FACULTY OF AUTOMATION AND COMPUTERS
ANNUAL REPORT
2006

Timisoara, 2007
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"Politehnica" University of Timisoara  
FACULTY OF AUTOMATION AND COMPUTERS  

Faculty Address: 2, Vasile Parvan Blvd., 300223 – Timisoara, Romania  
Phone: +40 256 403211  
Fax: +40 256 403214  
E-mail: decanat@ac.upt.ro, octavian.prostean@ac.upt.ro, iuliana.boboia@ac.upt.ro  
Web: http://www.ac.upt.ro

1 General Information

1.1 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 began.

The first computer designed and built in the Romanian academic environment, called MECIPT-1 ("Masina Electronica de Calcul a Institutului Politehnic Timisoara") was built 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.

1.2 Structure of the Faculty

1.2.1 Executive Board of the Faculty

Dean: Prof. Dr. Eng. Octavian PROŞTEAN (octavian.prostean@ac.upt.ro)  
Vice Deans: Prof. Dr. Eng. Mircea STRATULAT (mircea.stratulat@ac.upt.ro)  
Prof. Dr. Eng. Mircea POPA (mircea.popa@ac.upt.ro)  
Scientific Secretary: Prof. Dr. Eng. Ştefan PREITL (stefan.preitl@ac.upt.ro)
1.2.2 Faculty Council

Staff Members:
- Prof. Dr. Eng. Octavian PROŞTEAN
- Prof. Dr. Eng. Vladimir CREŢU
- Prof. Dr. Eng. Toma-Leonida DRAGOMIR
- Prof. Dr. Eng. Ștefan HOLBAN
- Prof. Dr. Eng. Ionel JIAN
- Prof. Dr. Eng. Ioan JURCA
- Prof. Dr. Eng. Mircea POPA
- Prof. Dr. Eng. Radu-Emil PRECU
- Prof. Dr. Eng. Ștefan HOLBAN
- Prof. Dr. Eng. Ioan SILEA
- Assoc. Prof. Dr. Eng. Nicolae ROBU
- Prof. Dr. Eng. Vasile STOICU–TIVADAR
- Prof. Dr. Eng. Mircea STRATULAT
- Assoc. Prof. Dr. Eng. Marius MINEA
- Prof. Dr. Eng. Mariu CRISAN
- Prof. Dr. Eng. Mircea VLADUŢIU
- Assoc. Prof. Dr. Eng. Daniel-Gh. ANDREESCU
- Prof. Dr. Mat. Octavian LIPOVAN (invited)
- Mircea POPA
- Mircea VLADUŢIU
- Ştefan PREITL

Student Members:
- Andreea MĂRGINEANU
- Camelia NICOLICIOIU
- Lavinia OPRESCU
- Ana-Manuela STRINU
- Bogdan VODĂ
- Lucian LAURITZ

1.2.3 Faculty Departments

Department of Automation and Applied Informatics
Head of department: Assoc. Prof. Dr. Eng. Ioan SILEA
2, Vasile Parvan Bv., 300223-Timişoara, Romania
Phone: +40 256 403241
Fax: +40 256 403214
E-mail: isilea@aut.upt.ro, secretar@aut.upt.ro
Web: www.aut.upt.ro

Department of Computer and Software Engineering
Head of department: Prof. Dr. Eng. Vladimir CREŢU
2, Vasile Parvan Bv., 300223-Timişoara, Romania
Phone: +40 256 403261
Fax: +40 256 403214
E-mail: vcretu@cs.upt.ro, secretariat@cs.upt.ro
Web: www.cs.upt.ro
2 Faculty Departments

2.A Department of Automation and Applied Informatics

Correspondence address: 2, Vasile Parvan Bv., 300223-Timisoara, Romania
Phone:  +40 256 403241 (Secretary)
        +40 256 403247 (Head of Department)
Fax:    +40 256 403214
E-mail: ioan.silea@aut.upt.ro, secretariat@aut.upt.ro
Web:    www.aut.upt.ro
Head of department: Assoc.Prof.Dr.Eng. Ioan SILEA
Secretary: Lucica ANTON

2.A.1 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.

2.A.2 Department Board

Prof.Dr.Eng. Gheorghe-Daniel ANDREESCU
Prof.Dr.Eng. Daniel-Ioan CURIAC
Prof.Dr.Eng. Toma-Leonida DRAGOMIR
Prof.Dr.Eng. Ştefan PREITIȘ
Prof.Dr.Eng. Octavian PROŞTEAN
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 PETRICEAN
T.Assist.Eng. Onuț LUNGU

2.A.3 Academic Staff

Prof.Dr.Eng. Ioan BABUȚIA: Consulting professor
Prof.Dr.Eng. Nicolae BUDIŞAN: PhD. Supervisor, Consulting professor
Prof. Dr. Eng. Daniel-Ioan CURIAC: Data Security Techniques, Knowledge-Based Systems, 3D Graphics, E-Commerce, Artificial Intelligence and Knowledge Engineering


Prof. Dr. Eng. Stefan PREITL: PhD. Supervisor, Introduction to Automation, Control Structures and Algorithms, Control Engineering, Modern Control Theory 2


Prof. Dr. Eng. Octavian PROŞTEAN: PhD. Supervisor, Modeling, Simulation and Identification Elements, Modeling and Simulation, System Identification, Complex Automation, Electronic Control Systems, Adaptive Control Systems,

Prof. Dr. Eng. Nicolae ROBU: PhD. Supervisor, Computer Architecture, Concurrent Programming, Java Programming, Neural Networks, Embedded Systems 2

Prof. Dr. Eng. Lăcrămioara STOICU-TIVADAR: Computer Programming, Introduction in Computer Programming, Telemedicine, Medical Informatics, Biological Systems, Genetic Algorithm

Assoc. Prof. Dr. Eng. Ioan FILIP: Database, Internet Applications Programming, Interactive Simulation Tools, CASE Tools, Database Programming Technologies

Assoc. Prof. Dr. Eng. Ioan SILEA: Computer Networks, Networks with Integrated Services

Assoc. Prof. Dr. Eng. Constantin VOLOŞENCU: Standardization and Technical Graphics, Control of Industrial Processes, Fuzzy and Neural Systems, Control of Electrical Drives, Virtual Instrumentation in Control


Lect. Dr. Eng. Dorina POPESCU: Languages for Artificial Intelligence, Control Systems Based on Microprocessor Equations, System Theory, System Science, Fundamentals of Automation


T. Assist. Mat. Lavinia Elena DRAGOMIR: Computer Assisted Mathematics, Data Structures and Algorithms


T.Assist.Eng. Ștefan OCTAVIAN: Computer Networks, System Theory, Automation and System Theory
Eng. Adrian POPA: Digital Circuit Design, Multiprocessor Systems
Eng. Florin OCOLIŞAN: Digital Circuit Design, Multiprocessor Systems

