforms, digital filters, digital signal processors.

Content: General Considerations. Application Fields of DSP With Examples. Discrete-time Signals. Discrete-time Systems (Digital Processors). Convolution of Discrete-time Signals. Correlation of Discrete-time Signals. Discrete-time Systems Described by Difference Equations. The Z Transform and Its Applications. The Fourier Transform of Continuous-time and Discrete-time Signals. Properties of the Fourier Transform for Discrete-time Signals. LTI Systems Analysis in the Frequency Domain. DFT - The Discrete Fourier Transform. FFT - The Fast Fourier Transform.

Software Engineering 1 (0.AC.02.TS.L.3.*.2.7, Professor Dr. Ioan JURCA)

Keywords: Program life cycle, specification, design, software tools, programming environment, object oriented methodologies

Content: Programming engineering definition and software main characteristics; software system modeling and requirements specification, requirements specification methods; object oriented design, prototyping, interface design; software

developments environments; software verification and validation; importance of software products documentation; elements of software projects management.

Automated Speech Processing (0.AC.02.TS.L.3.*.3.7, Lecturer Dr. Marian BOLDEA)

Keywords: Speech act modeling, short term analysis, time domain analysis, linear prediction, spectral analysis, automatic speech synthesis, concatenative synthesis, text-speech conversion, automated speech recognition, acoustical distances, vector quantization, dynamic time deformation, hidden Markov models, performance evaluation

Content: Introduction, speech producing and modeling, vocal signal analysis, automatic speech synthesis, automated speech recognition, applications examples.

Computer Aided Design Techniques (0.AC.02.TS.L.3.*.4.7, Teaching Assist. Doru TODINĂ)

Keywords: Computer aided design of numerical systems, hardware description languages, VHDL, simulating mechanism, discrete simulation, oriented on events simulator, dataflow modeling and sequential modeling, structural modeling, entities, architectures, configurations, processes, sensitivity list, resolution functions.

Content: Introduction. Sequential modeling. Dataflow modeling. Basics of VHDL. Predefined attributes. Structural descriptions. Configurations. PACKAGE structures. Advanced VHDL.

Quality in Information Technology (0.AC.02.TS.L.3.*.5.7, Teaching Assist. Constantin COSOVAN)

Keywords: Auditing, operational capacity, quality, conformity, complexity, flaw, decision, diagram, dependency, reliability, histogram, maintenance

Content: Quality: characteristics, instances, factors; quality problems treatment, quality analysis and evaluation methods; information quality assurance system; software quality standardization and certification; quality management systems – ways of implementation.

Internet Technologies (0.AC.02.TS.L.4.*.2.7, Teaching Assist. Carmen HOLOTESCU)

Keywords: HTML, Javascript, Perl, CGI, PHP, SQL, XML, ASP, Design Web, Portal, Vortal, Online Learning, Online Communities

Content: HTML: Basics of Web Design, Documents, Formatting a Text, Layouts, Tables, Images, Frames, Multimedia. Javascript: nesting Javascript code in HTML, Values, Variables, Literals, Expressions, Operators, Instructions, Functions, Events, Objects, Forms, Windows, Frames, Cookies. Perl/CGI: Perl variables, CGI variables, Operators, Instructions, Arrays, Forms, Files, Multi-Script Forms, Searching,

Sorting, SSI, Strings, Cookies, CGI.pm, Modular constructing, HTTP authentication. Basics of PHP, MySQL, ASP, XML, Learning Objects. Online communities, Learning online

Complex Computing Systems (0.AC.02.TS.L.4.*.3.7, Professor Dr. Marius CRÎȘAN)

Keywords: Kolmogorov-Chaitin complexity, complexity theory, algorithmic complexity, incompressibility method, informational distance, computation thermodynamics, algorithmic entropy, self-evolving systems

Content: Introduction, circuits complexity, informational distance, space time impact, reversible computation, complex computation thermodynamics, chaos theory and self-evolving system, quantum computing systems, optical computing systems, molecular computing systems.

Local Computer Networks (TS.I.*.2.8, Professor Dr. Crișan STRUGARU)

Keywords: Ethernet, Token-ring, Token-bus, PDN, CSDN, PSDN

Content: Local Ethernet (IEE 802.3) networks, local networks in ring topologies (IEEE 802.5), TOKEN-BUS (IEEE 802.4) local networks, local networks in star topologies, optical fibers based networks, public data networks, ISDN communication networks, communication channels multiplexing, communication networks interconnection, wireless communication networks, considerations about communication systems' evolution over time and predictions about the future.

Basic Artificial Intelligence (TS.I.*.3.8, Professor Dr. Ștefan HOLBAN)

Keywords: Logic programming, knowledge representation, SWI-Prolog

Content: Introduction to artificial intelligence, elements of logic programming, problem solving strategies, rule based systems, semantic networks, expert systems, combinatory problems.

Modern Digital Telecommunications (0.AC.02.TS.P.1.1.1.8, Lecturer Dr. Mihai V. MICEA)

Keywords: Telecommunications, data transmission, analogic channels, digital channels, fixed and mobile switching, signaling protocols, GSM, GPRS.

Content: General Considerations. General Model of a Telecom Channel. Analog Telecom Channels. Digital Telecom Channels. Open Systems Interconnection (OSI) Model. Physical Media of Communication. Introduction to Mobile Digital Telecom. GSM Standard. GPRS Standard. Advanced Mobile Telecom Standards: EDGE, UMTS. Fixed Digital Telecom. Public Switched Telephone Network (PSTN). Alcatel 1000 E 10 Commutation Center. Integrated Services Digital Network (ISDN). Intelligent Telecom Networks (IN).

Peripheral Equipments (0.AC.02.TS.P.1.1.2.8, Professor Dr. Crişan STRUGARU)

Keywords: Superheterodine devices, color coder-decoder, audio interface

Content: Audio interface; human – computer interface through voice; working principle and command of step-by-step motors, examples of applications from robotics; standard buses, superheterodina radio-receiver; color TV coder-decoder, receiving signals from passing-by and geostationary weather satellites; other equipments: mouse, scanner, fax, joystick; information security (DES, RSA); modem, mobile phone, basic problems in digital television.

Digital Data Acquisition and Processing (0.AC.02.TS.P.1.1.3.8, Professor Dr. Mircea STRATULAT)

Keywords: Operational amplifier, analogue-to-digital converter, digital-to-analogue converter, system of data acquisition, system of data distribution

Content: Operational amplifiers, instrumental amplifiers, isolation amplifiers, signal multiplexing, signal sampling, digital-to-analogue converter, analogue-to-numeric converter, system of data acquisition, system of data distribution

Databases Design (0.AC.02.TS.P.1.2.1.8, Professor Dr. Ionel JIAN)

Keywords: Relational databases, object oriented DB, Visual dBase, SQL, Oracle

Content: Relational databases, relational database normalization, relational algebra, relational database design, SQL oracle language for relational databases, pl/sql language (procedural language sql), object oriented databases.

Operating Systems 2 (0.AC.02.TS.P.1.2.2.8, Professor Dr. Ioan JURCA)

Keywords: Operating system, operating systems design, UNIX, Windows, multiprogramming, multiprocess programs, resource sharing, resource handling

Content: Operating systems structure, process handling: process concept, concurrent processes, processes states, process coordination: critical section problem, hardware support for synchronization, synchronization mechanism (semaphores, monitors, messages), deadlocks: models and handling modalities, memory handling, virtual memory systems, secondary memory handling: disks' structure, disk access planning methods, file systems, organization, operations, access methods, protection, operating systems' security.

Programming Systems for Computer Networks (0.AC.02.TS.P.1.2.3.8, Professor Dr. Ioan JURCA)

Keywords: Computer networks, protocols families, TCP/IP, Internet, file transfer, remote access, client-server applications, multilevel applications, CORBA, EJB, Web services

Content: Protocol stacks in computer networks, TCP/IP stack, UNIX sockets programming, remote procedure call, Java sockets programming, remote method invocation (RMI), CORBA – heterogeneous distributed applications, EJB component based applications, Web services realization.

Hardware Resource Handling and Autoconfiguration Techniques (Lecturer Marius MARCU)

Keywords: Driver, plug-and-play, power management, synchronization, I/O request packet

Content: Physical device general architecture: hardware resources, auto-configuration, PCI bus; Windows drivers: driver characteristics, driver layering, executive's role in I/O requests processing; data structures: IRP, driver object, device object, controller object, adapter object; Windows driver implementation: support routines, error handling, data types, memory allocation, character strings; resource handling in a system: plug-and-play, interrupts handling, synchronization, Registry databases, power management, symmetrical multiprocessor systems (SMP) handling; Linux drivers, input/output mechanism in Linux operating system; general structure of a driver; applications usage of drivers: Windows services, DirectX.

Fifth year of study

Computer Network Design (0.AC.02.TS.P.2.1.1.9, Professor Dr. Crişan STRUGARU)

Keywords: Local Area Networks (LAN), Ethernet, Reference models: OSI, TCP/IP, protocols: SONET, SDH, Controller, Transceiver.

Content: LAN, MAN, WAN networks. Circuit switching and packet switching principles (PSTN, ISDN, CSDN, PSDN). Communication systems interconnection. Signaling in communication systems. ATM based communication system. Mobile communication systems.

Fault Tolerant Digital Systems (0.AC.01.TS.P.2.1.2.9, Teaching Assistant Lucian PRODAN)

Keywords: Dependability attributes, Fault modeling (Stuck-at faults, bridging faults, delay faults), Fault dominance, Fault detectability, Fault tolerance, Design for testability, Test generation techniques, Digital signatures, Digital evolution and evolvability

Content: Testing strategies for combinational and sequential systems. Fault tolerant digital systems. Hierarchical fault tolerance. Bio-inspired digital systems. The POE Model. Evolvable hardware

Parallel Architectures (0.AC.01.TS.P.2.1.3.9, Professor Dr. Mircea POPA)

Keywords: Parallel system, interconnection network, pipeline.

Content: Parallel system performance. Pipeline based architectures. Memory organization in parallel systems. Interconnection networks. Algorithms parallelization.

Data Coding Techniques (0.AC.01.TS.P.2.1.4.9, Lecturer Dr. Marian BOLDEA)

Keywords: Information, entropy, discrete sources, source encoding, no-prefix codes, dictionary-based compression, error control, block codes, syndrome, error detection, error correction, cyclic codes.

Content: Introduction. Discrete Sources of Information. Data Compression. Error Control.

Distributed Computing Systems (0.AC.02.TS.P.2.2.1.9, Assoc. Professor Dr. Mircea CHECEANU)

Keywords: Distributed system, Tele-informatics, Transputer, Superscalar

Content: Introduction, Tele-informatics systems, Transputers, Superscalar processors, Complex structures, Scientific attached processors, Study of transputer based systems and auxiliary components from the same family, The transputer, Databook, INMOS.

Digital Systems Reliability (0.AC.01.TS.P.2.2.2.9, Teaching Assist. Mihai UDRESCU-MILOSAV)

Keywords: Self-Checking ALU, Self-Checking PLA, Hamming Codes, Error Detecting/Correcting Codes, Built-In Self Testing, Built-In Logic Block Observation, Quantum Error Correcting Codes

Content: Definitions. Relationship with other computer engineering fields. Checker circuit synthesis. Parallel control of data storing/transmitting. BIST (Build-In Self Testing) facilities. Fault tolerant quantum computation.

Digital Image Processing and Recognition (0.AC.01.TS.P.2.2.3.9, Assoc. Professor Dr. Horațiu MOLDOVAN)

Keywords: Digital Image, filtering, compression, segmentation, Fourier function.

Content: Introduction. Fundamental Issues. Transforming Images. Improving Images. Restoring Images. Compressing Images. Segmenting Images. Viewing and Describing .

Artificial Intelligence Systems (0.AC.01.TS.P.2.2.4.9, Professor Dr. Marius CRIȘAN)

Keywords: Representation, semantic networks, search methods, rule based systems, logic, learning, neural networks, genetic algorithms, cognitive modeling.

Content: Artificial intelligence and functions hierarchy. Theoretical foundations in artificial intelligence. Representation and methods in artificial intelligence. Elements of logic and resolution based proving. Learning. Cognitive models and subjective consciousness.

Software Engineering 2 (0.AC.02.TS.P.2.3.1.9, Lecturer Dr. Radu MARINESCU)

Keywords: Object Oriented Programming (OOP), OO design principles, design patterns, design quality, software architectures

Content: Design principles and heuristics. Design patterns. Introduction to Software Architectures.

Real Time Programming Systems (0.AC.01.TS.P.2.3.2.9, Professor Dr. Vladimir CREȚU)

Keywords: Real-time, Modeling RTS, Heuristic methods, Data and control transformation, Transformation scheme, Hierarchic model, Essential model, Behavior model, Formal verification methods.

Content: Real-time systems, definition. Modeling RTS. State modeling method. Heuristic methods. Data and control transformation. Transformation scheme. Data modeling. Model organization. Essential model. External events modeling. Behavior model. Formal verification methods.

Computing Systems Modeling and Simulation (0.AC.01.TS.P.2.3.3.9, Professor Dr. Stefan HOLBAN)

Keywords: System, model, simulation.

Content: Modeling techniques for continuum systems. Graphical representation techniques for models. Evaluation nets. Statistical concepts used on modeling and on simulation. Correlation analysis of elements used on statistical analysis and on data modeling. Modeling techniques for discrete systems. Nets with waiting strings.

Translator Design (0.AC.01.TS.P.2.3.4.9, Professor Dr. Horia CIOCĂRLIE)

Keywords: Syntactic analysis, graphs, syntactic trees, postfix notation, symbols table, semantic analysis, object code generator.

Content: Ascendant syntactic analysis. Compiling techniques guided by syntax. Type verification. Object code generator.

Artificial Intelligence (0.AC.02.TS.P.2.4.1.9, Professor Dr. Stefan HOLBAN)

Keywords: knowledge bases, artificial intelligence, data bases, data mining.

Content: A panoramic view on detecting knowledge from data bases and on data mining. Data mining techniques. Detecting association rules using Dynamic FP-tree. Detecting knowledge systems. Architectures of Data Mining systems.

Expert Systems (0.AC.01.TS.P.2.4.2.9, Lecturer Dr. Dan PESCARU)

Keywords: Expert systems, knowledge based system, fuzzy inference, conceptual graphs.

Content: Statistical methods for implementing expert systems. Symbolic processing based systems. Fuzzy expert systems. Descriptive methods for presenting knowledge. Conceptual connectionist model.

Distributed Data Bases (0.AC.01.TS.P.2.4.3.9, Professor Dr. Ionel JIAN)

Keywords: Relational Databases, Object Oriented Databases, Distributed Databases, SQL, PL/SQL

Content: Oracle Defining and Using Packages in Oracle. Defining and using the object type. Data Collections. Optimizing SQL Queries. Databases implementing techniques. Logical and physical organization of Oracle Databases. Database information structure in memory. Distributed databases. Internet Database Access.

Parallel Computing Algorithms (0.AC.01.TS.P.2.4.4.9, Lecturer Dr. Ioana ȘORA)

Keywords: Parallel Computing, Algorithms

Content: Parallel Computing frameworks. Parallel algorithm design principles. Concurrent programming. Parallel processing algorithms and applications. Parallel programming language examples.

Computing Systems Testing (0.AC.02.TS.L.*.1.9, Professor Dr. Mircea VLĂDUȚIU)

Keywords: FPGA, auto testing, auto repair, auto replication, dynamic re configurability, errors detector and corrector codes, reliability, fault tolerance.

Content: Computing systems reliability. Detector and corrector codes utilization. Self-checking concept. Bio-inspired systems. POE model.

High-end Interfaces and Equipments (0.AC.02.TS.L.*.2.9, Professor Dr. Mircea STRATULAT)

Keywords: CD-ROM Drives, MO(Magneto-Optical) Drives, Optical memories.

Content: Optical recording. Optical reading. CD playback system. Magneto-optical recording. Optical physics.

VLSI Design (0.AC.02.TS.L.*.3.9, Professor Dr. Marius CRIȘAN)

Keywords: Integrated circuits technology and physics. Integrated circuits families, Programmable logic devices. Application specific integrated circuits. Computer aided VLSI design. Systolic networks. VLSI arithmetic processors.