2.A.4 Administrative and Technical Staff

1 Lucica ANTON Secretary
2 Monika-Agneta ELEKEŞ Technician
3 Iuliana-Margareta CIOBANU Technician
4 Eng. Gabriel VLASIU Network engineer
5 Mărioara STANJIC Janitor
6 Tamara GOICOVICI Janitor

2.A.5 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 Bases
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  Using and Programming of Computers  
Laboratories

2.A.6 Main Research Fields

- Process control systems and algorithms (see Research Division in Automation and Industrial Informatics, pp. 56, and Autonomous Research Groups, pp. 70)
- System Identification and Adaptive Systems (see Research Division in Automation and Industrial Informatics, pp. 56)
- Applied Informatics (see Research Division in Automation and Industrial Informatics, pp. 56)
- Real-Time Control Systems (see Research Division in Automation and Industrial Informatics, pp. 56)
- Applied Systems Theory (see Autonomous Research Groups, pp. 70)
- Cryptology and Information Security (see Autonomous Research Groups, pp. 70)

2.A.7 PhD Activity

PhD Advisors:

<table>
<thead>
<tr>
<th>PhD Advisor</th>
<th>Number of PhD Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>10</td>
</tr>
<tr>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>15</td>
</tr>
<tr>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>9</td>
</tr>
<tr>
<td>Prof.Dr.Eng. Radu PRECUP</td>
<td>4</td>
</tr>
<tr>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
<td>9</td>
</tr>
<tr>
<td>Prof.Dr.Eng. Nicolae ROBU</td>
<td>6</td>
</tr>
<tr>
<td>Prof.Dr.Eng. Gheorghe-Daniel ANDREESCU</td>
<td>1</td>
</tr>
</tbody>
</table>

PhD programs:

<table>
<thead>
<tr>
<th>Nr.</th>
<th>PhD Student</th>
<th>PhD Theme / Domain</th>
<th>PhD Advisor</th>
<th>Enrollment Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tiberiu IONICĂ.</td>
<td>Automation domain</td>
<td>Prof.Dr.Eng. Gheorghe-Daniel ANDREESCU</td>
<td>Oct.2006</td>
</tr>
<tr>
<td>2</td>
<td>Florin DRAGAN</td>
<td>Contributions to chaotic systems Control</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Nov.1998</td>
</tr>
<tr>
<td>3</td>
<td>Alina BOGAN-MARTA</td>
<td>Contributions to speech processing</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Nov.2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prof.Dr.Eng. Nicolae ROBU</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Adriana PRATA</td>
<td>Contributions to Internet commercial operation automation</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Nov.2001</td>
</tr>
<tr>
<td>5</td>
<td>Adela BERDIE</td>
<td>Principles, methods and technologies for object-oriented soft systems standardization</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Nov.2003</td>
</tr>
<tr>
<td>6</td>
<td>Ovidiu FALCAN</td>
<td>Study and integration of some electronic devices into unconventional generator sets control systems</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>7</td>
<td>Bogdan MUSCA</td>
<td>Contributions to energy supply systems automation for remote sites exploitation, based on alternative energy sources</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Title</td>
<td>Advisor</td>
<td>Date</td>
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<tr>
<td>8</td>
<td>Valentin NEDELEA</td>
<td>Contributions to microhydro groups optimal control</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>9</td>
<td>Mihaela POPA</td>
<td>Contributions to variable rotation speed windmills structures and control methods</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>10</td>
<td>Gabriel CULINCO</td>
<td>Contributions to winmills optimal Control</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>11</td>
<td>Daniel TOADER</td>
<td>Contributions to energy supply systems for some agricultural exploitation</td>
<td>Prof.Dr.Eng. Nicolae BUDIŞAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>12</td>
<td>Dadiana Valeria GRANDO</td>
<td>Analyses and synthesis of non linear systems</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.1998</td>
</tr>
<tr>
<td>13</td>
<td>Adrian POPA</td>
<td>Control structures for electrical drives</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.1998</td>
</tr>
<tr>
<td>14</td>
<td>Sanda UNGUREANU</td>
<td>Control systems with interpolative controllers</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.1998</td>
</tr>
<tr>
<td>15</td>
<td>Constantin Dorin BICHIS</td>
<td>Adaptive control in mehan gas distribution</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Dec.1999</td>
</tr>
<tr>
<td>16</td>
<td>Ioan MOLDOVAN</td>
<td>Aspects regarding communication quality in control systems</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Dec.1999</td>
</tr>
<tr>
<td>17</td>
<td>Dorin BERIAN</td>
<td>Structures and strategies for large informatic systems for primary medical assistance</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.2000</td>
</tr>
<tr>
<td>18</td>
<td>Nagy Zoltan TAMAS</td>
<td>Intelligent selfdiagnosys control systems for machine tools</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.2000</td>
</tr>
<tr>
<td>19</td>
<td>Ovidiu Lucian MOLDOVAN</td>
<td>Control problems associated to hydroelectrical plant considering uncertainties</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.2001</td>
</tr>
<tr>
<td>20</td>
<td>Emil-Ioan VOIŞAN</td>
<td>Control problems for distributed systems applied in telematic</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.2002</td>
</tr>
<tr>
<td>21</td>
<td>Ana-Maria DAN</td>
<td>Applications of system theory in non industrial fields</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.2003</td>
</tr>
<tr>
<td>22</td>
<td>Adrian Stefan KORODI</td>
<td>Safety analysis for robotic systems</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Nov.2003</td>
</tr>
<tr>
<td>23</td>
<td>Sanda Valentina BĂLAŞ</td>
<td>Applications of intelligent systems in non industrial fields</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>24</td>
<td>Bogdan Ioan GROZA</td>
<td>Integrated safety cryptographic solutions in control systems</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>25</td>
<td>AurelianDorel IGNAT</td>
<td>Supervized control of complex systems</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>26</td>
<td>Cezar POPESCU</td>
<td>Automation domain</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Oct.2006</td>
</tr>
<tr>
<td>27</td>
<td>Ştefan OCTAVIAN</td>
<td>Automation domain</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>Oct.2006</td>
</tr>
<tr>
<td>28</td>
<td>Radu BORACI</td>
<td>Contributions to digital control structures synthesis of electric drive systems and of electronen systems</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Dec.1999</td>
</tr>
<tr>
<td>29</td>
<td>Calin CÎRSTEA</td>
<td>Contributions to the development of distributed fault redundant systems</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Nov.2003</td>
</tr>
<tr>
<td>30</td>
<td>Andrei GUDIU</td>
<td>Contributions regarding the distributed system’s remote control</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>31</td>
<td>Dan Lucian MIHAILESCU</td>
<td>Contributions regarding the analysis, modeling and control of distributed systems</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>32</td>
<td>Iosif SZEIDERT</td>
<td>Control systems used in unconventional energetics</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Dec.1999</td>
</tr>
<tr>
<td></td>
<td>Name</td>
<td>Contributions</td>
<td>Advisor</td>
<td>Date</td>
</tr>
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<td>-------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>33</td>
<td>Dan UNGUREANU</td>
<td>Contributions at modeling and optimization of discrete event systems</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Nov.2002</td>
</tr>
<tr>
<td>34</td>
<td>Cristian VASAR</td>
<td>Contributions regarding the neuro-fuzzy structures usage in system identification</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Dec.1999</td>
</tr>
<tr>
<td>35</td>
<td>Arsene Vincentiu RADOI</td>
<td>Automation domain</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>Oct 2006</td>
</tr>
<tr>
<td>36</td>
<td>Ana Daniela CRISTEA</td>
<td>Contributions to the development of model-based control structures</td>
<td>Prof. Radu-Emil PRECUP</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>37</td>
<td>Marian STAN</td>
<td>Contributions to the development of control structures dedicated to vehicle braking systems</td>
<td>Prof. Radu-Emil PRECUP</td>
<td>Oct.2004</td>
</tr>
<tr>
<td>38</td>
<td>Zsuzsa PREITL</td>
<td>Contributions to the development of control structures based on sensor networks</td>
<td>Prof. Radu-Emil PRECUP</td>
<td>Oct.2005</td>
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<td>39</td>
<td>Adrian Sebastian PAUL</td>
<td>Contributions to automatic control problems in digital audio signal processing</td>
<td>Prof. Radu-Emil PRECUP</td>
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<td>40</td>
<td>Levente KOVACS</td>
<td>Contributions to process control development of advanced control structures</td>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
<td>Nov.2001</td>
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<td>41</td>
<td>Corina LAMOS</td>
<td>Contributions to control structures</td>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
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<td>42</td>
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<td>43</td>
<td>Laszlo SZONYI</td>
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<td>44</td>
<td>Niculae VULPES</td>
<td>Contributions to control structures</td>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
<td>Nov.2000</td>
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<td>45</td>
<td>Simona GHEJU</td>
<td>Contributions to control structures</td>
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<td>46</td>
<td>Peter BALAZS</td>
<td>Contributions to control structures</td>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
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<td>47</td>
<td>Marius TOMESCU</td>
<td>Contributions to control structures</td>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
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<td>48</td>
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<td>Contributions to control structures</td>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
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<td>49</td>
<td>Iercan DANIEL</td>
<td>Contributions to control structures</td>
<td>Prof.Dr.Eng. Nicolae ROBU</td>
<td>Oct.2005</td>
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<td>50</td>
<td>Alexander SCHEID (from Germany)</td>
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<td>Prof.Dr.Eng. Nicolae ROBU</td>
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<td>51</td>
<td>Roman MAGDA (from Serbia)</td>
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<td>52</td>
<td>Csaba VAJDA</td>
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<td>53</td>
<td>Eberhard MUELLER (from Austria)</td>
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<td>Prof.Dr.Eng. Nicolae ROBU</td>
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PhD Theses published in 2006:

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<tr>
<th>Nr.</th>
<th>Author</th>
<th>Title</th>
<th>Scientific Supervisor</th>
<th>Publication Date</th>
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<tr>
<td>1</td>
<td>Sanda DALE (UNGUREANU)</td>
<td>Contribution to the study of Control Systems with Interpolative Controllers</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>18.11.2006</td>
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<td>2</td>
<td>Cristian SAVII</td>
<td>Conception and realization of user interfaces in CAD-CAM applications development</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>16.02.2006</td>
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PhD Reports published in 2006:

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<tbody>
<tr>
<td>1</td>
<td>Aurelian Dorel IGNAT</td>
<td>Multivariable Linear Systems - state of the art</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>31.03.06</td>
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<td>2</td>
<td>Adrian KORODI</td>
<td>Control Structures for robots</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>21.07.06</td>
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<td>3</td>
<td>Bogdan GROZA</td>
<td>The necessity of cryptographic secure techniques for industrial systems. Cryptographic solutions for authentication based on one way chains</td>
<td>Prof.Dr.Eng. Toma-Leonida DRAGOMIR</td>
<td>21.07.06</td>
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<td>4</td>
<td>Iosif SZEIDERT</td>
<td>Identification, parameter estimation and simulation of systems with induction generators</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>07.05.06</td>
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<td>5</td>
<td>Calin CIRSTEA</td>
<td>Actual stage of the researches in the domain of fault redundant distributed systems</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>07.05.06</td>
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<td>6</td>
<td>Cristian VAŞAR</td>
<td>Neural networks used for system identification and control</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>08.04.06</td>
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<td>7</td>
<td>Dan UNGUREANU</td>
<td>The modeling and simulation of discrete event systems using Petri nets and sequential automata</td>
<td>Prof.Dr.Eng. Octavian PROŞTEAN</td>
<td>21.03.06</td>
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<td>8</td>
<td>Ovidiu BANIAŞ</td>
<td>Sensor network architecture for traffic control</td>
<td>Prof.Dr.Eng. Radu PRECUP</td>
<td>07.04.06</td>
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<td>9</td>
<td>Ovidiu BANIAŞ</td>
<td>Contributions to automatic control problems in digital audio signal processing – research program project presentation</td>
<td>Prof.Dr.Eng. Radu PRECUP</td>
<td>28.09.06</td>
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<td>10</td>
<td>Zsuzsa PREITL</td>
<td>Analysis and design of control structures based on Internal Model Control (IMC) in presence of restrictions and disturbances</td>
<td>Prof.Dr.Eng. Radu PRECUP</td>
<td>23.10.06</td>
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<td>11</td>
<td>Marius TOMESCU</td>
<td>Applications of fuzzy mechanisms in plant control</td>
<td>Prof.Dr.Eng. Ştefan PREITL</td>
<td>16.06.06</td>
</tr>
</tbody>
</table>

2.A.8 Department Events

- "Doctor Honoris Causa" Title awarded to Prof.Dr.Eng. Iósef BOKOR, member of the Hungarian Academy
- Oct, 2006: The department of Automation and Applied Informatics has collaborated with the company National Instruments Debrecen, and this collaboration was materialized by organizing The National Instruments Day in Timisoara, a profesional contest for students as well as awarding a grant for equipment and programs
2.C Department of Computer and Software Engineering

Correspondence address: 2, Vasile Parvan Bv., 300223-Timişoara, Romania
Phone: +40 256 403261 (Secretary) 
       +40 256 403255 (Head of Department)
Fax: +40 256 403214
E-mail: vladimir.cretu@cs.upt.ro, secretariat@cs.upt.ro
Web: www.cs.upt.ro

Head of department: Prof.Dr.Eng. Vladimir CREŢU
Secretary: Maria DUMITROV, Eng. Alexandru PETŐFI

2.C.1 Brief History

1960 In the Politehnic Institute of Timisoara, the MECIPT Research Center ("Electronic Computing Machine at the Politechnic 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 Soceneanu).
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".
2.C.2 Department Board

Prof.Dr.Eng. Vladimir CREŢU
Prof.Dr.Eng. Mircea STRATULAT
Prof.Dr.Eng. Mircea POPA
Prof.Dr.Eng. Ioan JURCA
Prof.Dr.Eng. Ştefan HOLBAN
Prof.Dr.Eng. Marius CRIŞAN