Content: Introduction. Physics and very large scale integration principles. Application specific integrated circuits. VLSI circuits synthesis. VLSI architectures.

Multiprocessor Systems (0.AC.02.TS.L.*.4.9, Lecturer Marius MARCU)

Keywords: multiprocessor, hardware modules, memory, server

Content: Parallel architectures classification. Parallel Random Access Machine. Multiprocessor hardware modules: bus window, multiport memory, bus monitor. Interconnecting networks: multiprocessor bus, crossbar switch, hypercube. Memory in multiprocessor systems: Shared memory, Distributed

memory, Distributed-shared memory. Server sizing: file server sizing, database server sizing, applications server sizing, web server sizing.

Optical Fiber Transmissions (0.AC.02.TS.L.*.5.9, Professor Dr. Mircea STRATULAT)

Keywords: Fiber optics, optical emitters, optical receivers, optical fiber communications, deterministic signals, internal and external noises, pass-through band, attenuation.

Content: Transmission Through Optical Fibers. Types of Optical Fibers. Fiber Optics Transmitters. Fiber Optics Receivers. Optical Physics. Fiber Optic Networks.

Computer Graphic Systems (0.AC.02.TS.L.*.6.9, Teaching Assist. Sorin BABII)

Keywords: Surface hiding, z-buffer, color models, lighting, ray-tracing, radiosity, animation techniques.

Content: Hidden lines and surfaces: Depth ordering methods, Warnock and Depth buffer methods, Special cases. Color in CG: Object lighting, shadows. Animation techniques

Computer Aided Integrated Production Systems (0.AC.02.TS.L.*.9.9, Teaching Assist. Constantin COSOVAN)

Keywords: Flow, System, Information, Formalist, Reengineering, Program, Object, Synergy, Holon, Paradigm, Multi-agent, Heuristics, Mega-programming, Virtual.

Content: Production systems, Models for (and modeling of) industrial production systems, Industrial-Economical systems aggregation, Defining elements of production systems.

Machine Learning (0.AC.02.TS.L.*.10.9, Professor Dr. Marius CRIȘAN)

Keywords: Inductive learning, PAC learning, Bayesian learning, auto-evolving systems.

Content: Algorithms learning. Learning limitation. Differences analysis learning. Error correction learning. Finite errors learning. Inductive learning. PAC (Probably Approximately Correct) learning. Natural language learning. Answering questions and commands.

Advanced Digital Signal Processing (0.AC.02.TS.L.*.11.9, Lecturer Dr. Mihai V. MICEA)

Keywords: Discrete-time systems, digital filtering, multi-rate signal processing, adaptive filtering, spectral analysis and estimation, linear prediction.

Content: Discrete Fourier Transform. Fast Fourier Transform. Implementation of discrete-time systems. Design of digital filters. Multi-rate digital signal processing. Design of adaptive digital filters. Elements of spectral analysis and estimation. Linear prediction and optimum linear filters.

c. Syllabus for the Courses Taught by the Academic Staff of Other Departments for the Computer Science and Engineering Department

First year of study

Mathematical Analysis 1 (FD.I.*.1.1, Professor Dr. Octavian LIPOVAN)

Metric spaces. Topological spaces. Banach spaces. Sequences in metric spaces. Principle of contraction. Infinite series in a vector space. Limits and continuity of vector functions. Infinite sequences and series of functions. Differential Calculus of vector functions. Partial derivatives. Jacobians. Directional derivative. Differentials of different orders. Euler's Theorem on homogeneous functions. Taylor's formula for a function of several variables. Maxima and minima. Applications to errors. Maximum and minimum of a function at several variables related by given equations. Implicit functions. Transformations.

Linear Algebra, Analytical and Differential Geometry (FD.I.*.2.1, Professor Dr. Dorina RENDI)

Linear spaces. Subspaces. Linear transformations. Matrices. Linear operators: eigenvalues and eigenvectors. Linear, bilinear, quadratic forms. Vector spaces. Orthogonal and symmetric transformations. Orthogonal bases. Affine spaces: the line and the plane. Conics. Quadratics. Differential geometry of curves and surfaces. Oriented and non-oriented graphs. Hamiltonian paths. Optimal paths in a graph. Fundamentals numbers in graph theory.

Physics (FD.I.*.4.1, Professor Dr. Ioan LUMINOSU)

Mechanics (frames of reference, Newton's laws, conservation laws, mechanical systems). Oscillations (free, damped and forced oscillations, summation of harmonic oscillations, Fourier analysis). Waves (wave's equation, interference, diffraction, polarization, attenuation, reflection, refraction, Maxwell's equations). Thermodynamics and statistical physics (equilibrium states and processes, principles of thermodynamics, entropy, irreversible processes, principles of statistical physics). Quantum mechanics (experimental bases, Schrodinger's equation, atomic models, quantum transitions, lasers). Solid state physics (crystalline state, amorphous state, Kronig-Penney model). Semiconductors (electrons and holes, p-n junction, transistor, properties).

Electrical Engineering 1 (FD.I.*.5.1, Professor Dr. Dumitru RADU)

Basic concepts about electrical circuits. Basic electrical quantities. Ideal passive and active

elements of circuits. Linear and nonlinear DC circuit analysis. Kirchhoff theorems. Nodal and loop analysis techniques. Thevenin's and Norton's theorems. Another useful theorems. Sinusoidal steady-state circuit analysis. Circuit equations in complex forms. Complex impedance and admittance. Electrical powers in sinusoidal steady-state. Resonant circuits. Three-phase circuits. Electrical circuits in transient state. Initials conditions theorems. Applications of the Laplace transform to circuit analysis.

Mathematical Analysis 2 (FD.I.*.1.2, Professor Dr. Octavian LIPOVAN)

Integral calculus. Riemann – Stietjes integrals. Improper integrals. Integrals of unbounded functions. Integrals dependent on parameter. Line integrals. Conditions for a line integral to be independent of the path integration. Multiple integrals: Double integrals, Triple integrals. Change of variable in a double and triple integrals. Surface integrals and Integral Theorems; The Divergence Theorem, Stoke's Theorem. Field Theory. Scalar Field. Vector Field. Gradient of scalar Field. Divergence and Rotation of Vector Field. Directional Derivative. Circulation and Flux of Vector Field. The Hamiltonian operator. Operations with Vector ∇ . Integral Theorems; Ostrogradsky Theorem and Stokes' Formula in Vector Notation. Potential Field. Solenoidal Field.

Special Mathematics (FD.I.*.2.2, Professor Dr. Dorina RENDI)

Differential equations and systems of differential equations. Fourier Transform. Laplace Transform and Z transform. Partial differential equations. Probabilities and statistics.

Computer Assited Mathematics (FD.I.*.1.3, Assoc. Prof. Dr. Pavel NĂSLĂU)

Approximating computation and error estimation. Function approximation. Curves and surfaces approximation. Numerical integration. Differential equation. Partial differential equations.

Electrical Engineering 2 (TG.I.*.5.2, Professor Dr. Dumitru RADU)

Two-port electrical circuits. Parameters. Interconnection of two-port circuits. Equivalent networks. Electrical filters. The static electric field. Physical quantities. Laws. Dielectrics and conductors in electric field. Electrical capacitors. Energy and forces in electric field. The static magnetic field in vacuum and magnetic materials. Linear and nonlinear magnetic circuits.. Energy and

forces in magnetic field. The electromagnetic field. Magnetic circuit law and electromagnetic induction law. Power flow in electromagnetic field. The Poynting vector. Electromagnetic waves.

Second year of study

Mechanical System Modeling (TG.I.*.2.3, Professor Dr. Doina DRĂGULESCU)

Kinematics modeling of rigid bodies general and particular motions: translation, rotation with fixed axis; relative motion of rigid body. Array representation of rigid body motions. Modeling the complex motion of rigid bodies systems. Static modeling of rigid bodies systems: mechanical torques as model of forces systems, mass distribution, modeling joints constraints and their reactions, equilibrium of rigid bodies systems. Dynamics modeling: fundamental characteristics, modeling dynamic behavior by using general theorems of dynamics, dynamic modeling of rigid body motions, modeling dynamic behavior by using analytical mechanics principles.

System Theory 1 (FD.I.*.1.4, Professor Dr. Toma-Leonida DRAGOMIR):

The objectives of the course are: Assimilation of terminology and basic systemic concepts, Knowledge of main models of linear, non-linear, continuous and discrete time systems; Assimilation of characterization elements of systems in time and complex frequency domains; Using of stability, controllability and observability analysis techniques for linear systems. The competencies created by the course are: Generating interpretation, design and research skills by using knowledge from other fundamental courses for modeling and analysis of physical systems.

Measurements, Sensors and Transducers (TG.I.*.2.4, Professor Dr. Alimpie IGNEA)

Metrology basics. Measurement error and uncertainty. Accuracy, confidence limits, confidence level. Measuring methods. Characteristics of measuring instruments. Voltage and current measurement. Frequency measurement. Signals and noise. Signal conditioning: instrumentation amplifiers, sample and hold circuits, filters, current to voltage conversion, analog multiplexers, isolation amplifiers. A/D and D/A conversion: parallel, successive approximation and dual slope A/D converters. Data acquisition systems. Virtual instrumentation. Sensors and transducers: temperature, geometric displacement, force, torque, vibration. Oscilloscopes, analog and digital.

Electronic Devices and Circuits (TG.I.*.5.2, Professor Dr. Sabin IONEL)

Junction Diodes (Rectifier and Zener diodes, Models, Applications, LEDs). Bipolar Junction Transistors (Characteristics, Models, Common-Emitter Amplifier). Field Effect Transistors (JFET, MOSFET, Characteristics, Models, FET amplifiers). Basic Amplifier Stages at Low Frequencies (Emitter Follower, Differential Amplifier, Operational Amplifier). Feedback Amplifiers (Topologies, Examples). Operational Amplifier in Applications (Inverting and non-inverting stages, Differential amplifier, Integrators, Active filters, Comparators, Schmitt trigger). Waveform Generators (Sinusoidal oscillators, Crystal oscillators, Regenerative Comparator, Pulse Generators). Power Devices and Circuits (Thyristors, Triacs, GTO, IGBT, Applications).

Third year of study

Economics 1 (EM.I.*.1.6, Professor Dr. Septimiu POP)

The main objective of this course is to provide information and knowledge concerning the basics in economy for engineering students. The curricula includes titles such as: the system of the socio-economic activities, the contemporary market, the economic agents, the production factors, price and market mechanisms, competition, supply and demand, money and inflation. All of these concepts and mechanisms are taught so that they can be applicable under the conditions of the existing economy system in Romania.

Economics 2 (EM.I.*.1.7, Professor Dr. Septimiu POP)

The income theory. The salary as a main form of income. The salary. Theories regarding its nature and content. The labor market, labor supply and demand. Labor market equilibrium. The establishment of salary dimension in a market economy. The profit – a specific way of income. The notion of profit. Profit indicators. Profitability. The interest. Monetary market and credit. The interest. Concept, indicators and forms. The rent. Evolution regarding the rent concept from the market economy. Rent in the neoclassical and contemporary theory. New forms of rent.

Fourth year of study

Companies Finances (EM.I.*.1.7, Lecturer Dr. Eugenia GRECU)

The course of Finances of trading companies offers information about the patrimonial and financial structure of enterprises, as well as the existing possibilities for a financial equilibrium and the

share capital growth. Also, it analyses the enterprises possibilities to be financed by bond loans, banking credit, leasing. The risk, investment decisions, taxes and synthesis documents for trading companies activities are some of the other topics the students have the possibility to study when taking this course.

Management (EM.I.*.*.1.5, Lecturer Dr. Nicu Dumitru FANTANĂ)

The concept of management, the scientific, human and quantitative approach, and the steps in creating a company, alternatives of businesses. The five functions of management (forecast / planning, organizing, ordering, leading and controlling) are presented in the context of nowadays realities

Marketing (EM.I.*.*.1.8, Professor Dr. Anghel TĂROATĂ)

The main objective of Marketing discipline is to provide knowledge about principles, technics and specific models of marketing, as much to the conceptual level and to the level of them application in the real conditions of market. The discipline curricula include: the concept of marketing, the stages of marketing evolution in the market economy, the marketing-mix, the management of marketing. The marketing curricula also include: the information systems for market research and de marketing strategic planning.

3. Complementary Courses Offered by the Department for Training the Didactic Personnel

□ About the Department

The Department for Training the Didactic Personnel is a didactic and scientific research structure of the University in which provides the specific training for the students and for the higher technique education graduates, who choose the didactic profession and also to perfecting of the specialty training, psycho-pedagogy and methods for didactic workers from the pre-university and university education.

The mission of the Department consists of creating some activities of higher education and pedagogical research which:

- Give an answer to the aspirations of the student's and graduates who choose the didactic profession;
- Meet the continuous training and career evolution requirements expressed by the engineer teachers from the pre-university technique education;
- Provide a permanent pedagogical perfecting for the entire didactic personnel of the "Polytechnic" University of Timisoara.

Attributions. Conceived as a specialized structure for the pedagogical training of future didactic workers, the Department has the following attributions:

- The unitary coordination of the activity concerning the conception, the content and methodology specific for the didactic worker training, reflected in the education plans, in the analytic programs and in the class didactic activities, seminary and pedagogical practice, according to the modern standards of the profession;
- The implementation of education modernizing solutions and of it's reform support, as well as the direct transfer of information and experience between the university didactic workers in the Department's structure and the teachers from the application schools where the students are doing the pedagogical practice;
- Organizing the perfecting special, psycho-pedagogical and methodical training activities for the pre-university didactic workers, including organizing the exams to finalize in education and

obtaining the didactic grades II and I, according to the methodology of the Education and Research Ministry;

- Promoting the fundamental and applied scientific research in the field, for publications, research contracts, counseling, scientific sessions, elaborating courses, manuals, didactic guides etc.

The Staff

Lect. Mazilescu Crisanta Alina Senior Assist. Dinu Adela Ionela,	Education psychology , first year / 1. sem.
Lect. Dragomir Gabriel Mugurel Senior Assist. Todorescu Liliana,	Pedagogy , second year / 1. and 2. sem.
Prof. Preitl Stefan	The didactic of the specialty , Third year / 1. sem.
Lect. Mazilescu Crisanta Alina Senior Assist. Todorescu Liliana	Educational communication, Third year / 2. sem.
Lect. Dragomir Gabriel Mugurel Senior Assist. Mitroi Monica,	The sociology of education, Fourth yea / 1. sem.

Courses and Syllabus

Education Psychology

The course wants to describe behavior manifestations and psychological dynamics met in the educational system, in the teaching-learning process. Mostly, it is pursued the understanding of the individual and age specific periods psychological profile, to facilitate the communication of the educative content and the obtaining of good performances, in the context of skills and competences that are being formed. The course contains theoretical and practical elements, being realized through dissertations, discussions, structural exercises and role plays. The students prepare here materials which are discussed in the seminary and actively participate in the exercises.

Pedagogy

Pedagogy, provides the students with the possibility of forming a real image about:

- What mean the components of the instructive-educative process (principles, finalities, contents, organization forms, the instructing methodology, means, evaluation, the didactic activities projecting);
- The adaptation of some behavior and professional intervention ways concerning the “education” activity of pupils, having as a landmark an integral (holistic) conception regarding education.

Pedagogy approach the educative process, no matter where the educative action takes place, no matter it’s institutionalized or not institutionalized character.

The Didactic of the Specialty

The teaching mode is an art in which the teacher is a good creator, a good actor, but also a good manager of the learning process. The vertiginous growth in the volume of knowledge that needs to be considered in the education process implies the continuous perfecting of teaching methodologies.

With all the modern means that education posses, the lesson remains for teachers and students, the organized environment of efficient dialogue.

The engineer-teacher needs to consider that the technical information is accumulated in variable rhythms, meanwhile the assimilation and memory fixing capacities, at the individual level are limited.

Therefore modern didactic puts an accent on the forming character of the teaching. In the specialty teaching methodic are answered questions like: “what?”, “how much?” and “how?” the knowledge to be taught more efficiently.