Prof.Dr.Eng. Ionel JIAN
Assoc.Prof.Dr.Eng. Marius MINEA
Assoc.Prof.Dr.Eng. Ioana ŞORA
Assoc.Prof.Dr.Eng. Mihai V. MICEA
Assoc.Prof.Dr.Eng. Dan PESCARU

2.C.3 Academic Staff


Prof.Dr.Eng. Crişan STRUGARU: Input-Output Systems, Local Area Computer Networks, Peripheral Equipments, Computer Network Design


Prof.Dr.Eng. Ştefan HOLBAN: Basic Concepts of Artificial Intelligence, Modeling and Simulation, Artificial Intelligence, Data Mining


Prof.Dr.Eng. Ionel JIAN: Assembly Language Programming, Database Systems, Database Systems Design, Distributed Database Systems


Prof.Dr.Eng. Mircea POPA: Digital Microsystems Design, Microprocessor-Based Systems, Application-Oriented Embedded Systems, Parallel Architectures, Embedded Systems

Assoc.Prof.Dr.Eng. Horaţiu MOLDOVAN: Image Processing and Recognition

Assoc.Prof.Dr.Eng. Marius MINEA: Computer System Security, Software Verification and Validation, Formal Verification

Assoc.Prof.Dr.Eng. Ioana ŞORA: Parallel Computing Algorithms, Component-Based Software Engineering


Assoc.Prof.Dr.Eng. Dan PESCARU: Expert Systems

Assoc.Prof.Dr.Eng. Radu MARINESCU: Software Engineering 2, Software Quality Assurance

Assoc.Prof.Dr.Eng. Marius MARCU: Hardware Resources Handling and Auto-configuration Techniques, Multiprocessor Systems


Lect.Dr.Eng. Lucian PRODAN: Fault Tolerant Systems


T.Assist.Eng. Carmen HOLOTEŞCU: Internet technologies


T.Assist.Eng. Sebastian FUICU: Local Area Networks, Input/Output Systems
T.Assist.Eng. Sorin ŞERĂU: Assembly Language Programming
T.Assist.Eng. Ciprian CHIRILA: Data Structures and Algorithm Analysis, Compiling Techniques
T.Assist.Eng. Elena DOANDEŞ: Computer Use and Programming
T.Assist.Dr.Eng. Oana Maria CĂUŞ: Programming Techniques (C, L), Computer Programming (L), Fundamentals of Programming Languages (L), Programming Languages (L)
T.Assist.Eng. Cosmin CERNĂZANU-GLĂVĂN: Basic Concepts of Artificial Intelligence (L), Artificial Intelligence (L)
T.Assist.Eng. Oana BONCALO: Computer Fundamentals (L), Computer Engineering 2 (L)
PhD.Stud.Eng. Roxana TEODORESCU: Data Structures and Algorithms (L), Data Structures and Algorithm Analysis (L)

2.C.4 Administrative and Technical Staff

1. Maria DUMITROV - Secretary
2. Alexandru PETŐFI - Secretary
3. Rodica CIOCĂRLIE - Engineer
4. Ambroziu BĂLAN - Technician
5. Maria STOLOJESCU - Technician
6. Pavel GARTNER - Technician
7. Herta OPRIŞAN - Janitor
8. Maria CURESCU - Janitor
9. Floare GOLBAN - Janitor

2.C.5 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; 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 Laboratories ("DSPLabs")  
B511 Laboratory  Object-Oriented Programming; Software Engineering  
B514 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  

2.C.6 Main Research Fields

- Architectures and Advanced Computing Systems (see CC-SICTI-UPT Research Center, pp. 63)
- Data Bases and Artificial Intelligence (see CC-SICTI-UPT Research Center, pp. 63)
- Software Engineering (see CC-SICTI-UPT Research Center, pp. 63)
- Real-Time and Embedded Systems and Digital Signal Processing (see CC-SICTI-UPT Research Center, pp. 63)
- Electrical Machine and Equipment Testing Using Digital Signal Acquisition and Processing Systems (see CC-SICTI-UPT Research Center, pp. 63)

2.C.7 PhD Activity

PhD Advisors:

<table>
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<tr>
<th>PhD Advisor</th>
<th>Number of Phd Students</th>
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<tbody>
<tr>
<td>Prof.Dr.Eng. Crişan STRUGARU</td>
<td>2</td>
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<tr>
<td>Prof.Dr.Eng. Mircea VLADUŢIU</td>
<td>13</td>
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<tr>
<td>Prof.Dr.Eng. Ioan JURCA</td>
<td>6</td>
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<tr>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
<td>16</td>
</tr>
<tr>
<td>Prof.Dr.Eng. Vladimir CREȚU</td>
<td>16</td>
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<tr>
<td>Prof.Dr.Eng. Mircea STRATULAT</td>
<td>10</td>
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<tr>
<td>Prof.Dr.Eng. Ionel JIAN</td>
<td>2</td>
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<tr>
<td>Prof.Dr.Eng. Horia CIOCARLIE</td>
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PhD programs:

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<thead>
<tr>
<th>Nr.</th>
<th>PhD Student</th>
<th>PhD Theme / Domain</th>
<th>PhD Advisor</th>
<th>Enrollment Date</th>
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<tbody>
<tr>
<td>1</td>
<td>Cristin TODOR</td>
<td>Hierarchical Control and Programming Systems for Robots</td>
<td>Prof.Dr.Eng. Crişan STRUGARU</td>
<td>Nov.2003</td>
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<tr>
<td>3</td>
<td>Ciprian COMLOŞAN</td>
<td>Researches on Routing Optimization of Information Packets in Wireless Computer Networks</td>
<td>Prof.Dr.Eng. Mircea VLADUŢIU</td>
<td>Nov.2003</td>
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<td>4</td>
<td>Emanuel SASU</td>
<td>Researches on Error Testing Stages for Computer Networks</td>
<td>Prof.Dr.Eng. Mircea VLADUŢIU</td>
<td>Nov.2003</td>
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<tr>
<td>No.</td>
<td>Author</td>
<td>Title</td>
<td>Advisor/Institution</td>
<td>Date</td>
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<td>5</td>
<td>Petre POPESCU ROTOIU</td>
<td>Researches on Increasing the Efficiency of Information Security Through Reconfigurable Structures</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
<td>Oct.2004</td>
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<td>6</td>
<td>Versavia ANCUSĂ</td>
<td>Consensus Problem in Fault Tolerant Computing</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
<td>Oct.2005</td>
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<td>7</td>
<td>Cristian RUICAN</td>
<td>Automatic Synthesis of Quantum Circuits Using Genetic Algorithm</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
<td>Oct.2005</td>
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<td>8</td>
<td>Alexandru AMĂRIĈĂI</td>
<td>On the Design of Floating Point Units for Interval Arithmetic</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
<td>Sep.2006</td>
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<td>Oana BONCALO</td>
<td>Simulation – Based Assessment of Quantum Circuit Reliability</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
<td>Sep.2006</td>
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<td>10</td>
<td>Elena DOANDEȘ</td>
<td>Studies on Applying the Interaction Design Methods</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
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<td>11</td>
<td>Nicolae VELCIOV</td>
<td>Design and Security Assessments of Symmetric-Key Cryptosystems</td>
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<td>Sep.2006</td>
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<td>12</td>
<td>Răzvan Virgil BOGDAN</td>
<td>A Data Security Perspective on Information Transmission Over Distributed Systems</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
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<td>13</td>
<td>Marius CĂVĂȘDAN</td>
<td>Claim Base Authentication Mechanism for Web Services</td>
<td>Prof.Dr.Eng. Mircea VLĂDUŢIU</td>
<td>Sep.2006</td>
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<td>14</td>
<td>Stejărel Claudiu VERES</td>
<td>Computer Networks Performance Improvement Based on Traffic Analysis</td>
<td>Prof.Dr.Eng. Ioan JURCA</td>
<td>Nov.2003</td>
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<td>15</td>
<td>Cristina MARINESCU</td>
<td>Quality Assurance in Distributed Software Systems</td>
<td>Prof.Dr.Eng. Ioan JURCA</td>
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<td>16</td>
<td>Petru MIHANCEA</td>
<td>Object-Oriented Software Systems Analysis</td>
<td>Prof.Dr.Eng. Ioan JURCA</td>
<td>Oct.2004</td>
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<td>17</td>
<td>Andrei Răzvan RÎSCUTA</td>
<td>Anthologies Design for Semantic Web</td>
<td>Prof.Dr.Eng. Ioan JURCA</td>
<td>Oct.2005</td>
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<td>18</td>
<td>Dan CIREȘAN</td>
<td>Automatic Handwriting Recognition for the Romanian Language</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
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<td>19</td>
<td>Cosmin CERNĂZEAN</td>
<td>Contributions to Artificial Neural Networks Dimensioning</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
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<tr>
<td>20</td>
<td>Diana Maria ANDONE</td>
<td>Contributions to Development of E-Learning Informational Technologies</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
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<td>22</td>
<td>Nicolae Teodor MELIȚĂ</td>
<td>Contributions to Data Analysis and Processing in Genetic Analysis</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
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<td>23</td>
<td>Ildiko SZOKE</td>
<td>Contributions to Fractal Utilization in Pattern Recognition Techniques</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
<td>Nov.2003</td>
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<td>24</td>
<td>Adrian ZAFIU</td>
<td>Contributions to Formal Analysis of Software Applications</td>
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<td>Nov.2003</td>
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<td>25</td>
<td>Gabriela BOBU</td>
<td>Software Agents for GRID (Development)</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
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<tr>
<td>26</td>
<td>Dan Ciprian CIUBOTARU</td>
<td>Information Indexing Based on Graphs and Data Mining Techniques</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
<td>Oct.2004</td>
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<tr>
<td>27</td>
<td>Mihai CHEVERSEȘAN</td>
<td>Methods for Improving the Execution Speed of Uniprocessor Systems</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
<td>Oct.2004</td>
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<td>28</td>
<td>Adrian DELAMARIAN</td>
<td>Analysis of Programs Written in Pointer-Based Languages</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
<td>Oct.2004</td>
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<td>29</td>
<td>Helios Dumitru MELENCU</td>
<td>Contributions to Developing Architectures for Distributed Databases of Large Dimensions</td>
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<td>Oct.2004</td>
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<tr>
<td>30</td>
<td>Cătălin STOIAN</td>
<td>Contributions to Recognition of GIS Database Objects Using Data Mining</td>
<td>Prof.Dr.Eng. Ștefan HOLBAN</td>
<td>Oct.2006</td>
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<td>31</td>
<td>Georgeta TURIAN</td>
<td>Contributions to Data Exploration Methodology in Data Store</td>
<td>Prof.Dr.Eng. Vladimir CREȚU</td>
<td>Nov.2002</td>
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<tr>
<td>32</td>
<td>Călin JEBELEAN</td>
<td>Contributions to Automatic Refactorization of Object-Oriented Code</td>
<td>Prof.Dr.Eng. Vladimir CREȚU</td>
<td>Nov.2002</td>
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<tr>
<td>33</td>
<td>Adrian NAGY</td>
<td>Contributions to Performance Improvement and Security Enhancement of Data Stores</td>
<td>Prof.Dr.Eng. Vladimir CREȚU</td>
<td>Nov.2003</td>
</tr>
<tr>
<td>Nr.</td>
<td>Author</td>
<td>Title</td>
<td>Scientific Supervisor</td>
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<td>34</td>
<td>Adrian NÎTĂ</td>
<td>Cryptographic Algorithms</td>
<td>Prof.Dr.Eng. Vladimir CREŢU</td>
<td>Nov.2003</td>
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<tr>
<td>35</td>
<td>Dacian Florin TUDOR</td>
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<td>Sorin BABII</td>
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<td>Roxana Oana TEODORESCU</td>
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<td>Prof.Dr.Eng. Vladimir CREŢU</td>
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<td>Prof.Dr.Eng. Vladimir CREŢU</td>
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3 Ionel MUSCALAGIU
Implementation, Evaluation and Performance Improvement of Asynchronous Search Techniques Within Distributed Constraints - Based Programming Prof.Dr.Eng. Vladimir CREŢU 19.06.06

4 Cristina MARINESCU
Quality Assessment of Enterprise Software Systems Prof.Dr.Eng. Ioan JURCA 05.06.06

5 Bogdan Ciprian CHIRILĂ
State of the Art in Reuse Mechanisms of Object-Oriented Programming Prof.Dr.Eng. Ioan JURCA 20.03.06

6 Dan COSMA
Understanding and Qualitative Analysis of Distributed Systems Design Prof.Dr.Eng. Ioan JURCA 06.07.06

7 Dan CIREŞAN
Methods for Character Recognition Prof.Dr.Eng. Ștefan HOLBAN 30.09.06

8 Radu IRHAŞIU
Detection Systems for Attacks in Computer Networks: State of the Art and Prospects Prof.Dr.Eng. Ioan JURCA 20.11.06

9 Dan CIREŞAN
Pattern Recognition: Conserving Topology Through Windowed Hough Transform Prof.Dr.Eng. Ștefan HOLBAN 16.10.06

10 Sorin BABII
Neural Networks: State of the Art and Prospects Prof.Dr.Eng. Vladimir CREŢU 06.11.06

11 Sorin BABII
Data Par Sim: Parallel Simulator with Data Partitioning Prof.Dr.Eng. Vladimir CREŢU 11.12.06

2.C.8 Department Events
Conferences:

Academic Events:
- May, 2006: "Doctor Honoris Causa" Title awarded to Prof.Dr.Eng. Mircea PETRESCU
- June, 2006: "40 Years Since the Setup of the Computers Section in Timisoara"
3 Educational Activity

3.1 Educational Programs

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

At present, 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)
- Computers (5 years)

The Faculty offers also Master programs in the following directions:

- Automatic Systems (2 years)
- Advanced Computing Systems (2 years)
- Automotive Embedded Software (2 years)

Conforming to the Bologna process, our system and curricula where modified and adapted to the fast evolution of the Automation and Computer fields. Therefore, our faculty offers a levered education, in three domains, the first level being:

- Computers and Information Technology (4 years)
- Systems Engineering (4 years)
- Informatics (3 years)

The studies will be continued with the Master level of 2 years and with the third level, for Doctoral studies, which is supervised 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.