Pedagogical Practice

Forming for the didactic profession includes besides the theoretic component also a practical one with formative valence: forming some abilities and competences specific for the didactic job through experiencing the teaching practice.

The pedagogical practice offers the students the possibility to experiment the professor role, teaching, evaluating and being examined in the same time. The objectives:

- Forming students' capacities to operate with information from the educational sciences' field;
- The general knowledge of the school reality;
- The orientation in the analytical programs and school manuals;
- The accumulation of some abilities specific to the didactic profession;
- The knowledge and interpretation of information about the pupils and the class of pupils.

Educational Communication

As an integrant part of the human communication and, in the same time, distinct domain of activity, *Educational communication* has as a goal to make an incursion in the pre-university and university educational field in order to identify the means of communication and the existent interpersonal relationships between the educational actors.

The making of this incursion requires the reference of some communication elements that suit to the educational space: verbal, nonverbal, Para-verbal language, notion about listening, negotiation, argumentation, interaction, conflict solving, the communicational between individuals and group

communication, communication structures and networks and not the least methods and techniques of written and oral communication.

The Sociology of Education

The sociological approach of the educational system has led to the consecration of a specialized discipline, which is called "*The sociology of education*". In the domain of social pedagogy there is even a tradition, through the work called "*The sociology of education*". Even though there existed some kind of preoccupations in this field from the manifestation of this discipline as a science, we dare to say that the sociology of education hasn't yet, evidently, come out of the "creation book".

Referring to what we want to achieve in the next pages, we emphasize the fact that, on one hand we will keep in mind the nature of the orientations in this domain, and on the other hand we will try to disclose the problematic content kept in mind. In this last direction, there will be aimed problems like: educational styles in the contemporary family, education and frustration, educational space and juvenile delinquency.

C. FACULTY DEPARTMENTS

C.1. Department of Automation and Applied Informatics

Correspondence address:

**Bd. Vasile Pârvan nr. 2,
300223 -Timișoara, Timis, Romania**
Phone: +40-(0)-256-40-3241 (Secretary)
+40-(0)-256-40-3247 (Head of department)
Fax: +40-(0)-256-40-3214
e-mail: isilea@aut.utt.ro , secretar@aut.utt.ro
WEB-site: www.aut.utt.ro

Head of the Department: *Assoc. Prof. Dr. Eng. Ioan SILEA*

Secretary: *Lucica ANTON*

Brief History

- 1959** The first automation course in the "Politehnica" University of Timisoara (at the Mechanical Faculty).
1960 The first automation course at the Electrical Engineering Faculty, Department of Measurements and Electrical Power Stations. The first teaching and research group has been formed in the automation field, coordinated by Professor Dr. Nicolae Budisan.
1967 Department of Electrical Engineering and Computers is changed to the Department of Computers, Electronics and Automation.
1972 The Department of Electronics, Automation and Measurements is formed.
1979 The first class of engineers specialized in "Industrial Automation" to graduate in Timisoara.
1981 The Department of Computers and Automation is created.
1983 The first class of automation engineers to graduate, specialized in "Process Control using Computers".
1985 The Timisoara branch of the Institute of Automation (IPA), Bucharest, is opened in the "Politehnica" University of Timisoara, under the coordination of Professor Dr. Nicolae Budisan and Assoc. Prof. Dr. Mircea Vladutiu.
1990 The Faculty of Automation and Computers is created.
1994 Post-graduate studies on "Modern Approaches in IT-Based Control".
1997 The three-year college in "Applied Informatics" is created.
1997 Master studies in the "Automated Systems" field.
2004 The Automation and Industrial Informatics Department changes into the Automation and Applied Informatics Department.

Department Board

Prof. Dr. Eng. Gheorghe-Daniel ANDREESCU
Prof. Dr. Eng. Daniel-Ioan CURIAC
Prof. Dr. Eng. Toma-Leonida DRAGOMIR
Prof. Dr. Eng. Ștefan PREITL
Prof. Dr. Eng. Octavian PROȘTEAN
Prof. Dr. Eng. Nicolae ROBU
Prof. Dr. Eng. Vasile STOICU-TIVADAR
Assoc. Prof. Dr. Eng. Ioan FILIP
Assoc. Prof. Dr. Eng. Ioan SILEA
Lect. Dr. Eng. Dorina PETRICĂ
Teaching Assist. Onuț LUNGU

□ Academic Staff

- Prof. Dr. Eng. Ioan BABUȚIA**, Consulting professor
- Prof. Dr. Eng. Nicolae BUDIȘAN, PhD. Supervisor**, Consulting professor
- Prof. Dr. Eng. Gheorghe-Daniel ANDREESCU**, Computer Added Design of Complex Logical Circuits, Multiprocessor Systems, Introduction in Robot Control, Control Systems for Servo-drives
- Prof. Dr. Eng. Daniel-Ioan CURIAC**, Data Security Techniques, Knowledge Based Systems, Computer Graphics, E-Commerce
- Prof. Dr. Eng. Toma Leonida DRAGOMIR, PhD. Supervisor**. System theory, Complements of Systems Theory and Quality Engineering
- Prof. Dr. Eng. Ștefan PREITL, PhD. Supervisor**. Introduction to Process Automation, Control Structures and Algorithms, Control Engineering, Modern Control Theory
- Prof. Dr. Eng. Dipl. Math. Radu-Emil PRECUP, PhD. Supervisor**. Computer Assisted Mathematics, Advanced Control Strategies, Control Engineering, Computer-Aided System Optimization, Fuzzy Control Systems, Advanced Control Systems, Modern Approaches to Process Control 1
- Prof. Dr. Eng. Octavian PROȘTEAN, PhD. Supervisor**. Modeling and Simulation, System Identification, Complex Automation
- Prof. Dr. Eng. Nicolae ROBU**. Computer Architecture, Concurrent Programming, Neural Networks, Practical Software Project Management, Computer Driving of Flexible Manufacturing Structures, Embedded systems, Java Programming, Computer Operation, Databases
- Prof. Dr. Eng. Vasile STOICU – TIVADAR**. Software Engineering, Software Design Management in Health Informatics, Windows Programming, Programming Environments, Medical Applications Programming, Object-Oriented Programming
- Assoc. Prof. Dr. Eng. Ioan FILIP**. Database, Internet Applications Programming, Case Tools, Delphi Programming, Interactive Simulation Tools
- Assoc. Prof. Dr. Eng. Ioan SILEA**. Computer Networks, Networks with Integrated Services
- Assoc. Prof. Dr. Eng. Lăcrămioara STOICU-TIVADAR**. Using and Programming of Computers, Medical Informatics, Biological Systems, Telemedicine, Languages for Artific. Intelligence, Genetic Algorithms
- Assoc. Prof. Dr. Eng. Constantin VOLOȘENCU**. Informatics Standards, System Theory, Norms, Standards and Quality Guarantee, Fuzzy and Neural Systems, Control Systems for Electrical Actuation, Control Systems for Continuous Processes
- Lect. Eng. Florin DRĂGAN**. Operating Systems, Programmable Logic Controllers, Design Web and XML Techniques, Intranet Networks, Computer Graphics
- Lect. Dr. Eng. Sorin NANU**. Signal Processing in Control, Equipments for Motion Control, Measurement Systems in Process Control
- Lect. Dr. Eng. Dorina PETRICĂ**. Computer Programming 2, Data Structures and Algorithms, Assembly Language, Artificial Intelligence, Expert Systems in Medicine
- Lect. Dr. Eng. Dorina POPESCU**. Control Systems Based on Microprocessor Equipments, System Theory, System Science
- Assist. Prof. Eng. Adriana ALBU, PhD student**. Concurrent Programming, Computer Architecture, Java Programming, Computer Operation, Databases
- Assist. Prof. Eng. Radu BORACI, PhD student**. Digital Integrated Circuits, Electronic Devices and Circuits
- Assist. Prof. Ing. Dadiana CĂIMAN, PhD student**. Computer Programming 2, Assembly Language, Data Structures and Algorithms, Artificial Intelligence
- Assist. Prof. Eng. Ana-Maria DAN, PhD student**. Computer Added Design of Complex Logical Circuits, System Theory, System Science.
- Assist. Prof. Dipl. Math. Lavinia-Elena DRAGOMIR, PhD student**. Computer assisted mathematics, Data structures and algorithms, Computer Programming 2
- Assist. Prof. Eng. Tiberiu-Dănuț IONICĂ, PhD student**. Application with Microcontrollers, Distributed System for Data Acquisition and Control, Machine-Tool Control
- Assist. Prof. Eng. Levente KOVACS, PhD student**. Control Structures and Algorithms, Control Theory, Control Engineering, Advanced Control Strategies
- Assist. Prof. Eng. Onuț LUNGU, PhD student**. Analysis and Synthesis of Numerical Devices, Programmable Logic Controllers
- Assist. Prof. Eng. Cezar POPESCU, PhD student**. Data Communications, Advanced Computer Architectures, Image processing, Computer Architecture
- Assist. Prof. Eng. Daniela SPILCĂ, PhD student**. Assembly Language, Artificial Intelligence
- Assist. Prof. Eng. Iosif SZEIDERT, PhD student**. Modeling and Simulation, System Identification

Assist. Prof. Eng. Dan UNGUREANU, PhD student. Microprocessor Based Systems, Real Time Operating Systems, Microcontrollers

Assist. Prof. Eng. Loredana UNGUREANU, PhD student. Concurrent Programming, Computer Architecture, Java Programming, Embedded Systems, Computer Operation

Assist. Prof. Eng. Cristian VAȘAR, PhD student. Modeling and Simulation, System Identification, Computer Aided Manufacturing

Assist. Prof. Eng. Emil VOIȘAN, PhD student. Analysis and Synthesis of Numerical Devices, Computer Graphics

Teach. Assist. Eng. Ioan ARDELIAN. Using and Programming of Computers, Object Oriented Programming, Windows Programming

Teach. Assist. Eng. Ovidiu BANIAȘ. Data Security Techniques, Knowledge Based Systems

Teach. Assist. Eng. Claudia-Ioana DRĂGAN. Data Security Techniques

Teach. Assist. Eng. Simona GHEJU. Advanced Control Strategies, Control Engineering

Teach. Assist. Eng. Ștefan OCTAVIAN. Computer Networks, System Theory 1

Teach. Assist. Eng. Felix PAPP. Using and Programming of Computers, Object Oriented Programming, Programming Environments

Teach. Assist. Eng. Zsuzsa PREITL, PhD student. Introduction to Process Automation, Control Structures and Algorithms, Control Engineering

Teach. Assist. Eng. Claudiu-Raul ROBU. Computer Programming 2, Assembly Language, Data Structures and Algorithms

Teach. Assist. Eng. Bogdan SOLGA. Using and Programming of Computers, Object Oriented Programming

Teach. Assist. Eng. Szilard SZOKE. Integrated Circuits 1, Integrated Circuits 2

Phd. Student Eng. Dorin BERIAN. Programming Environments, Windows Programming, Medical Applications Programming

Phd. Student Eng. Bogdan GROZA. Computer Programming 2, Assembly Language, Artificial Intelligence

Phd. Student Eng. Andrei GUDIU. Intranet Networks, Internet Applications Programming

Phd. Student Eng. Ștefan KORODI. System Theory, Using and Programming the Computers

Phd. Student Eng. Lucian PEANĂ. System Theory

☐ Administrative and technical Staff

1	Lucica ANTON	Secretary
2	Monika-Agneta ELEKEȘ	Technician
3	Iuliana-Margareta CIOBANU	Technician
4	Gabriel VLASIU, eng.	Network engineer
5	Zoltan TOMAN	Locksmith
6	Mărioara STANJIC	Janitor
7	Tamara GOICOVICI	Janitor

☐ Department's Main Research Directions

- Control systems and algorithms. Advanced control strategies. Fuzzy Control (see *Research Center*)
- Advanced control of AC drives: Sensor-less control of IPMSM; Applications to Electric and hybrid vehicles (see *Research Center*)
- Software applications for integrated healthcare networks, telemedicine software, software applications in public administration (see *Research Center*)
- Researches in the field of unconventional energetic (see *Research Center*)
- Researches regarding the system's modeling, identification and simulation (see *Research Center*)
- Researches in the field of neural networks and fuzzy systems (see *Research Center*)
- System theory applications in fault detection
- System analysis using sensitivities
- Development of control system devices

☐ Main Laboratories

B012 Laboratory —	Electronics
B018 Laboratory —	Control Engineering
B019 Laboratory —	Applied Informatics
B020 Laboratory —	System Science
B026 Laboratory —	Concurrent Engineering
B027-a Laboratory —	Modeling, Simulation/Database
B027-b Laboratory —	Complex Automations
B028-a Laboratory —	System Theory
B028-b Laboratory —	Advanced (Intelligent) Control Systems
A304 Laboratory —	Computer Basis
A307 Laboratory —	Microprocessor and Micro-controller Systems
B611 Laboratory —	Robot Control
B613 Laboratory —	Real Time Programming
B614 Laboratory —	Distributed Processing
B624 Laboratory —	Analysis and Synthesis of Numerical Devices
CC1 + CC2 Laboratories —	Using and programming of computers

☐ PhD Advisors

1. Prof. Dr. Eng. Nicolae BUDISAN:

- Adela BERDIE: *Principles, methods and technologies for object oriented soft systems standardization*
- Alina BOGAN-MARTA: *Contributions to speech processing*
- Gabriel CULINCO: *Contributions to windmills optimal control*
- Florin DRĂGAN: *Contributions to chaotic systems control*
- Ovidiu FĂLCAN: *Study and integration of some electronic devices into unconventional generator sets control systems*
- Bogdan MUSCĂ: *Contributions to energy supply systems automation for remote sites exploitation, based on alternative energy sources*
- Valentin NEDELEA: *Contributions to micro hydro groups optimal control*
- Mihaela POPA: *Contributions to variable rotation speed windmills structures and control methods*
- Adriana PRAȚA: *Contributions to Internet commercial operation automation*
- Daniel TOADER: *Contributions to energy supply systems automation for some agricultural exploitation, based on alternative sources*

2. Prof. Dr. Eng. Toma-Leonida DRAGOMIR:

- Dorin BERIAN: *Structures and strategies for large informatics medical assistance systems*
- Constantin Dorin BICHIȘ: *Intelligent control systems*
- Ana-Maria DAN: *Analysis and design of discrete event systems*
- Bogdan Ioan GROZA: *Integrated safety cryptographic solutions in control systems*
- Aurelian Dorel IGNAT: *Integrated control and supervision for complex systems*
- Adrian KORODI: *Ensuring safety of control systems*
- Lucian Augustin PEANĂ: *Implementation of interpolative type control structures*
- Emil Ioan VOIȘAN: *Processes control for telematic distributed applications*

3. Prof. Dr. Eng. Octavian PROȘTEAN:

- Radu BORACI: *Contributions to digital control structures synthesis of electric drive systems and of electrogen systems*
- Călin CĂRSTEA: *Contributions to the development of distributed fault redundant systems*
- Andrei GUDIU: *Contributions regarding the distributed system's remote control*
- Dan Lucian MIHĂILESCU: *Contributions regarding the analysis, modeling and control of distributed systems*
- Cristian SAVII: *Conception and realization of user interfaces in CAD-CAM applications development*
- Iosif SZEIDERT: *Control systems used in unconventional energetics*
- Dan UNGUREANU: *Contributions at modeling and optimization of discrete event systems*
- Cristian VAȘAR: *Contributions regarding the neuro-fuzzy structures usage in system identification*

4. Prof. Dr. Eng. Radu PRECUP:

- Zsuzsa PREITL: *Contributions to the development of model based control structures*
- Marian STAN: *Contributions to the development of control structures dedicated to vehicle braking systems*

5. Prof. Dr. Eng. Ștefan PREITL:

- Doru COROBAN: *Contributions to the analysis and the development of advanced control systems*
- Levente KOVACS: *Contributions regarding the design of multivariable systems in disconnected variant*
- Corina LAMOS: *Contributions to the development of fuzzy control systems*
- Cristian POP: *Contributions to the development of an automatic control system of the processes in metallurgic industry*
- Csongor SZABO: *Contributions to the development of a control system for mobile robots*
- Laszlo SZONYI: *Contributions regarding the development of control systems in automotive processes*
- Marius TOMESCU: *Contributions to the development of fuzzy systems for control systems*
- Nicolae VULPES: *Contributions to the control, faults' diagnosis and monitoring of hydro-energetic system*