Enrolment of students in the first year follows an admission examination (based on Multiple – Choice Queries tests) where general knowledge in Mathematics (Algebra, Analysis, Geometry and Trigonometry) is assessed (80%). The final score takes also into account the Baccalaureate score (20%). Graduates of other faculties that were awarded a license diploma can be directly enrolled.

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

Number of students:

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### 3.2 Curricula and Syllabus

#### 3.2.A Automation and Applied Informatics Section

#### 3.2.A.1 Curricula

**Systems Engineering Specialization (SE, 4 years)**

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**First Year of Study**

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## Automation and Applied Informatics Specialization (AAI, 5 years)

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Master Specialization: Automatic Systems (AS, 2 years)

First Year of Study

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3.2.A.2 Syllabus of the Courses Taught by the Department Staff

First Year of Study (SE)

SE-1-03: Computer Programming (Prof.Dr.Eng. 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 of C language (structure of a program, variables, constants), expressions, operators, standard types, standard functions, statements (compound, association, selection, iteration), functions, pointers, structured types (arrays, string, structures), files, lists, programming style, dynamic allocation of memory.

SE-1-06: Standards and Technical Graphics (Assoc.Prof.Dr.Eng. Constantin VOLOSENCU)
Course contents: Romanian standards, Standards oriented to process quality, Quality technical conditions of the automatic equipment, Quality technical conditions for software, Reference model for computer graphics, The technical book of a product, The professional standard of a product, Design documentation, Innovations and intellectual property, Ways of information, Application of technical graphic in electronics and mechanics.

SE-1-11: Computer Assisted Mathematics (Prof.Dr.Eng. Radu-Emil PRECUP)
Course contents: 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; numerical solving of ordinary differential equations and systems; optimization problems in automation and informatics.

SE-1-12: Data Structures and Algorithms (Lect.Dr.Eng. Dorina PETRICĂ)
Course contents: Fundamental concepts of data structures and structured programming; Fundamental data types and structured data types; Notions about algorithms; Algorithm analysis with asymptotic notations; Sorting techniques (direct and advanced, internal and external); Analysis of sorting algorithms; Arrays as abstract data types (implementation, searching techniques); Recursion; Lists (definition of the abstract data type list, implementation techniques, applications); Special lists (stacks, queues); Multi-list structure; Generalized lists; Trees (definition of the abstract data type tree, traversal of trees, specific operators); Binary and ordered trees.

SE-1-14: Electronic Devices and Circuits (T.Assist.Eng. Radu BORACI)
The aim of the course is to provide 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). Course contents: Diodes; Bipolar transistors; Thermo-sensitive devices, optic elements; Field effect transistors (JFET, MOSFET); Triac; Operational integrated amplifiers ( types, main applications in automatics); Voltage sources; Electronic circuits (operation analysis, synthesis); Application of electronic devices in automatics.

Offer basic knowledge in design with numerical devices to first year students. Main study areas 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, registers and synthesis of sequential
circuits in both forms synchronous and asynchronous. 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 (SE)

SE-2-01: System Theory 1 (Prof.Dr.Eng. 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.

SE-2-03: Object-oriented programming (Prof.Dr.Eng. Vasile STOICU-TIVADAR)
Objectives: to provide knowledge and skills about the development of medium-level complexity programs in C++, including templates, basics about Windows programming. 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, introduction in Windows programming, templates.

SE-2-04: Introduction in Automation (Prof.Dr.Eng. Stefan PREITL)

SE-2-05: Digital Circuit Design (Prof.Dr.Eng. Gheorghe-Daniel ANDREESCU)
Digital Circuit Design with VHDL, high-level functional hardware-description-language based on examples; Code structure: library, entity, architecture; Test bench; Data types; Operators and Attributes, overloading, generic; Concurrent code: when, generate, block; Sequential code: process, if, wait, case, loop - comparisons; Signal and variable; State machines: clock, edge detections, template styles; Hierarchical system design: package, component, port map, generic map; Functions and Procedures, assert; Study cases, applications; Problems: solved and proposed.

SE-2-06: Computer Architecture (Prof.Dr.Eng. Nicolae ROBU):
Overview on computer architecture; the place and the role of software and hardware architectural components and their interactions. Memories: RAM, ROM, PROM, EPROM, EEPROM –definition and units design. Ports: standard input port and standard output port. Numbers representation inside the computer: fixed point and floating point (IEEE 754) approach. Arithmetical-Logical Unit: adding devices, multiplying devices, dividing devices. The registry unit: case studies on CSAC 2001, MOTOROLA 68 0x0 and INTEL 80x86 processors, including the stack concept’s implementation and presentation. The command unit: the von Neumann paradigm and the architectural components of a von Neumann command unit, with a case study on CSAC 2001 processor; instructions’ coding -including addressing modes problems; instructions’ implementation, with illustration for LD, JP, ADD, CALL, RET, PUSH, POP, IN and OUT instructions. The advanced functionalities of the processors: the waiting mechanism, the bus giving up mechanism, the interruption mechanism (with vectored and non-vectored interruptions).

SE-2-10 System Theory 2 (Prof.Dr.Eng. Toma Leonida DRAGOMIR):
The objectives of the course are: Knowledge and using of terminology and basic concepts regarding non-linear systems; Knowledge and 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 nonlinear models, and analyzing of some problems regarding the structure of control systems.

SE-2-11: Database (Assoc.Prof.Dr.Eng. Ioan FILIP)
The objectives of the course are: Relational Database Management Systems (RDBMS), Oracle database, SQL (all basic SQL commands: SELECT, INSERT, UPDATE, DELETE; create and manage tables and views, Oracle functions), PL/SQL language (PL/SQL blocks, functions, stored procedures, triggers, cursors, sequences, users packages, built-in packages, SQL dynamic, object programming), parallel with other RDBMS (MySQL, Interbase, Microsoft SQL Server).

SE-2-12: Concurrent Programming (Prof.Dr.Eng. Nicolae ROBU)
In its first part, the course emphasizes the type of applications opportune in concurrent programming and present the basic notions of this field (i.e. process, task, thread, multitasking, multithreading, multithreading). It continues with tasks states presentation and tasks’ evolution in states
space. Follow context switching and task scheduling – concepts and implementations. The last three parts are dedicated to the mutual exclusion, synchronization and communication problems and their different classical mechanisms, from practical and theoretical point of view alike approached.

**SE-2-13: Modeling, Simulation and Identification Elements** (Prof. Dr. Eng. Octavian PROŞTEAN)
The objectives of the course are to provide knowledge and skills about modeling, simulation techniques of dynamic systems and the introduction to system’s experimental identification problems. The most important deterministic and stochastic types of input signals are presented and respectively linear models, analytical model building approach, problems of continuous/discrete linear/non linear mathematical models simulation with the aid of the digital computer and analog circuits. In the last part of the course presents introductory elements regarding the system’s experimental identification, graphic, parametric identification techniques from input step response for non perturbed systems and the model’s conversions methods. There are created practical skills regarding the usage of Matlab/Simulink simulation software package.

**SE-2-14 Discrete Event Systems** (Prof. Dr. Eng. Octavian PROŞTEAN)
The main objective of the course is to provide the knowledge and skills required for the model building and behavior’s analysis of the discrete event driven systems (DES). There are approached fundamental concepts regarding the DES, models and techniques used in the study of DES and also aspects regarding the usage of Petri nets formalism in the DES’s modeling and analysis. There are presented the characteristic properties of DES behavior, terminology and basic concepts in untimed Petri net formalism, typical structures used in Petri net modeling of DES, automata versus Petri net model building, case studies, analysis techniques for behavioral properties.

**SE-2-15: Microprocessor and microcontroller based systems** (Lect. Dr. Eng. Sorin NANU)
Continues the “Microprocessor architecture” discipline presenting the general use of microsystem resources both as external components for microprocessor and internal for microcontroller. Memory conceptions and access. Timers. Interrupt protocol. Serial communication (RS232, I2C, SPI). Parallel communication. Process interfaces: DAC and ADC, parallel port, PWM. Elements of data processing.

**Third Year of Study (AAI)**

**AAI-3-02: System Theory 2** (Prof. Dr. Eng. Toma Leonida DRAGOMIR)
The objectives of the course are: Knowledge and using of terminology and basic concepts regarding non-linear systems; Knowledge and 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 nonlinear models, and analyzing of some problems regarding the structure of control systems.

**AAI-3-03: Modeling and Simulation** (Prof. Dr. Eng. Octavian PROŞTEAN)
The contents of this course cover the problematic of the modeling and simulation of dynamical systems. The main objectives are the study of the most important deterministic and stochastic types of test signals and 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 MATLAB-Simulink, SIMNON software packages.

**AAI-3-04: Microprocessor Based Systems** (T. Assist. Eng. Dan UNGUREANU)
The course focuses on microprocessor based systems. In the first part, the Intel 8086 microprocessor is presented in details, as the base element of the Intel family. The study of 8086 includes: internal structure and functional mode; bus cycles of the microprocessor; interrupts system; connection of memories to the microprocessor. The second part of the course studies a series of peripheral circuits such as the interrupt controller 8259A, the input-output parallel port 8255 and the circuit timer-counter 8254.

**AAI-3-05: Assembly Language** (Lect. Dr. Eng. Dorina PETRICĂ)
Course contents: Characteristics of the assembly language for the 8086 family and of the MASM assembler; Structure of the registers; Assembler directives; Variable definition; Addressing techniques; Format of the instructions; Definitions of segments (complete, simplified, initialization of the segment registers, ordering of the segments); Transfer instructions; Arithmetic and logic instructions; Array processing; Branch instructions (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.

**AAI-3-06: Operating Systems** (Lect. Dr. Eng. Florin DRAGĂN)
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.
AAI-3-07: Introduction to Process Automation (Prof.Dr.Eng. Ștefan PREITL)

Course contents: 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.

AAI-3-08: Computer Added Design of Complex Logical Circuits (Prof.Dr.Eng. Gheorghe-Daniel ANDREESCU)

Introduction in hardware design language VHDL, goal, utility, applications; CAD design environments: hardware design, implementation, simulation, automatic synthesis; Entity design, libraries; Sequential states; Types; Registers and synchronizations; Finite state machine; Particularizations and applications with FPGA and ASIC, manufacturers specifications; Course based on examples given in advances.

AAI-3-09: Programmable Logic Controllers (T.Assist.Eng. Onuț LUNGU)

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.

AAI-3-10: Control Structures and Algorithms (Prof.Dr.Eng. Ștefan PREITL)


AAI-3-11: System Identification (Prof.Dr.Eng. Octavian PROSTEAN)

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.

AAI-3-12: Multiprocessor Systems (Prof.Dr.Eng. Gheorghe-Daniel ANDREESCU)

Multiprocessor structures: architectures, topologies, communication principles; MULTIBUS capability, specifications: Master-Multibus interface, Data address block, Dual port access RAM, Bus interrupts, Bus arbitration; Standard module architectures in multiprocessor applications; VMEbus: 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. Lab. applications using VHDL.

AAI-3-13: Databases (Assoc.Prof.Dr.Eng. Ioan FILIP)

The objectives of the course are: Relational Database Management Systems (RDBMS), Oracle database, SQL (all basic SQL commands: SELECT, INSERT, UPDATE, DELETE; create and manage tables and views, Oracle functions), PL/SQL language (PL/SQL blocks, functions, stored procedures, triggers, cursors, sequences, users packages, built-in packages, SQL dynamic, object programming), parallel with other RDBMS (MySQL, Interbase, Microsoft SQL Server).

AAI-3-14: Microcontrollers (T.Assist.Eng. Dan UNGUREANU)

The course creates capacities in the microcontroller field. In the first part of the course, the Intel MCS51 family is studied: internal structure, the instructions set, addressing modes, hardware structure of the 8051 microcontroller based systems, the interrupts system, the timer/counter system, the serial communication system. In the second part, the Motorola HC11 family is studied: internal structure, the instructions set, addressing modes, hardware structure of the 68HC11-
based systems, the interrupts system, the timer/counter system, the system of serial communication.

AAI-3-18: Data Communication (T.Assist.Eng. Cezar POPESCU)

AAI-3-20: Control Systems for Continuous Processes (Assoc.Prof.Dr.Eng. Constantin VOLOSENENCU)

Fourth Year of Study (AAI)

AAI-4-02: Control Engineering (Prof.Dr.Eng. Ştefan PREITL)
Course contents: 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 of 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 control structures; Introduction to predictive control; Introduction to multivariable control system design.

AAI-4-03: Computer Networks (Assoc.Prof. Dr.Eng. Ioan SILEA)
Goals: Presentation of the main local networks structures, equipment and problems involved in computer networks; Assimilation of the client-server model principles; Getting the notions regarding administration, access and safety in networks. Abilities created: 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 concerning a computer installation in a network; Competences regarding the user accounts administration; Achievement of a client-server application; Networks extension.

AAI-4-04: Knowledge Based Systems (Prof.Dr.Eng. 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.

AAI-4-05: Electrical Drives and Converters (Lect.Dr.Eng. Sorin MUŞUROI)
The course presents 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.