<input type="checkbox"/> Department events

PhD Theses:

Author	Title	Scientific Supervisor
Gianina-Adela GABOR	Contributions on the availability studies of control systems with applications on geo-thermal plant control system.	Prof. Toma-Leonida DRAGOMIR

PhD Reports:

Author	Title	Scientific Supervisor
Marius-Lucian TOMESCU	Properties of Fuzzy Operators	Prof. Ștefan PREITL
Adrian KORODI	Automatic system operating safety problem	Prof. Toma-Leonida DRAGOMIR
Dorin BERIAN	Distributed informatics system for primary medical assistance	Prof. Toma-Leonida DRAGOMIR
Dorin BICHIS	Automation aspects of gas transport processes on nation-wide pipes	Prof. Toma-Leonida DRAGOMIR

PhD Students, enrolled in 2004 – 2005:

Name of the PhD Student	Scientific Supervisor
Gabriel CULICO	Prof. Nicolae BUDISAN
Ovidiu FALCAN	Prof. Nicolae BUDISAN
Bogdan MUSCA	Prof. Nicolae BUDISAN
Valentin NEDELEA	Prof. Nicolae BUDISAN
Daniel TOADER	Prof. Nicolae BUDISAN
Bogdan-Ioan GROZA	Prof. Toma-Leonida DRAGOMIR
Marius-Daniel BALEANU	Prof. Toma-Leonida DRAGOMIR
Aurelian-Dorel IGNAT	Prof. Toma-Leonida DRAGOMIR
Sanda-Valentina BALAS	Prof. Toma-Leonida DRAGOMIR
Zsuzsa PREITL	Prof. Radu-Emil PRECUP
Marian STAN	Prof. Radu-Emil PRECUP
Csongor SZABO	Prof. Ștefan PREITL

Books Published:

- Antonius STANCIU, Loredana UNGUREANU, Adriana ALBU. *Utilizarea calculatoarelor*, Editura Politehnica, Timisoara, ISBN 973-625-179-9. pp. 150

International Cooperation:

- University of Bremen, Germany, ERASMUS-SOCRATES Program
- Budapest University of Technology and Economics (BME), Hungary, research cooperation,
- “Budapest Tech” University of Applied Science, Hungary, research cooperation, ERASMUS-SOCRATES Program, CEEPUS Program

C.2. Department of Computer and Software Engineering

❑ Correspondence address:

**Bd. Vasile Pârvan nr. 2,
300223 -Timișoara, Timis, Romania**
Phone: +40-(0)-256-40-3260 (Secretary)
+40-(0)-256-40-3255 (Head of department)
Fax: +40-(0)-256-40-3214
E-mail: vcretu@cs.utt.ro , secretariat@cs.utt.ro
Web: www.cs.utt.ro

❑ **Head of the Department:** *Professor Dr. Eng. Vladimir CREȚU*

❑ **Secretary:** *Maria DUMITROV, Alexandru PETOFI*

❑ Brief History

- 1960** In the Politehnic Institute of Timisoara, the *MECIPT Research Center* ("Electronic Computing Machine at the Politehnic Institute of Timisoara") is set up.
- 1961** At the *MECIPT Research Center*, the *MECIPT-1* is developed, as *the first digital computer built in an academic laboratory in Romania*. The MECIPT-1 was a first generation computer with advanced features (microprogramming). The initiators: I. Kaufmann, W. Lovenfeld and M. Fildan.
- 1963** First course on "Electronic Computers", at the Faculty of Electrical Engineering in Timisoara.
- 1963** Important research results and achievements in the domain of ferrite core memories. First Romanian ferrite memory produced.
- 1964** First group of students in "Computers" is set up.
- 1964** The Computer Science Department is set up. The first Head of department: *Professor Dr. Alexandru Rogojan*.
- 1966** First class of engineers specialized in "Electronic Computers" to graduate in Timisoara. The Ministry of Education grants the first "Electronic Computers" section in Romania, at the Politehnic Institute of Timisoara, due to the efforts of the staff collective coordinated by professor Rogojan.
- 1983** First implementation of the *Concurrent Pascal* Language Compiler (*Professor Dr. Aurel Soceneantu*).
- 1984** First *Pascal* Compiler for the Romanian FELIX computers is developed.
- 1990** The *Faculty of Automation and Computers* is set up at the Politehnic Institute of Timisoara.
- 1996** The Computer Science Department becomes "*Computer and Software Engineering Department*".



□ Department Board

Prof. Dr. Eng. Vladimir CREȚU
Prof. Dr. Eng. Mircea STRATULAT
Prof. Dr. Eng. Mircea POPA
Prof. Dr. Eng. Ioan JURCA
Prof. Dr. Eng. Ștefan HOLBAN
Prof. Dr. Eng. Marius CRIȘAN
Prof. Dr. Eng. Ionel JIAN
Assoc. Prof. Dr. Eng. Marius MINEA
Assoc. Prof. Dr. Eng. Ioana ȘORA
Lect. Dr. Eng. Mihai V. MICEA
Lect. Dr. Eng. Dan PESCARU

□ Academic Staff

Prof. Dr. Eng. Vladimir CREȚU: Data Structures and Algorithms, Data Structures and Algorithms Analysis 1 & 2, Real Time Programming Systems
Prof. Dr. Eng. Crișan STRUGARU: Input-output systems, Local Computer Networks, Peripheral Equipments, Computer Network Design
Prof. Dr. Eng. Mircea VLĂDUȚIU: Computer Architecture 1 and 2, Computer Engineering 1 and 2, Parallel Architectures, Computing Systems Testing
Prof. Dr. Eng. Ștefan HOLBAN: Artificial Intelligence Bases, Computing Systems Modeling and Simulation, Artificial Intelligence
Prof. Dr. Eng. Ioan JURCA: Object-oriented programming, Operating Systems 1 & 2, Software Engineering 1, Systems of programs for computer networks
Prof. Dr. Eng. Mircea STRATULAT: Digital Integrated Circuits 1 and 2, Large Scale Integrated Circuits, Semiconductor Memories, Digital Data Acquisition and Processing, Optical fiber transmissions, High-end interfaces and equipments
Prof. Dr. Eng. Ionel JIAN: Assembly Language Programming, Databases, Databases Design, Distributed Data Bases
Prof. Dr. Eng. Horia CIOCÂRLIE: Computer Programming 1, Fundamental Concepts of Programming Languages, Compiling techniques, Translator Design
Prof. Dr. Eng. Marius CRIȘAN: Theory of computation, Complex Computing Systems, Artificial Intelligent Systems, VLSI Design, Machine Learning
Prof. Dr. Eng. Mircea POPA: Microprocessor Based Systems, Digital Microsystems Design, Embedded Microcontroller Systems, Parallel Architectures, Embedded Systems
Assoc. Prof. Dr. Eng. Horațiu MOLDOVAN: Image Processing and Recognition
Assoc. Prof. Dr. Eng. Mircea - Dorel CHECEAN: Distributed Computing Systems
Assoc. Prof. Dr. Eng. Marius MINEA: Computer Programming 2
Assoc. Prof. Dr. Eng. Ioana ȘORA: Parallel Computing Algorithms
Lecturer Dr. Eng. Mihai V. MICEA: Introduction to Digital Signal Processing, Modern Digital Telecommunications, Advanced Digital Signal Processing
Lecturer Dr. Eng. Marian BOLDEA: Automated Speech Processing, Data Coding Techniques
Lecturer Dr. Eng. Dan PESCARU: Expert Systems
Lecturer Dr. Eng. Radu MARINESCU: Software Engineering 2
Lecturer Marius MARCU: Hardware Resources Handling and Auto-configuration Techniques, Multiprocessor Systems
Teaching Assist. Carmen HOLOTESCU: Internet technologies
Teaching Assist. Sorin BABII: Elements of Computer Graphics, Computer graphic systems
Teaching Assist. Adrian MIHĂILESCU: Analysis and Synthesis of Numerical Devices 1 and 2
Teaching Assist. Liliana JIAN: Using and Programming of Computers
Teaching Assist. Constantin COSOVAN: Quality in Information Technology, Computer Aided Integrated Production Systems
Teaching Assist. Doru TODINĂ: Computer Aided Design Techniques
Teaching Assist. Lucian PRODAN: Computer Engineering 1, Computer Architecture 1, Fault Tolerant Digital Systems
Teaching Assist. Mihai UDRESCU-MILOSAV: Computer Engineering 1, Computer Architecture 1
Teaching Assist. Sebastian FUCU: Local Area Networks, Input/Output Systems

Teaching Assist. Dan CHICIUDEAN: Digital Signal Acquisition and Processing, Semiconductor Memories, Evolved Interfaces and Equipments, Computer Aided Design Techniques

Teaching Assist. Razvan CIOARGA: Peripheral Equipments

Teaching Assist. Bogdan CIUBOTARU: Integrated Circuits 1

Teaching Assist. Mirella MIOC: Computer Use and Programming, Computer Programming 1

Teaching Assist. Dan COSMA: Operating Systems 1, Programming Systems for Computer Networks

Teaching Assist. Sorin SERAU: Assembly Language Programming

Teaching Assist. Antonius STANCIU: Computer Engineering 1 and 2, Computer Programming

Teaching Assist. Daniela STANESCU: Integrated Circuits 1 and 2

Teaching Assist. Ciprian CHIRILA: Data Structures and Algorithm Analysis, Compiling Techniques

Teaching Assist. Calin JEBELEAN: Data Structures and Algorithm Analysis, Compiling Techniques, Basics of Artificial Intelligence

Teaching Assist. Petre MIERLUTIU: Operating Systems 1 and 2

Teaching Assist. Cristina MARINESCU: Parallel Computing Algorithms, Object-Oriented Programming

Teaching Assist. Gabriela BOBU: Computer Programming 1 and 2

Teaching Assist. Versavia ANCUSA: Computer Engineering 1 and 2, Computer System Testing

Teaching Assist. Elena DOANDES: Computer Use and Programming

Teaching Assist. Sebastian GLITA: Computer Use and Programming, Data Structures and Algorithms

Teaching Assist. Petru MIHANCEA: Object-Oriented Programming, Operating Systems 1

Teaching Assist. Ovidiu PARVU: Computer Use and Programming, Computer Graphics

Administrative and Technical Staff

1	Maria DUMITROV	Secretary
2	Alexandru PETOFI	Secretary
3	Rodica CIOCARLIE	Engineer
4	Ovidiu OANCEA	Network Engineer
5	Ambroziu BALAN	Technician
6	Gheorghe BISORCA	Technician
7	Ioan KOVACS	Technician
8	Maria STOLOJESCU	Technician
9	Pavel GARTNER	Technician
10	Herta OPRISAN	Janitor
11	Maria CURESCU	Janitor
12	Floare GOLBAN	Janitor

Department's Main Research Directions

- Computer architectures, microprocessors, microcontrollers, multiprocessor and parallel structures (see *Research Center*)
- Reliability of computer systems (see *Research Center*)
- Distributed and real-time systems (see *Research Center*)
- Electrical machines and equipment testing with digital data acquisition and processing systems (see *Research Center*)
- Data bases and artificial intelligence (see *Research Center*)
- Object-oriented software engineering
- Digital signal, image and video processing, multimedia systems
- Digital telecommunication systems

Main Laboratories

A305 Laboratory	—	Data Structures and Algorithms; Real-Time Programming
B413-a Laboratory	—	Embedded Systems; Parallel Computer Architectures
B413-b Laboratory	—	Microprocessor and Microcontroller-Based Systems
B414 Laboratory	—	Local Area Networks; Computer Network Design; Peripheral and I/O Equipments
B418-a Laboratory	—	Computer Use and Programming
B418-b Laboratory	—	Database Systems
B419 Laboratory	—	Artificial Intelligence; VLSI Design
B424 Laboratory	—	Digital Signal Acquisition Systems
B425 Laboratory	—	Integrated Circuits; Semiconductor Memories

B426 Laboratory	—	Computer Use and Programming; Formal Verification
B513 Laboratory	—	Digital Signal Processing Laboratory ("DSPLabs")
B514 Laboratory	—	Object-Oriented Programming; Software Engineering
B515 Laboratory	—	Analysis and Synthesis of Digital Devices
B520 Laboratory	—	Computer Architecture; Computer Engineering
B521 Laboratory	—	"ROEDU" Network Operating Center Timisoara
B527 Laboratory	—	Computer and Software Engineering Research Lab
B528-a Laboratory	—	Operating Systems
B528-b Laboratory	—	Software Engineering; Distributed Programming
B529 Laboratory	—	Artificial Intelligence; Compiler Systems
B623 Laboratory	—	Database Systems; Assembly Language Programming
S4 Laboratory	—	Computer Programming
P14 Laboratory	—	Artificial Intelligence; Modeling and Simulations
P17 Laboratory	—	Computer Graphics
P18 Laboratory	—	Computer Programming

☐ PhD Advisors

1. Prof. Dr. Eng. Vladimir CRETU:

- Ionel MUSCALAGIU: *Concurrent Approach of the Constraint-Based Programming*
- Valer BOCAN: *Authentication Protocols in High-Security Networks*
- Calin JEBELEAN: *Contributions to the Automatic Re-Factorization Object-Oriented Code*
- Valentin PEPELEA: *Advances in the Design of Real-Time Kernels*
- Georgeta TURCU: *Contributions Data Exploration Methodology for Data Stores*
- Adrian NITA: *Cryptographic Algorithms*
- Adrian NAGY: *Advances on the Performance and Security Improvement of Data Store Exploiting*
- Dacian TUDOR: *Auto-Configurable Software Management in a GRID Environment*

2. Prof. Dr. Eng. Mircea VLADUTIU:

- Silviu Ioan BRANDUS: *Researches on Increasing the Protection of Information in Distributed Informatics Environments*
- Nica COCIUBA: *Researches on Real and Virtual Workspaces*
- Daniel-Samuil VOINA: *Researches on Digital Filter Implementation using Reconfigurable Architectures*
- Ciprian Cosmin COMLOSAN: *Researches on Information Routing Optimization for Wireless Computing Networks*
- Emanuel Ciprian SASU: *Researches on Error Testing Strategies for Computer Networks*
- Constantin Petre POPESCU-ROTOIU: *Researches on Increasing the Security Efficiency of Information in Reconfigurable Structures*

3. Prof. Dr. Eng. Crisan STRUGARU:

- Florin Fabian TRINC: *Multiprocessor Architectures for Banking System Transactions*
- Kristin TODOR: *Hierarchic Control and Programming Systems for Robots*
- Sebastian Onut FUICU: *Traffic and Congestion Control for Digital Communication Networks*

4. Prof. Dr. Eng. Ioan JURCA:

- Attila-Zoltan SANTA: *Distributed Application Development Methodologies using Reusable Components*
- Florin Cezar TOADER: *Modern Techniques for Computer Aided Education*
- Silviu Claudiu TRASCA: *Inter-Operability of Component-Based Programming Systems*
- Emanuel TUNDREA: *Software Instruments for Meta-Programming*
- Dan Calin COSMA: *Autonomous Distributed Systems*
- Ciprian Bogdan CHIRILA: *Generic Mechanisms for Expanding Object-Oriented Programming Languages*
- Radu IRHASIU: *Optimizing Attack Detection and Countermeasure Processes for Heterogeneous Computer Networks*
- Adrian Petru MIERLUTIU: *Computer Network-Specialized Operating Systems*
- Claudiu Stejarel VERES: *Improving Computer Network Performances by Traffic Analysis*
- Cristina-Margareta MARINESCU: *Quality Control of Distributed Software Systems*
- Petru Florin MIHANCEA: *Analysis of Object-Oriented Software Systems*

5. Prof. Dr. Eng. Mircea STRATULAT:

- Laurentiu IORDACONIU: *Advances on Computer Assisted Biorhythms Research*
- Daniela Gabriela MASTEI: *Contributions on Distributed System Performance Evaluation Methods*
- Cornel BARNA: *Advances on Image Recognition*
- Daniela Natalia STANESCU: *Advances on Using Steganography for Data Protection and Transmission*
- Horatiu Cristian DRAGAN: *Contributions on Using Modern Multimedia Techniques*
- Stevan MIHAJLOV: *Advances on Computer Data Security*
- Zsolt-Levente HUSZ: *Behavior-Based Controlled Reactive Systems*

6. Prof. Dr. Eng. Stefan HOLBAN:

- Helios MELENCU: *Contributions on Developing Large Scale Distributed Database Architectures*
- Razvan CHEVERESAN: *Methods of Execution Speed Improvement for Uniprocessor Systems*
- Adrian ZAFIU: *Advances on Formal Analysis of Software Applications*
- Nicolae-Teodor MELITA: *Data Analysis and Processing in Genetics Analysis*
- Dan CIRESAN: *Automatic Handwriting Recognition in Romanian Language*
- Ildiko-Angelica SZOKE: *Contributions on Fractal Usage for Pattern Recognition Techniques*
- Cosmin CERNAZEANU-GLAVAN: *Advances on Artificial Neural Networks Dimensioning*
- Eugenia LUCHIAN: *Expert Systems in Accounting Informatics*
- Adrian DELAMARIAN: *Program Analysis for Languages with Pointers*
- Ciprian CIUBOTARU: *Graph-Based Information Indexing using Data Mining Techniques*
- Gabriela BOBU: *Software Agents for GRID Development*
- Diana-Maria ANDONE: *Contributions on Development of eLearning Informational Techniques*

7. Prof. Dr. Eng. Ionel JIAN:

- Alexandrina-Mirela PATER: *Contributions on Object-Oriented Database Design*
- Sorin SERAU: *Contributions on Distributed Database Systems*
- Ileana Lia BRUDIU: *Object-Oriented Databases for Domestic Animal Evaluation and Selection*

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PhD Theses:

Author	Title	Scientific Supervisor	Date
Mihai V. Micea	Design and Implementation of Real-Time Systems for Critical Digital Signal Acquisition and Processing Applications	Prof. Dr. Eng. Vladimir Crețu	05.11.2004
Nina Holban	Researches on Photo-Chemically Catalyzed Oxide-Reduction Reactions of Residual Components with Sulphur and Heavy Metals Resulted from Mining Activities	Prof. Dr. Eng. Ilie Julean	19.03.2004
Marius G. Marcu	Researches on Thermal Phenomena on Integrated Circuit Wafers using Thermographic Imaging and Temperature Sensors	Prof. Dr. Eng. Mircea Vlăduțiu	22.04.2005
Sorin Babii	Researches on Improving the Performance of Neural Networks in Distributed Computing Environments	Prof. Dr. Eng. Vladimir Crețu	22.04.2005
Doru Todineă	Resource Allocation for Performance Improvement of Data Transmission over GPRS/EGPRS Mobile Telephony Networks	Prof. Dr. Eng. Ștefan Holban	04.02.2005

PhD Reports:

Author	Title	Scientific Supervisor	Date
Liliana Jian	Structure and Access Time Optimization of Relational Databases	Prof. Dr. Eng. Ioan Jurca	01.11.2004
Cornel Barna	Information Fusion under Uncertainty Conditions and Related Applications	Prof. Dr. Eng. Mircea Stratulat	20.12.2004
Laurenția Timar	Current problems and challenges in embedded software engineering (Report No. 1)	Prof. Dr. Eng. Mircea Vlăduțiu	15.09.2004

Dumitru Ostafe	Signal Analysis and Interpretation with Neural Networks	Prof. Dr. Eng. Ștefan Holban	07.07.2004
Dan Cireșan	Image Analysis and Processing for Pattern Recognition with Artificial Neural Networks	Prof. Dr. Eng. Ștefan Holban	23.09.2004
Doru Todincă	Resource Allocation for Performance Improvement of Data Transmission over GPRS/EGPRS Mobile Telephony Networks	Prof. Dr. Eng. Ștefan Holban	13.12.2004
Valer Bocan	Study on the Security Levels of Authentication Protocols (Report No. 2)	Prof. Dr. Eng. Vladimir Crețu	23.06.2004
Ionel Muscalagiu	Implementation of Constraint-Based Program Applications using Dedicated Environments. Case Studies (Report No. 3)	Prof. Dr. Eng. Vladimir Crețu	12.07.2004
Mihai Micea	Design and Implementation of Real-Time Systems for Critical Digital Signal Acquisition and Processing Applications	Prof. Dr. Eng. Vladimir Crețu	12.07.2004
Sorin Babii	Researches on Improving the Performance of Neural Networks in Distributed Computing Environments	Prof. Dr. Eng. Vladimir Crețu	25.03.2005
Marius Marcu	Researches on Thermal Phenomena on Integrated Circuit Wafers using Thermographic Imaging and Temperature Sensors	Prof. Dr. Eng. Mircea Vlăduțiu	07.03.2005
Udrescu Milosav	A hardware engineering view on dependable quantum computation: reliability improvement and simulated fault injection (Report No. 3)	Prof. Dr. Eng. Mircea Vlăduțiu	17.01.2005
Adi-Cristina Mitea	Comparative Study on the Performances of Relational and Object-Based Databases	Prof. Dr. Eng. Ionel Jian	31.01.2005
Valer Bocan	Single Sign-On Systems under Denial of Service-Type of Attacks. Case Study: the Liberty Alliance Project (Report No. 2)	Prof. Dr. Eng. Vladimir Crețu	24.01.2005

PhD Students, enrolled in 2004 – 2005:

Name of the PhD Student	Scientific Supervisor	Enrollment Date
Florin TRÂNC	Prof. Dr. Eng. Crișan Strugaru	Nov.2004
Petre POPESCU ROȚOIU	Prof. Dr. Eng. Mircea Vlăduțiu	Oct.2004
Cristina MARINESCU	Prof. Dr. Eng. Ioan Jurca	Oct.2004
Petru MIHANEA	Prof. Dr. Eng. Ioan Jurca	Oct.2004
Gabriela BOBU	Prof. Dr. Eng. Ștefan Holban	Oct.2004
Dan CIUBOTARU	Prof. Dr. Eng. Ștefan Holban	Oct.2004
Mihai CHEVEREȘAN	Prof. Dr. Eng. Ștefan Holban	Oct.2004
Adrian DELAMARIAN	Prof. Dr. Eng. Ștefan Holban	Oct.2004
Helios Dumitru MELENCU	Prof. Dr. Eng. Ștefan Holban	Oct.2004
Zsolt Levente HUSZ	Prof. Dr. Eng. Mircea Stratulat	Oct.2004
Dacian Florin TUDOR	Prof. Dr. Eng. Vladimir Crețu	Oct.2004

Books Published:

Author	Title	Publisher	ISBN
Mirela Amalia MIOC	Computer Programming Lab Workbook	SOLNESS, Timișoara-2004	973-729-016-X
Mirela Amalia MIOC	Computer Use and Programming	SOLNESS, Timișoara-2004	973-729-019-4

Ioan Jurca	System Programming in UNIX	Editura de Vest-2004	973-36-0395-3
Mircea Stratulat	Microelectronics	Editura Politehnica-2004	973-625-161-6
Mircea Stratulat	Digital Integrated Circuits	Editura Politehnica-2004	973-625-161-6
Holban S., Burciu A., Exner Robert	Intelligente Systeme in der optimierung von entscheidungen	KM Verlag, Germany-2004	3-9802437-6-1

Lectures from Invited Guests:

Author	Conference Title	Date
Prof. Cristoph Kirsch	Real –Time Programming Based on Schedule-Carrying Code	29.11.2004
Drd.ing.Valentin Pepelea	The Matrix Filesystem	17.11.2004
Drd.ing. Alexa Doboli	Systematic Development of Sensor Network Architectures	20.12.2004

D. RESEARCH AND DEVELOPMENT

D.1. "Politehnica" University of Timișoara Research Center in Automation and Computers (C.C.S.A.C.)

Head of Research Center: Professor Dr. Eng. Ștefan PREITL
"Politehnica" University of Timisoara
Faculty of Automation and Computers
2, V. Parvan Blvd., 300223 – Timisoara, Romania
Phone: +40-256-40-3229, -3230, - 3224
Fax: +40-256-40-3214
E-mail: spreitl@aut.utt.ro , <http://www.aut.utt.ro/~spreitl>

The main aim of the centre is to develop high-level research and development in the fields of automatic control, computer and software engineering, and information technology. It offers the research result in these fields to interested companies and organizations all over the world. The structure of the Research Centers:

- Research Division in Automation and Industrial Informatics
- Research Division in Computer and Software Engineering

D.1.1. Research Division in Automation and Industrial Informatics

Head of the division: Professor Dr. Eng., Dipl. Math. Radu-Emil PRECUP
"Politehnica" University of Timisoara
Faculty of Automation and Computers
2, V. Parvan Blvd., RO-300223 Timisoara
Phone: +40-256-40-3229, -3230, - 3224
Fax: +40-256-40-3214
E-mail: rprecup@aut.utt.ro, <http://www.aut.utt.ro/~rprecup>

□ R&D Team 1: Process Control

Contact person: Professor Dr. Eng. Ștefan PREITL (head of the team),
"Politehnica" University of Timisoara, Faculty of Automation and Computers
Department of Automation and Applied Informatics
2, V. Parvan Blvd., RO-300223 Timisoara,
Phone: +40-256-403229, Fax: +40-256-403214
E-mail: spreitl@aut.utt.ro , <http://www.aut.utt.ro/~spreitl>

Research team: Prof. Radu-Emil PRECUP,
Assist.Prof. Levente KOVACS, PhD student
Teaching Assist. Zsuzsa PREITL, PhD student
Teaching Assist. Simona GHEJU

Research fields:
— Control systems with conventional controllers;
— Advanced control systems. Intelligent control strategies.

Keywords:

Fuzzy logic control; sliding mode control; intelligent systems; stability analysis; sensitivity analysis; mobile robots; 2-DOF controllers; servo systems.

Activities:

- Development of conventional and advanced control systems;
- Development of adaptive control systems;
- Soft computing in industrial applications;
- Development of control systems for servo systems;
- Development of control systems for mobile robots.

Research and development results in 2004:

□ National grants and projects.

Project 1 Development of nonlinear controllers for mobile robots

The control of nonholonomic mobile robots has received much research interest during the past years due to the implications of nonholonomic constraints that represent constraints on the admissible control inputs for this class of systems. The majority of controllers for nonholonomic mobile robots are based on either cinematic models, or dynamic models. But, the dynamic models do not exploit the dynamics of the actuators, of the measuring devices and of the control equipment. This leads to the necessity of simple dynamic models. Since the development of tracking controllers based on the current approaches is rather complex, it is necessary to simplify the controller development for the further implementation. The control system performance enhancement is also necessary and this requires nonlinear controllers. These methodologies must be systematic and based on the stability analysis of the control systems involved. The sensitivity analysis of fuzzy control systems (FCSs) with respect to the parametric variations of the controlled plant is necessary because the behavior of these systems is generally reported as 'robust' or 'insensitive' without offering systematic analysis tools. The sensitivity analysis performed in the project is based on the idea of approximate equivalence between the FCSs and the linear control systems, in certain conditions.

Project 2 Conventional control systems: development and optimization

The development of design and tuning methods for conventional PI and PID controllers applicable to variable parameter plants is extremely actual by taking into account the large use of controllers with dynamics when coping with this type of applications. The 2DOF controllers are also widely used due to the good control system performance they can achieve with respect to both the reference and the disturbance inputs. In the framework of this project: CNCSIS grant code 190, type A, Development of control structures and controllers for positioning systems.

Project 3 Advanced control systems (fuzzy and hybrid neuro-fuzzy control systems, and sliding mode control systems)

Fuzzy control represents a relatively new domain of automatic control with exquisite potential applications in the control of plants that are subject to difficult analytical modeling. This is the case of anti-lock braking systems and of mobile robots. Sliding mode control systems represent a particular case of variable structure systems, and they have advantages such as relatively high robustness and good dynamic performance. In the framework of this project: CNCSIS grant code 189, type A, Development of new fuzzy controller structures based on sensitivity theory.

□ International grants and projects.

Project 1 Bilateral research contract, 2003-2005, with Budapest University of Technology and Economics (B.U.T.E.), Hungary, theme "Nonlinear systems and control in the field of power electronics", directors Prof. Ștefan PREITL (U.P.T., Romanian partner) and Acad. Istvan NAGY (B.U.T.E., Hungarian partner) (*The Agreement of the Second Romanian-Hungarian Session of Scientific and Technologic Co-operation, signed in Budapest, 07.03.2003, Appendix 2, pos. 16 Ro-18/2002, MCT no. C-18015 / 26.03.2003*). Nowadays nonlinear dynamic systems are in the focus of research interest of scientists. The co-operation during 2004 has embraced and oriented on on three topics in the broad field of the Application of Nonlinear Dynamics in Emerging Technologies. They are as follows: Servo systems; Feedback controlled nonlinear dynamic variable structure systems with single and multi loops in power electronics and motion control; Intelligent Space; Development of nonlinear controllers for mobile robots.

□ Relations:

Budapest University of Technology and Economics, Hungary (see the project described shortly before).
Budapest Tech, University of Applied Science, Hungary research cooperation in field of fuzzy logic and fuzzy control

□ Publications:

• Papers:

- [1] R.-E. Precup, St. Preitl - *Optimization Criteria in Development of Fuzzy Controllers with Dynamics*, Engineering Applications of Artificial Intelligence, Elsevier Science, ISSN 0952-1976, vol. 17, no. 6, pp. 661 – 674, 2004.

- [2] R.-E. Precup, St. Preitl, P. Korondi - *Development of Fuzzy Controllers with Dynamics Regarding Stability Conditions and Sensitivity Analysis*, Journal of Advanced Computational Intelligence and Intelligent Informatics, Fuji Technology Press, vol. 8, no. 5, pp. 499 – 506, 2004.
- [3] R.-E. Precup, St. Preitl, M. Balas, V. Balas - *Fuzzy Controllers for Tire Slip Control in Anti-lock Braking Systems*, IEEE International Conference on Fuzzy Systems – FUZZ – IEEE 2004, Budapest (Hungary), Proceedings, ISBN 0-7803-8354-0, CD-ROM, paper index 1311, 6 pp., 2004.
- [4] R.-E. Precup, St. Preitl, Cs. Szabo, P. Korondi, P. Szemes - *On the Development of Mamdani PI-Fuzzy Controllers for a Class of Mobile Robots*, IEEE 4th International Conference on Intelligent Systems Design and Application – ISDA 2004, Budapest (Hungary), Proceedings, ISBN 963-7154-29-9, vol. 1, pp. 277 – 282, 2004.
- [5] R.-E. Precup, St. Preitl - *Sensitivity Analysis of a Class of Fuzzy Controlled Mobile Robots*, 2nd IFAC Workshop on Advanced Fuzzy/Neural Control – AFNC’04, Oulu (Finland), Proceedings, editor: K. Leiviska, Finnish Society of Automation, Publication No IFAC WS 2004 0005 FI, Painoporssi Oy, ISBN 952-5183-22-X, pp. 115 – 120, 2004.
- [6] R.-E. Precup, St. Preitl, Cs. Szabo, P. Korondi, P. Szemes - *A Low Cost Solution for the Navigation Problem of Wheeled Mobile Robots*, Buletinul Științific al Universității “Politehnica” din Timișoara, Seria Automatică și Calculatoare, ISSN 1224-600X, vol. 49 (63), no. 1, pp. 77 – 82, 2004.
- [7] St. Preitl, R.-E. Precup, I.-B. Ursache, S. Gheju, Zs. Preitl - *Methodical Aspects Concerning the Study of Control Solutions for Plants with Slow Responses*, Buletinul Științific al Universității “Politehnica” din Timișoara, Seria Automatică și Calculatoare, ISSN 1224-600X, vol. 49 (63), no. 1, pp. 127 – 132, 2004.
- [8] R.-E. Precup, St. Preitl - *On the Stable Development of Fuzzy Controllers for Electro-Hydraulic Systems*, Buletinul Științific al Universității “Politehnica” din Timișoara, Seria Mecanică, ISSN 1224-6077, Special Issue, Proceedings of 6th International Conference on Hydraulic Machinery and Hydrodynamics – HMM2004, Tom 49 (63), pp. 387 – 392, 2004.
- [9] R.-E. Precup, St. Preitl - *Fuzzy Logic Decision Rules in Two Input-Single Output Linear Time-varying Systems Control*, 1st Romanian-Hungarian Joint Symposium on Applied Computational Intelligence – SACI 2004, Timisoara, Proceedings, ISBN 963-7154-26-4, pp. 70 – 69, 2004.
- **Submitted proposal** of a project as part of the Sixth European Framework in control of new electrical machines applied to robot control: “Entwicklung eines Modells und eines Regelalgorithmus für die Transverse Flux Machine”, partners: University of Bremen and companies from Germany and Romania.
 - **Research cooperation** in fields of mutual interest in the framework of The Bilateral Agreement “Politehnica” University of Timisoara – B.U.T.E. according to the following table (starting with 2003).

Names of research themes	Research teams “Politehnica” University of Timisoara	Research teams Budapest University of Technology and Economics
<i>Structures and algorithms for linear and nonlinear control algorithms. Control algorithms for power electronic circuits</i>	Fac. of Automation and Computers Dept. of Automation and Applied Informatics <i>Prof. Stefan PREITL,</i> Prof. Radu-Emil PRECUP, Lect. Florin DRĂGAN, Assist. Emil VOIȘAN, Teach.Assist. Zsuzsa PREITL	Faculty of Electrical Engineering and Informatics, Department of Automation and Applied Informatics <i>Acad. Istvan NAGY,</i> Prof. Ruth BARS
<i>Study of multivariable systems with applications in bio-systems and bio-medical systems</i>	Fac. of Automation and Computers Department of Automation and Applied Informatics <i>Prof. Stefan PREITL,</i> Prof. Radu-Emil PRECUP, Assist. Levente KOVACS	Faculty of Electrical Engineering and Informatics, Department of Control Engineering and Information Technology <i>Prof. Zoltan BENYO</i>
<i>Analysis and development of fuzzy controllers</i>	Fac. of Automation and Computers Department of Automation and Applied Informatics <i>Prof. Radu-Emil PRECUP,</i> Prof. Stefan PREITL, Teach.Assist. Simona GHEJU	Faculty of Electrical Engineering and Informatics Dept. of Telecommunications and Telematics (<i>Prof. Peter BARANYI</i>) Department of Automation and Applied Informatics (<i>Assoc.Prof. Peter KORONDI</i>)

- **Research cooperation** in fields of fuzzy logic and Fuzzy Control in frame of The Bilateral Agreement “Politehnica” University of Timisoara – “Budapest Tech” University of Applied Science, Hungary (starting with 2003).
- **Prof. Dr. Ing. Stefan Preitl** is Vice president of The Romanian Society for Automation and Technical Informatics (SRAIT), member of The IFAC Technical Committee on Control Design (2002-2005), Honorary member of The Hungarian Fuzzy Association, Honorary professor of “Budapest Tech” University of Applied Science, Hungary.
- **Prof. Dr. Ing. Radu-Emil Precup** is member of The IFAC Technical Committee on Cognition and Control (2002-2005).

Perspectives:

Perspective domains:

- New methods for the algorithmic design of conventional and intelligent controllers (fuzzy, neural, sliding mode);
- Methods for computer-aided design of control systems;
- Control solutions in the fields of: power systems, servo systems, electrical drives, general industrial automation, mobile robots.

Strategic priorities:

- Control systems ensuring low sensitivity;
- Tools for computer-aided design of 2-DOF controllers;
- Low cost solutions to solve control problems dedicated to mobile robots;
- Methods and tools to enable the systematic development of fuzzy control systems.

<p>❑ R&D Team 2: Applied Informatics in Healthcare and Process Control Domains</p>

Contact person: **Prof. Vasile STOICU-TIVADAR** (head of the team),
 "Politehnica" University of Timisoara, Faculty of Automation and Computers
 Department of Automation and Applied Informatics
 2 V. Parvan Blvd., RO-300223 Timisoara
 Phone: +40-256-403234
 Fax: +40-256- 403214
 E-mail: tivadar@aut.utt.ro, <http://www.aut.utt.ro/~tivadar>

Research team: Prof. Dr. Vasile STOICU-TIVADAR
 Assoc.Prof. Lăcrimioara STOICU-TIVADAR
 PhD. Student Dorin BERIAN
 Teaching assist. Bogdan SOLGA
 Teaching assist. Ioan-Daniel ARDELIAN

Research fields:

- Software applications for integrated healthcare networks, telemedicine software, software applications in public administration

Keywords: distributed medical informatics; applied informatics; telemedicine; e-administration.

Activities:

- Study and development of alternative solutions for integrated healthcare networks based on Microsoft.NET and JAVA platforms;
- Development of mobile applications in medical informatics;
- Development of distributed document flow– based software for the Timis County Council administration

Research and Development results in 2004:

❑ **Relations:**

University Milano-Bicocca, Italy: prof. Francesco Sicurello, and Giancarlo Mauri

Purpose: preparing and starting a bilateral program that has as objective to implement a telemedicine Network with the technical support of our research group. Medics from Timiș County Hospital and from 2 Italian hospitals from Treviso and Florence will use this network.

Activities in 2004: two meetings, one in Desio, Italy, one in Timișoara, for preparing this project.

Results: the definition of the basic structure of the network, preparation of the project documents, evaluation of the needs (technical, financial, staff).

❑ **Publications:**

- [1] L. Stoicu-Tivadar, V. Stoicu-Tivadar, C. Kormos, S. Oprean, *Contributions of Medical Informatics to Health*, EFMI, IOS Press, June, 2004, ISBN 1-58603-435-9, pg. 49-51
- [2] L. Stoicu-Tivadar, V. Stoicu-Tivadar, *Human-Computer Interaction Reflected in the Design of User Interfaces for General Practitioners*, Satellite Workshop on RTD Potential in Central and Eastern Europe for Building Information Society in Healthcare, Euromise 2004, Prague, April 2004
- [3] V. Stoicu-Tivadar, S. Oprean, A. Miron, C. Minciună, *Several aspects of the migration toward the Microsoft.NET technology for an integrated healthcare information system*, Scientific Bulletin of „Politehnica” University of Timișoara, Transactions on Automatic Control and Computer Science, Vol.49 (63), 2004, ISSN 1224-600X, Timișoara, 2004
- [4] D. Berian, *Technical Aspects in Development of a Software Application Used in the Framework of a GPs National Level Network*, Buletinul Științific al Universității "Politehnica" din Timișoara, Romania, Seria Automatica și Calculatoare, Vol. 49(63) 2004, No. 2, ISSN 1224-600X, pp. 87-92
- [5] L. Stoicu-Tivadar, C. Kormos, *Solution for Health Care Information System Architecture*, Buletinul Științific al UPT, Seria Automatică și Calculatoare Vol. 49 (63) No.2, 2004, ISSN 1224-600X, pg. 81-86
- [6] N. Robu, V. Stoicu-Tivadar, I. Silea, L. Stoicu-Tivadar, D. Berian, A. Albu, *Incremental Development of a Regional E-administration Network with Academic Expertise*, European Conference E_COMM_LINE 2004 Proceedings, Gh. M. Sandulescu et al. (Editors), ISBN 973-0-03671-3, București
- [7] L. Stoicu-Tivadar, C. Kormos, *Java based technologies for communication between health information systems*, New IT Tools in Medicine and Life Sciences, MEDINF2004, 27-th Medical Informatics Conference, Tg. Mures, 15-16 Oct. 2004, pg. 15-16
- [8] V. Stoicu-Tivadar, L. Stoicu-Tivadar, D. Berian, *Perspectivă tehnologică asupra dezvoltării sistemului informatic integrat MedINS/MediNET pentru medici de familie*, Seminarul de prezentare a rezultatelor proiectului Rețeaua de dispensare santinelă MediNET, București, aprilie 2004, ISBN 973-602-051-7, pg. 147-161

- *Assoc. prof. dr. eng. Lăcrimioara Stoicu-Tivadar is Member of the Board of the European Federation of Medical Informatics, President of the Working Group „Medical Informatics in Countries in Transition” (since October, 2003).*

❑ **Perspectives:**

1. Perspective domains:

- Home automation, embedded systems, architectural patterns;
- Distributed information systems, mobile applications, peer-to-peer architecture, Microsoft.NET technology, e-administration;
- Mobile applications.

2. Strategic priorities:

Researches:

- distributed architectures and appropriate technological solutions,
- mobile applications and related technologies,
- interoperability standards in distributed medical informatics;

Tools:

- for statistical processing of the medical data,
- for rapid development of embedded applications;

Solutions:

- for integrated healthcare networks and interoperability,
- for e-administration (document flow and data collecting).

□ R&D Team 3: Advanced Control of AC Drives

Contact person: Prof. Gheorghe-Daniel ANDREESCU, (head of the team)
“Politehnica” University of Timisoara, Faculty of Automation and Computers
Department of Automation and Applied Informatics
2, V. Parvan Blvd., RO-300223 Timisoara,
Phone: +40-256-403245
Fax: +40-256-403214
E-mail: dandre@aut.utt.ro, <http://www.aut.utt.ro/~dandre>

Research team: Prof. Gheorghe-Daniel ANDREESCU
Prof. Toma-Leonida DRAGOMIR,
Prof. Dr. Ing. Nicolae ROBU,
Dipl.eng. Adrian POPA,
Assist.Prof. Tiberiu IONICĂ;
Strong cooperation with the team of Prof. Ion BOLDEA

Research fields:

- Advanced control of AC drives: Sensorless control of IPMSM; Applications to Electric and hybrid vehicles.

Keywords:

Sensorless direct torque and flux control; State and disturbance observers; Variable structure flux-observer, Fuzzy-interpolating implementation, Signal injection; Real-time implementation; Interior permanent magnet synchronous machines (IPMSM); Electric and hybrid vehicles (EHV).

Activities:

- Development of Sensorless control system from zero speed for starter-generator with IPMSM for EHV;
- Development of Integrated sensors of rotor position and speed based on signal injection for IPMSM drives;
- Real-time implementation and testing using dSpace for Sensorless control system of PMSM drive.

Research and Development results in 2004:

□ National projects:

Grant CNCISIS 143A/2004: Title: *Sensorless control system from zero speed with direct torque and flux control (DTFC) for starter-generator with IPMSM for EHV (EHV-Sensorless).*

Results: A prototype of IPMSM at 42 Vdc for EHV has been designed, simulated and manufactured. A new EHV-Sensorless control system has been proposed, including: 1) Development of DTFC with space vector modulation using sliding mode. 2) New rotor position observer with signal injection and phase-sensitive vector-filter including zero speed, with initial position identification. 3) New intelligent observer for flux, torque and speed, starting from zero speed, with combined structure: using signal injection at low speed, and respectively, based on induced voltage at medium-high speed, with a smooth transition. This sensorless control system has been elaborated and validated by digital simulation. In advance, good preliminary experimental results in complex regimes have been obtained using a dSpace real-time platform within cooperation program between UPT (Prof. Ioan Boldea) and the Institute of Energy Technology, Aalborg University, Denmark (Prof. Fred Blaabjerg). The research results have been published in international journals and conference proceedings as ISI, INSPEC, IEEE papers.

□ Publications:

- [1] G.D. Andreescu, A. Popa - *Dynamic estimation of speed, acceleration and equivalent load torque in servo-motion control with only position sensor*, Revue Roumaine des Sciences Techniques, Serie Electrotechnique et Energetique, Romanian Academy, Publishing House of the Romanian Academy, ISSN 0035-4066, tome 49, no. 3, pp. 395 – 404, July/Sept. 2004.
- [2] G.D. Andreescu - *Model reference adaptive observer for sensorless control of permanent magnet synchronous motor drives*, Revue Roumaine des Sciences Techniques, Serie Electrotechnique et Energetique, Romanian Academy, Publishing House Romanian Academy, ISSN 0035-4066, tome 49, no. 1, pp. 85 – 98, Jan./Mar. 2004.
- [3] G.D. Andreescu, R. Rabinovici - *Torque-speed adaptive observer and inertia identification without current transducers for control of electric drives*, Proceedings of the Romanian Academy Series A:

- Mathematics, Physics, Technical Sciences, Information Science, Romanian Academy, Publishing House of the Romanian Academy, ISSN 1454-9069(p), 1454-8267(e), vol. 5, no. 1, pp. 89 – 95, Jan./April 2004.
- [4] G.D. Andreescu, I. Boldea - *Integrated sensors of rotor position and speed based on signal injection for IPM-synchronous motor drives*, Proceedings of 8th IEEE Int. Conf. on Intelligent Engineering Systems INES 2004, Eds.: S. Nedevschi, I.J. Rudas, Ed. U.T.Press, Cluj-Napoca, ISBN 973-662-120-0, pp. 371 – 375, Sept. 2004.

Perspective domains:

- Real-time control using LabView (LabWindowsCVI);
- Applications with FPGA using VHDL;
- Automotive control;
- Advanced control of electric drives, Robotics.

Strategic priorities:

- Control of EHV and Automotive;
- dSpace platform, LabView real-time platform;
- Advanced control of electric drives, Automotive, Robotics, Mechatronic systems.

□ R&D Team 4: System Modeling, Identification and Simulation. Adaptive Control. Neuro-Fuzzy Systems. Wind Energy Conversion Systems
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Contact person: Professor Octavian PROȘTEAN
Dept. of Automation and Applied Informatics
Timișoara, 2 V. Parvan Blvd.,
e-mail: prostean@aut.utt.ro
Tel.: +40-256-403213.

Members: Prof. Nicolae BUDIȘAN,
Assoc.prof. Ioan FILIP,
As. Iosif SZEIDERT,
As. Cristian VAȘAR

Research fields:

Modeling, identification and simulation of systems, neural networks and fuzzy systems, wind energy conversion systems, unconventional energetics

Keywords:

Modeling, identification, simulation, parameter and state estimators, neural networks, fuzzy systems, adaptive control, neuro-fuzzy systems, automatic control strategies, wind aggregates, asynchronous generators, renewable resources energetic

Activities:

Modeling and simulation of wind energy conversion systems (WECS). Development of control systems for WECS.

Publications:

- [1] Dordea T., Budisan N., Prostean O., Madescu G., Craiovan D., "Low Speed Induction Generators for gearless Windmills", 1st World Wind Energy Conference and Exhibition. Berlin, 2002.
- [2] Szeidert I., Prostean O., Budisan N., Filip I. "Two axes modelling of induction generators for windmills", 2002 Global Windpower Conference and Exhibition, Paris, 2002.
- [3] Szeidert I., Prostean O., Filip I., Budisan N., "Considerations regarding the modelling of wind energy conversion systems", Simpozion Electrotehnica si Energetica, Zilele Academice Timisorene, 22-23 mai 2003
- [4] Budisan N., "Contributii romanesti privind echipamentele electrice ale agregatelor aeroelectrice", Simpozion Electrotehnica si Energetica, Zilele Academice Timisorene, 22-23 mai 2003 (in romanian)
- [5] Budisan N., Gyulai F., Prostean O., Hentea T., "Speed control strategies for fixed blade turbine windmills" Global Windpower 2004, Conference Proceedings, March 29-31, 2004, Chicago, Illinois, USA.
- [6] Prostean O., "Self-Tuning Control Systems", "Orizonturi Universitare" Publishing House, 2004.

Perspectives:

1. Perspective domains:

The use of advanced control methods for WECS and unconventional energetics.

2. Strategic priorities:

Advanced control systems in the field of unconventional energetics. Development of several advanced control structures (neural networks, fuzzy control) for WECS.

D.1.2. Research Division in Computer and Software Engineering

Head of the division: Professor Dr. Eng. Marius CRISAN

"Politehnica" University of Timisoara
Faculty of Automation and Computers
2, V. Parvan Blvd., 300223 – Timisoara, Romania
Phone: +40-256-40-3254
Fax: +40-256-40-3214
E-mail: crisan@cs.utt.ro

The division has six research teams, according to specific research topics.

□ R&D Team 1: Computer Architectures

Contact Person: Professor Dr. Crisan STRUGARU

Tel: +40 256 403257
E-mail: secretariat@cs.utt.ro

Members: Professor Dr. Mircea STRATULAT,
Professor Dr. Mircea POPA,
Lecturer Marius MARCU,
Assist. Daniela STANESCU

Research Fields:

Microprocessors and microcontrollers, multiprocessing systems, embedded systems, transputers and parallel computing architectures, personal computers, data acquisition and signal processing, turnkey industrial equipment, local area networks, mobile communications hardware and software, image and voice interfaces, specialized high-speed processors.

Current Activities and Prospects:

- (a) "Methods of Temperature and Power Reduction in Embedded Systems and their Applications" (CNCSIS R&D Grant).
- (b) Development of unconventional computer architectures.
- (c) New interfaces based on image and speech recognition.

Publications:

- [1] Popa Mircea, Marcu Marius, Fuicu Sebastian, Jucu Adorian, "Microcontroller Based Programmable Logic Controller", Buletinul Stiintific al Univ. "Politehnica" Timisoara, Seria Automatica si Calculatoare.
- [2] Popa Mircea, Igrat Radu, Lupu Cristian, Stanescu Daniela, "Webpic – An Embedded Internet Solution", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [3] Popa Mircea, Marcu Marius, Popa Anca, "A Microcontroller Based Data Acquisition System with USB Interface", Proceedings Of ICEEC'04, The IEEE International Conference On Electrical, Electronic and Computer Engineering, Cairo, Egypt.
- [4] Popa Anca, Gruescu C., Popa Mircea, Uscatescu M., "Remote Controlled Autonomous Mobile Robot Equipped with Optoelectronic Devices", Romanian Journal of Optoelectronics, Vol. 12, Issue 3.
- [5] Popa Mircea, "16 Bit Microcontroller Solutions for Controlling DC Motors", Proceedings of ICC'04, The 5th International Carpathian Conference Control, Zakopane, Poland, 25-28 May.

- [6] Popa Mircea, Stanescu Daniela, "A Node for Serial Communications in Microcontroller Networks", Proceedings of ECI 2004, The 6th International Scientific Conference on Electronic Computers and Informatics, Kosice, Slovakia, 22 – 24 September.
- [7] Popa Mircea, "A Flexible and General Solution for Reconfiguring Pipeline Computing Systems", Proceedings of the International Conference on Computer Systems and Technologies, COMPSYTECH'04, Rousse, Bulgaria, 17 – 18 June.
- [8] Popa Mircea, "Solutions for Increasing the Number of PC Parallel Port Control and Selecting Lines", Proceedings of the International Conference on Computer Systems and Technologies, COMPSYTECH'04, Rousse, Bulgaria, 17 – 18 June.
- [9] Miha Ioana, Stratulat Mircea, Miha Ioan, "EKG Signal Processing", The 6th International Conference on Technical Informatics: CONTI2004, Timisoara, 2004.
- [10] Stratulat Mircea, Miha Ioana, Miha Ioan, Stanescu Daniela, Mastei Daniela, "Digital Signal Processing For ECG Signal", International Conference on Computers Communications, ICCS 2004, Oradea, 2004.

□ R&D Team 2: Computer Systems Reliability

Contact Person: **Professor Dr. Mircea VLADUTIU**

Tel: +40 256 403258

E-mail: mvlad@cs.utt.ro

Members: Assist. Lucian PRODAN,
 Assist. Mihai UDRESCU

Research Fields:

Fault tolerant computer systems configuration, concurrent engineering, standardization of tools for increasing the testability, level improvement of availability, maintainability and reliability of computer systems.

Current Activities and Prospects:

- (a) Watchdog processor for reliability increasing of computers
- (b) Selftesting development concepts.
- (c) Selfchecking development tools.
- (d) Digital system testing based on data compression (transitions counting syndrome, linear feedback shift register).
- (e) Equipment structures with fault tolerant capability (error detecting and correcting codes, triple modular redundancy).
- (f) "Bio-Inspired Design of Applications on Reconfigurable Platforms" (CNCSIS R&D Contract).

Publications:

- [1] Prodan Lucian, Udrescu Mihai, Vladutiu Mircea, "Self-Repairing Embryonic Memory Arrays", IEEE NASA/DoD Conference on Evolvable Hardware, Seattle Wa, Usa, June 24 - 26, 2004.
- [2] Udrescu Mihai, Prodan Lucian, Vladutiu Mircea, "Using HDLS for Describing Quantum Circuits: A Framework for Efficient Quantum Algorithm Simulation", 1st ACM Conference on Computing Frontiers, Ischia, Italy, April 14 - 16, 2004.
- [3] Marcu Marius, Vladutiu Mircea, "A Genetic Algorithm for Thermal Image Deconvolution", Iranian Journal of Electrical and Computer Engineering, Summer-Fall 2004, Vol 3, No 2, IJECE.
- [4] Vladutiu Mircea, Marcu Marius, "Printed Circuit Boards Testing Using Thermal Signatures", CONTI 2004 Timisoara.
- [5] Cosovan Constantin, Prostean Gabriela, "Manufacture Ordering by Using Combinatorial Methods", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [6] Cosovan Constantin, Cosovan Ioana, "Quality and Standardization in Information Technology", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [7] Prostean Gabriela, Pugna A., Cosovan Constantin, "Strategy of Control Developed for Project Management Intelligent System Manufacturing and Management in 21st Century", Mo-74 16-17sept. Ohrid, Republic Of Macedonia.

□ **R&D Team 3: Distributed and Real-Time Systems**

Contact Persons: **Professor Dr. Ioan JURCA**

Tel: +40 256 403256

E-mail: ionel@cs.utt.ro

Professor Dr. Vladimir CRETU

Tel: +40 256 403255

E-mail: vcretu@cs.utt.ro

Members:

Professor Dr. Horia CIOCARLIE,

Lecturer Dr. Radu MARINESCU,

Lecturer Carmen HOLOTESCU,

Teaching Assist. Sorin SERAU,

Teaching Assist. Dan COSMA

Research Fields:

Distributed and real-time systems for dedicated applications.

Current Activities and Prospects:

- (a) Programming and distributed processing media.
- (b) Network protocols.
- (c) Designing, implementing and testing real-time executives for systems based on various microprocessors.
- (d) Implementing and testing real-time executives for dedicated applications.
- (e) Extending real-time concepts in distributed applications.
- (f) "Integrating Enterprise Applications into GRID-Type Networks Using Service-Oriented Software Architectures" (R&D Contract).
- (g) "Methods, Techniques and Structures for Adaptive Computing Applications in Data Communications Field" (CNCSIS R&D Contract).

Publications:

- [1] Ciocarlie Horia, "The Characteristic Features of a Concurrent Language Implementation in a Distributed Environment", International Conference on Computational Intelligence 2004, Istanbul.
- [2] Ciocarlie Horia, "A Mechanism of Visibility Control", International Conference on Signal Processing 2004, Istanbul.
- [3] Ciocarlie Horia, "Informatizarea Administratiei Publice. Perspective si Solutii", Colocviu International "Eurpoa intre cei 15 si cei 25", Academia Romana, Filiala Timisoara si Univ. de Vest, Timisoara, 2004.
- [4] Genest B., Minea Marius, A. Muscholl A., Peled D., "Specifying and Verifying Partial Order Properties Using Template Mscs.", Proceedings of the 7th International Conference on Foundations of Software Science and Computation Structures, LNCS Vol. 2987, Pp. 195-210, Springer 2004.
- [5] Cosma Dan, "Towards Building Feature-Oriented Distributed Systems", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [6] Borlea Sabina, Cosma Dan, "A Framework for Feature Migration", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [7] Cosma Dan, Cirstea Calin, Stefanut Loredana, "SOLIST – A Java-Based Application for Educational Internet Polls", Buletinul Stiintific al Univ. "Politehnica" Timisoara, Seria Automatica si Calculatoare.
- [8] Marinescu Radu, "Detection Strategies: Metrics-Based Rules for Detecting Design Flaws", Proceedings of the 20th IEEE International Conference on Software Maintenance (ICSM 2004), IEEE Computer Society Press, Pag. 350 -359.
- [9] Marinescu Radu, Mihancea P., "Towards the Optimization of Automatic Detection of Design Flaws in Object-Oriented Software Systems", Metrics 2004.
- [10] Marinescu Radu, Ratiu Doru, "Quantifying the Quality of Object-Oriented Design", Proc. of the 11th IEEE Working Conference on Reverse Engineering, Delft, IEEE Computer Society Press, pp. 192 -201.
- [11] Ratiu D., Girba T., Ducasse S., Marinescu Radu, "Using History Information to Improve Design Flaws Detection", Proceedings of the 8th European Conference on Software Maintenance and Reengineering (CSMR 2004), IEEE Computer Society Press, Pag. 223-232.

- [12] Girba T., Ducasse S., Marinescu Radu, Ratiu Doru, "Identifying Entities That Change Together", Proceedings of 9th IEEE Workshop on Empirical Studies of Software Maintenance (WESS 2004), Chicago 2004.

□ R&D Team 4: Electrical Machines and Equipment Testing with Digital Data Acquisition and Processing Systems

Contact Persons: **Professor Dr. Vladimir CRETU**
Tel: +40 256 403255
E-mail: vcretu@cs.utt.ro

Members: Professor Dr. Marius BIRIESCU,
Lecturer Dr. Mihai V. MICEA,
Lecturer Dr. Ioana SORA,
Dr. Ioan MADESCU,
Assist. Martian MOT

Research Fields:

Electrical machines and equipment testing, data acquisition and conditioning systems, digital signal processing (DSP).

Current Activities and Prospects:

- (a) Testing, modeling and monitoring in the domain of electric machines and equipments using data acquisition and processing systems.
- (b) Design and implementation of digital signal conditioning, acquisition and data processing systems.
- (c) Data recording and processing programs for transient regime analysis of electrical machines.
- (d) Optimal design of electrical machines.
- (e) Virtual instrumentation systems.
- (f) "Modeling, Design and Development of Real-Time Systems for Critical Applications of Data Acquisition, Signal Processing and Embedded Control" (CNCSIS R&D Contract).

Publications:

- [1] Micea Mihai, Cretu Vladimir, Patcas Lucian, "Program Modeling and Analysis of Real-Time and Embedded Applications", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [2] Micea Mihai, Cretu Vladimir, "Non-Preemptive Execution Support for Critical and Hard Real-Time Applications on Embedded Platforms", Proceedings of the 2004 International Symposium on Signal, System and Electronics, ISSSE'04, Linz, Austria, Aug. 2004.
- [3] Micea Mihai, "A Real-Time Compact Kernel for Critical Applications on Embedded Platforms", Proceedings of the 7th International Conference on Development and Application Systems, DAS2004, Suceava, Romania, May 2004.
- [4] Sora Ioana, "Defining Composable Components in Multi-Flow Architectures Through Structural Constraints", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [5] Cretu Vladimir, Bocan V., "Security and Denial of Services Threats in GSM Networks", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [6] Cretu Vladimir, Muscalagiu Ion, "Asynchronous Searching Algorithms Seen from the Perspective of Algorithms' Ending Detection Technique", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [7] Babii Sorin, Cretu Vladimir, "A Distributed Algorithm for Neural Network Training in a Network of Computers", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [8] Sora Ioana, Cretu Vladimir, Verbaeten Pierre, Berbers Yolande, "Automating Decisions in Component Composition Based on Propagation of Requirements", Computer Science (LNCS) Nr. 2984, Springer Verlag, 2004, Pag. 374-388.

□ R&D Team 5: Data Bases and Artificial Intelligence

Contact Persons: **Professor Dr. Ionel JIAN**

Tel: +40 256 403259
E-mail: jian@cs.utt.ro

Professor Dr. Stefan HOLBAN

Tel: +40 256 404060
E-mail: holban@cs.utt.ro

Members: Professor Dr. Marius CRISAN,
Teaching Assist. Liliana JIAN,
Lecturer Dr. Dan PESCARU,
Lecturer Dr. Sorin BABII

Research Fields:

Distributed data bases, artificial intelligence, neural networks, cognitive systems.

Current Activities and Prospects:

- (a) Designing and implementing relational databases with complex network structures.
- (b) Pattern recognition in medicine and chemistry.
- (c) Development of a hybrid expert system (rules + neural network) for research in infectious diseases.
- (d) Implementing complex distributed databases and Internet access to databases in companies, banks, and local administration.
- (e) Interdisciplinary cooperation for expert and cognitive systems development.
- (f) "E-Learning Application-Oriented Intelligent Agent with Pedagogic Functions" (R&D Contract).
- (g) "Responsibility and Anticipation". Multinational R&D Project with UE financing, type STREP (Specific Targeted Research Project), focusing on the design and implementation of an anticipative-type intelligent agent, able to communicate and interact with human users in a dynamic environment.

Publications:

- [1] Jebelean Calin, "Automatic Detection of Missing Abstract Factory Design Pattern in Object-Oriented Code", International Conference on Technical Informatics, CONTI, Politehnica University, Timisoara, May 2004.
- [2] Chirila Ciprian Bogdan, Crescenzo Pierre, Lahire Philippe, Pescaru Dan, Tundrea Emanuel, "Factoring Mechanism of Reverse Inheritance", International Conference on Technical Informatics CONTI 2004, Computer Science & Software Engineering Department, Timisoara, Romania, May 2004.
- [3] Tundrea Emanuel, Lahire Philippe, Parigot Didier, Ciprian-Bogdan Chirila, Pescaru Dan, "Smartfactory - An Implementation of the Domain Driven Development Approach", SACI 2004, 1st Romanian-Hungarian Joint Symposium on Applied Computational Intelligence, Timisoara, Romania, May 25-26, 2004.
- [4] Pescaru Dan, Lahire Philippe, Chirila Ciprian, Tundrea Emanuel, "A Better Representation for Class Relationships in UML Using OFL Meta-Information", 2004 IEEE-TTTC International Conference on Automation, Quality & Testing, Robotics AQTR 2004 (Theta 14), Cluj-Napoca, Romania, May 13-16, 2004.
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- [8] Pescaru Dan, Mocofan Muguras, "Efficient Implementation for Image Processing Algorithms", 6th International Conference on Technical Informatics - CONTI 2004, Timisoara, Romania, 2004, Vol. 49(63)/2004 No.4, Pag. 217-222, May 27-28.

- [9] Pescaru Dan, Mocofan Muguras, "An Easy-to-Use Distributed Framework for Image Processing", Facta Universitatis (NIS), Series: Electronics and Energetics, Volume 17, Issue No. 3, Nis, Yugoslavia, Pp. 453-464, December 2004.
- [10] Cernazanu C., Ciresan Dan, Holban Stefan, "EKG Signal Recognition with Neural Networks", 1st Romanian-Hungarian Joint Symposium on Applied Computational Intelligence Timisoara, Romania, May 25-26, 2004.
- [11] Gyorodi C., Gyorodi R., Holban Stefan, "A Comparative Study of Association Rules Mining Algorithms", 1st Romanian-Hungarian Joint Symposium on Applied Computational Intelligence, Timisoara, Romania May 25-26, 2004.
- [12] Todinca Doru, Holban Stefan Perry Philip, Murphy John, "Fuzzy Logic Based Admission Control for GPRS/EGPRS Networks", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [13] Ciresan Dan, Cernazanu Cosmin, "Linguistic Modeling for Automatic Speech in Romanian Language", Development and Application Systems, 27-29 May 2004, Suceava.
- [14] Ciresan Dan, "Image Segmentation Methods Based on Natural Clustering Algorithms, Usable for Unconstrained Handwriting Recognition", Symbolic and Numeric Algorithms for Scientific Computing, 26-30 September, 2004, P131-140.
- [15] Todinca Doru, "Applying Fuzzy Logic to Admission Control In GPRS/EGPRS Networks", Proceedings of 1st Romanian - Hungarian Joint Symposium on Applied Computational Intelligence, SACI 2004, Pp. 133-142, Timisoara, Romnia, Mai 2004.
- [16] Todinca Doru, Graja H., Perry P., Murphy J., "Novel Admission Control Algorithm For GPRS/EGPRS Based on Fuzzy Logic", Proceedings of IEE 5th International Conference on 3G Mobile Communications Technologies 3G3004, Londra, UK, Octombrie 2004.
- [17] Mitea A. C., Jian Ionel, "A Physical Design Methodology For Databases", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare
- [18] Borza Sorin, Jian Ionel, "Objectual Implementation for Relational Database in the Object- Relational Software", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [19] Pater M., Jian Ionel, "Object Oriented Representation of Relational Database", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [20] Jian Liliana, "A Study on the Transmission of Sets of Records to the Oracle Server", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [21] Jian Liliana, Jian Lucian, "The Influence of Indexing on Record Reading and Writing Time in Database Tables", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [22] Jian Liliana, Jian Lucian, "About Object-Relational Database Implementations Using Oracle", Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Seria Automatica si Calculatoare.
- [23] Crisan Marius, "On Shannon, Fisher, and Algorithmic Entropy in Cognitive Systems", 1st Romanian-Hungarian Joint Symposium on Applied Computational Intelligence, SACI-2004, Timisoara.
- [24] Crisan Marius, "Beyond Observer and Observed", International Conference on Dynamic Ontology, Trento, Italy, 8-11 September 2004.

<p>□ R&D Team 6: Data and Vocal Communications</p>

Contact Persons: **Professor Dr. Crisan STRUGARU**
 Tel: +40 256 403257
 E-mail: secretariat@cs.utt.ro

Members: Lecturer Dr. Marian BOLDEA

Research Fields:

Data transmission, automatic recognition and synthesis of vocal signal.

Current Activities and Prospects:

- (a) Man-machine vocal dialogue.
- (b) Computational linguistic resources development.
- (c) Automatic recognition of speech in Romanian language.
- (d) Multilingual databases.

□ Research and Development Partnerships

1. SIEMENS VDO, Timisoara, Romania
 - Automotive control, embedded systems
 - Training courses for employees, diploma projects
 - A dedicated Master's program (at faculty level)
2. MOTOROLA/FREESCALE SEMICONDUCTOR:
 - Digital signal processing and embedded applications, data communications
 - Didactic activities (courses and lab workshops), diploma, Master's and doctoral theses, scientific papers and application notes
 - Application projects with students
 - Technical, equipment and software support; donations and sponsorships
3. LASTING SYSTEMS, Timisoara:
 - Common R&D projects on generic hardware and software systems, networking and image processing
 - Diploma and Master's theses
 - Practical activity programs for students
 - Donations and sponsorships
4. MICROSOFT:
 - "Microsoft Academic Program" partner
 - Local Microsoft student office
 - Support for staff and students to attend to national and international scientific conferences and events
 - Donations and sponsorships with equipment and software
5. ALCATEL, Timisoara, Romania:
 - Digital telecommunications, digital control of telecommunication systems
 - Didactic activities (courses and lab workshops), diploma and Master's theses, training courses for employees
 - Practical activity programs for students
 - Donations and sponsorships with equipment and software

D.2. Autonomous Research Groups

D.2.1. Department of Automation and Applied Informatics

Main research fields

1. *System theory applications in fault detection*
2. *System analysis using sensitivities*
3. *Development of control system devices*

□ Research and development Group 1: Applied System Theory

**Contact person: Prof. Toma Leonida DRAGOMIR,
Lecturer Dorina POPESCU, Phd.**
Dept. of Automation and Applied Informatics
300223 Timisoara, Bv. V. Parvan No.2,
E-mail: dragomir@aut.utt.ro / dpopescu@aut.utt.ro
Tel.: +40-256-40-3222 / +40-256-40-3231.

Research fields:

Linear and non-linear systems, knowledge based systems, artificial intelligence, DSP and μ P - applications, quality engineering, mobile robots

Keywords:

Fault detection and identification, mathematical modeling, system safety and availability, controller development, process control, interpolating strategies

Activities:

Development of safety control structures of technical systems.

1. Publications:**Papers:**

- [1] T. L. Dragomir, G. Gabor, A. Korodi, Some aspects Regarding Availability of Repairable Structures, Buletinul Stiintific al Univ. Politehnica din Timisoara, seria Automatica si Calculatoare, vol. 49 (63) 2004, nr. 2, ISSN 1224-600X, pag. 159-166.
- [2] Dragomir, T.L., Roth,H., Roesch, O.J., Control Loop Adjustment of Plant Uncertainties, Buletinul Stiintific al Universitatii Politehnica din Timisoara, seria Automatica si Calculatoare, vol. 49 (63) 2004, nr. 2, ISSN 1224-600X, pag. 227-234.
- [3] D. Popescu, Comparison Study of Sensitivities of Nonlinear and Linear Mathematical Models of the Same Plant, Buletinul Stiintific al Universitatii Politehnica din Timisoara, seria Automatica si Calculatoare, vol. 49 (63) 2004, nr. 2, ISSN 1224-600.
- [4] Dragomir, T.L., Gabor, G., Korodi, A., On an Active Redundant Structure with K Identically Repairable Components, The 12th International Symposium on Modeling, Simulation and Systems' Identification SIMSIS 12 - Galati 2004, Proceedings pag. 54-60.

Perspectives:

1. Perspective domains: Quality engineering in control systems.

2. Strategic priorities: Building a net oriented research on developing of standards for control engineering.

Main research fields

1. Researches in the field of unconventional energetic
2. Researches regarding the system's modeling, identification and simulation
3. Researches in the field of neural networks and fuzzy systems

□ Research and Development Group 2: Process Control
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Contact person: Lecturer Florin DRĂGAN
Teaching Assist. Onuț Lungu:
Dept. of Automation and Applied Informatics
Timișoara, 2 V. Parvan Blvd.,
e-mail: fdragan@aut.utt.ro
Tel.: +40-256-486539, +40-256-288254,
www.aut.utt.ro/~fdragan

Members: Lect. eng. Florin Drăgan
Assist. eng. Onuț Lungu
Assist. eng. Emil Voișan

Research fields

- Chaotic systems
- Programmable Logic Controllers
- Remote control
- Operating Systems.

Keywords

Chaotic systems, programmable logic controllers, remote control.

Activities

- camera virtual with COIN 3D
- haptic device control
- analysis and synthesis of the electronic converters with chaotic behaviour

Published papers

- [1] Drăgan, F., Iercan, D., *Analyze of a Chaotic Behaviour via Period-Doubling at the Current-mode Controlled Boost Converter*, Scientific Bulletin of the “Politehnica” University of Timișoara, Transactions on Automatic Control and Computer Science
- [2] Szemes, P., Hashimoto, H., Voișan, E., Drăgan, F., *Evaluation of Inhabitant’s Walking Habit in Intelligent Space*, IECON

□ Research and Development Group 4: Knowledge Engineering. Applications in Medicine
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Contact Person: Lect. dr. eng. Dorina Petrică

Department of Automation and Applied Informatics
Bd. Vasile Pârvan, Nr. 2
300223 Timișoara, Romania
Tel.: +40-256-40-3244
Email: dpetrica@aut.utt.ro

Members: Lecturer dr. eng. Dorina Petrică, head of the team
Assist. eng. Lavinia Dragomir
Assist. eng. Raul Robu
Eng. Bogdan Groza, PhD student

Research fields

- knowledge based systems
- artificial intelligence
- medical expert systems
- cryptographic techniques, security.

Keywords

Inference strategies, knowledge representation, knowledge processing, medical diagnosis, neural networks, medical decision-making process, entity authentication, applied cryptography.

Activities

- Development of medical expert systems and other applications for medical diagnosis
- Authentication protocols

Published papers

- [1] Petrică D., “*Structure of Models for Medical Knowledge Processing*”, Buletinul Stiintific al Univ. Politehnica din Timisoara, seria Automatica si Calculatoare, vol. 49 (63) 2004, nr. 2, ISSN 1224-600X, pag. 103-106.

Perspective domains:

- The use of artificial intelligence methods for medical diagnosis.
- Building rules-based medical expert systems.

D.2.2. Computer and Software Engineering Department

□ Research and Development Group 1: Object-Oriented Software Engineering

Contact person: Lecturer dr. eng. Radu Marinescu

Computers and Software Engineering Department
Bd. Vasile Pârvan, nr. 2
300223 Timișoara, Romania
Tel: +40-256-404058
Email: radum@cs.utt.ro
www: <http://loose.utt.ro>

Members: Lecturer dr. eng. Radu Marinescu
Assoc. prof. dr. eng. Marius Minea
Assist. eng. Călin Jebeleanu
Assist. eng. Cristina Marinescu
Assist. eng. Petru Florin Mihancea

Research fields:

- Evolution and re-engineering of object-oriented software systems
- Software quality assurance
- Analysis and formal verification of software

Keywords: object-oriented software evolution, re-engineering, design faults, detection strategies, quality metrics, quality assurance, analysis tools, formal verification

Published papers

- [1] Radu Marinescu, "*Detection Strategies: Metrics-Based Rules for Detecting Design Flaws*", Proc. of the 20th IEEE International Conference on Software Maintenance, IEEE Computer Society Press, 2004, p. 350-359.
- [2] Radu Marinescu, Petru Mihancea, "*Towards the Optimization of Automatic Detection of Design Flaws in Object-Oriented Software Systems*", Proc. 9th European Conference on Software Maintenance and Reengineering, IEEE Computer Society Press, 2005, p. 92-101
- [3] Radu Marinescu, Daniel Ratiu, "*Quantifying the Quality of Object-Oriented Design*", Proceedings of the 11th IEEE Working Conference on Reverse Engineering, IEEE Computer Society Press, 2004, p. 192-201.
- [4] D. Ratiu, T. Girba, S. Ducasse, R. Marinescu, "*Using History Information to Improve Design Flaws Detection*", Proc. 8th European Conf. on Software Maintenance and Reengineering, IEEE Computer Society Press, p. 223-232.
- [5] T. Girba, S. Ducasse, R. Marinescu, D. Ratiu, "*Identifying Entities That Change Together*", Proceedings of 9th IEEE Workshop on Empirical Studies of Software Maintenance (WESS 2004), Chicago 2004.
- [6] B. Genest, M. Minea, A. Muscholl, D. Peled, "*Specifying and Verifying Partial Order Properties Using Template MSCs.*", Proc. 7th International Conference on Foundations of Software Science and Computation Structures, LNCS vol. 2987, Springer, 2004, p. 195-210
- [7] Calin Jebelean, "*Automatic Detection of Missing Abstract Factory Design Pattern in Object-Oriented Code*", Proc. of International Conference on Technical Informatics, CONTI, Politehnica University, Timisoara, May 2004.

Research contracts

1. Modeling, analysis and verification of software systems. CNCSIS AT contract 23/2004. Value: Lei 130,000,000. Research team: Marius Minea, Radu Marinescu, Dan Pescaru, Ioana Sora, Cristina Marinescu.

E. EVENTS IN 2004 AND 2005 (FIRST SEMESTER)

Organized Conferences

- ❑ **CONTI-2004 The 6th International Conference on Technical Informatics 27-28 May 2004, Timișoara, Romania.** Organizer: “Politehnica” University of Timișoara, Romania, Faculty of Automation and Computers, In cooperation with: IEEE- Romania section, *ASTR - Technical Academy of Science, Romania*, *SRAIT - Romanian Society of Control Engineering and Technical Informatics*, *SSICR - Romanian Society of Computer Science and Engineering* Chair: Stefan Holban, P.U. of Timișoara, Romania
- ❑ **SACI 2004 1st Romanian-Hungarian Joint Symposium on Applied Computational Intelligence, Timișoara, Romania, May 25-26, 2004.** Organizers: Budapest Polytechnic Hungary “Politehnica” University of Timișoara, Romania, Faculty of Automation and Computers, In cooperation with: *ASTR - Technical Academy of Science, Romania*, *SRAIT - Romanian Society of Control Engineering and Technical Informatics*, *SSICR - Romanian Society of Computer Science and Engineering* Honorary Chair László T. Kóczy, General Co-Chairs, Imre J. Rudas, Budapest Polytechnic, Hungary, Nicolae Robu, Vladimir Crețu P.U. of Timișoara, Romania
- ❑ **SACI-2005 2nd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence, Timișoara, Romania, May 12-14, 2004.** Organizers: Budapest Polytechnic Hungary, “Politehnica” University of Timișoara, Faculty of Automation and Computers, Department of Automation and Applied Informatics, Romania, In cooperation with: *IEEE Romania Section*, *ASTR - Technical Academy of Science, Romania*, *SRAIT - Romanian Society of Control Engineering and Technical Informatics*, Honorary Chairs, Rector Nicolae Robu, , *Politehnica* University of Timișoara, Romania, Rector Imre J. Rudas *Budapest Tech* University of Applied Science, Hungary

F. STUDENT LEAGUE OF THE FACULTY OF AUTOMATION AND COMPUTERS

League leader: Stud. Simona Miculescu-Dragila

Contact: Students' League from the Faculty of Automation and Computer Science and Engineering, "Politehnica" University, Timișoara, România
Bd. Vasile Pârvan nr. 2, Room 221
300223 -Timișoara, County Timiș, Romania
Phone: +40-256-403286
Fax: +40-256-403214
E-mail: ligaac@cs.utt.ro, md_simona@yahoo.com
Home Page: <http://www.ligaac.utt.ro>

Who are we?

We are a non-governmental, non-profit and apolitical organization, that represents the students of the Faculty of Automation and Computers from "Politehnica" University, Timisoara. Since 1990 we are trying to defend the student's rights and among other thing we are organizing social and cultural events.

What have we done in the last 14 years?

❑ International Student Week in Timișoara - ISWinT

ISWinT is an international student festival that gathers for about 200 participants from all over the world each spring since 1994.

The purpose of this festival is to give an opportunity to the students from different countries to communicate freely, to express their opinions. Each edition's theme was selected showing the student's concerns towards the present and the future: "Our Generation, Our Future" (1994), "Communication For A New Europe I" (1995), "Communication For A New Europe II" (1996), "Let's Build Together The Common European House" (1997), "A New Millennium, A New Europe I" (1998), "A New Millennium, A New Europe II" (1999), "Borders vs. Globalization" (2000), "The IIIrd Millennium – Intention Innovation Identity" (2001), "Future Education" (2002), "Attitude! Altitude!" (2003), "Human Rights: Is or Should?" (2004), "Beyond Boundaries >> Fast Forward" (2005).

During that one week the participants have the opportunity to make new friends, to know the Romanian culture to discuss, to express their opinions during the workshops, to attend the conferences. There is a possibility to relax and to have fun each night at the parties and at the sports afternoon. Romania's beautiful landscape is revealed during the one-day trip, when we visit the surroundings.

We could not imagine ISWinT without the "Nations Party". This event is opened to everyone. Each country is presented by the participants (singing, theatre, video-projection), so that we could get familiar with their culture and habits.

❑ Balkans

This ten-day seminar has participants from the Balkan area and held in different locations (Black Sea, Cluj, Brasov). The purpose of this event is to visualize the problems from this area, to discuss about them and to suggest a possible solution. The seminar has four sections – economic, cultural, politic and social – expressed through workshops and conferences. This year we had four trips, so we could observe the multiculturalism of that region. Themes from the last editions:

1998 – "Balkans, towards an open society?"

1999 – "Balkans, evolution or revolution?"

2001 – "Balkans, more than a name"

2003 – "Future for a perfect history"

2004 – „The terror – The new inheritance"

❑ www.OurTimisoara.ro

A web site, created and updated by the students from our organization, with the support of Caatoosee SRL and the „Politehnica" University – since 2001.

❑ **Freshmen's Prom**

Each autumn the freshmen have to face different tests, so they can become „real” students. After the show begins the real party.

❑ **Parties**

Christmas Party. The party took place on the 15th December where people met from all generations and we had some special guests too.

❑ **Freshmen's Prom**

Each autumn the freshmen have to face different tests, so they can become „real” students. After the show begins the real party. – since 1991

❑ **Parties**

Christmas Party, Get to know party (for the freshmen) The party took place on the 15th December where people met from all generations and we had some special guests too.

❑ **Web Design course**

This course is addressed especially for the first year students. You can appropriate the basic elements of HTML, PHP, Photoshop.