AAI-4-06: Fuzzy Control Systems (Prof.Dr.Eng. Radu-Emil PRECUP)
Elements of fuzzy set theory and fuzzy logic, notions concerning fuzzy sets, connectors and operators associated to fuzzy sets; information processing in terms of fuzzy logic; basic fuzzy controller (FC) structure and analysis; typical and special FCs, FCs without dynamics, FCs with dynamics, Takagi-Sugeno FCs; PI-fuzzy controllers, conventional controllers with parameter adaptation in terms of fuzzy logic; fuzzy control structures and design; applications of fuzzy control.

AAI-4-07: Internet Applications Programming (Assoc.Prof.Dr.Eng. 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.

microprocessor. 80x86 compatible processors. The PowerPC 555 microcontroller.

AAI-4-09: Fuzzy and Neural Systems (Assoc.Prof.Dr.Eng. Constantin VOLOSENČU)

AAI-4-10: Design WEB and XML Techniques (Lect.Dr.Eng. Florin DRĂGAŅ)
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.

AAI-4-13: Advanced Control Strategies (Prof.Dr.Eng. Radu-Emil PRECUP)
Sliding mode control systems with commutation based on control error and state-feedback; elements of fuzzy set theory and fuzzy logic; adaptive hybrid neuro-fuzzy control strategies, basic model of a neuron, single layer perceptron, multiple layer perceptron artificial neural networks, standard version of PI-fuzzy controller, adaptive hybrid neuro-fuzzy control structures; elements of control system optimization.

AAI-4-14: Concurrent Programming (Prof.Dr.Eng. Nicolae ROBU)
In its first part, the course emphasizes the type of applications opportune in concurrent programming and present the basic notions of this field (i.e. process, task, thread, multitasking, multithreading, multitasking with multithreading). It continues with tasks states presentation and tasks’ evolution in states space. Follows context switching and task scheduling – concepts and implementations. The last three parts are dedicated to the mutual exclusion, synchronization and communication problems and their different classical mechanisms, from practical and theoretical point of view alike approached.

AAI-4-15: Artificial Intelligence (Lect.Dr.Eng. Dorina PETRİCĂ)

AAI-4-16: Computer Aided Manufacturing (T.Assist.Eng. Cristian VĂȘAR)
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.

AAI-4-17: Computer-Aided System Optimization (Prof.Dr.Eng. Radu-Emil PRECUP)
Definition of an optimization problem (OP); one-step OPs including no constraint OPs, OPs with equality/inequality constraints, parametric OPs of dynamic regimes corresponding to continuous- and discrete-time linear systems; discrete-time optimization problems, discrete Euler-Lagrange equations, discrete-time optimal control problems, discrete-time minimum principle for optimal control problems, discrete-time dynamic programming, discrete-time linear quadratic regulator problem.

AAI-4-18: Signal Processing in Control (Lect.Dr.Eng. Sorin NĂNU)

AAI-4-19: Medical Informatics (Prof.Dr.Eng. 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.

AAI-4-20: Biological Systems (Prof.Dr.Eng. 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.

AAI-4-21: Medical Applications Programming (Prof.Dr.Eng. Vasile STOICU-TIVADAR)
Objective: 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,
Objective: 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.

**AAI-4-22: Programming Environments**
Prof. Dr. Eng. Vasile STOICU-TIVADAR
Objective: 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.

**AAI-4-23: Languages for Artificial Intelligence**
Lect. Dr. Eng. Dorina POPESCU
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.

**AAI-4-24: Computer Graphics**
Prof. Dr. Eng. Daniel Ioan CURIEC
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.

**AAI-4-25: Networks with Integrated Services**
Assoc. Prof. Dr. Eng. Ioan SILEA
Goals: 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); Assimilation of some notions about virtual networks (VPN). Abilities created through this discipline: Implementation of specific protocols in the network; Achievement of distributed applications structures; Theoretical knowledge concerning present orientations in networks; The principles and necessary equipment for building a virtual network for a firm; Introductive notions, necessary for TCP/IP applications.

**AAI-4-26: Intranet Networks**
Lect. Dr. Eng. 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.

**AAI-4-27: Distributed Systems for Data Acquisition and Control**
T. Assist. Eng. Tiberiu-Dănuţ 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 (with three layers: physical, data link and application, ISO-OSI standard). Examples for industrial network: CAN (Controller Area Network) and AS-I (Actuator/sensor Interface).

**Fifth Year of Study (AAI)**

**AAI-5-01: Equipments for Motion Control**
Lect. Dr. Eng. Sorin NANU

**AAI-5-02: Control Systems Based on Microprocessor Equipments**
Lect. Dr. Eng. 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 in choosing a bus for control systems. Description of measurement and control SBC, digital and analog input/output boards. Using SBC for measuring 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.

**AAI-5-03: Control of Electrical Drives**
Assoc. Prof. Dr. Eng. Constantin VOLOŞENCU

**AAI-5-05: Complex Automation**
Prof. Dr. Eng. Octavian PROŞTEAN
The aim of the course is to provide grounding in the concepts, the main aspects of modeling, analysis and
design methods of some special system's categories, such as: Large Scale Systems, Systems with Distributed Parameters, Robust Systems, Variable Structure Control Systems and Hierarchical Systems. There are presented examples and representative study cases regarding each type of studied system.

AAI-5-06: Advanced Control Systems (Prof.Dr.Eng, Radu-Emil PRECUP)
Definition of model-based predictive control problem; models and predictors; integral quadratic objective functions; development of unified predictive control law; predictive control of multivariable plants; structures and development of binary control systems; aspects concerning auto-tuning control systems; applications to time-delay and MIMO systems.

AAI-5-07: Norms, Standards and Quality Guarantee (Assoc.Prof.Dr.Eng. Constantin VOLOSCANU)

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.

AAI-5-09: Windows Programming (Prof.Dr.Eng. 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 PocketPC developed with Embedded Visual C, improvements in Visual C.NET.

AAI-5-10: Software Engineering (Prof.Dr.Eng. 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 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.

AAI-5-11: E-Commerce (Prof.Dr.Eng 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.

AAI-5-12: Interactive Simulation Tools (Assoc.Prof.Dr.Eng. 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, selecters/routers, data collectors, timing and computational nodes, etc. are described.

AAI-5-13: Telemedicine (Prof.Dr.Eng. Lăcrămioara STOICU TIVADAR)
Objectives: Study of the integration and communication between healthcare systems, data transmission, remote access to 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.

AAI-5-14: Software Design Management in Health Informatics (Prof.Dr.Eng. Vasile STOICU TIVADAR)
Objective: 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 life 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 (definitions, general characterization, structural definition elements, performances). Development methodology of the expert systems. The formalism of the expert systems. Analysis of

AAI-5-17: Introduction to Robot Control (Prof. Dr. Eng. Gheorghe-Daniel ANDREESCU) Industrial robot generation types; Geometrical and kinematical models; Trajectory generation, 2D orthogonal interpolation algorithm, applications; Control structure for 1 axis module, robust control; Advanced control: model reference, dynamic, force control; Main tasks – software structure; Case study: Hierarchical control for a point to point 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.


AAI-5-19: Control Systems for Servo-Drives (Prof. Dr. Eng. Gheorghe-Daniel ANDREESCU) Requirements, specific applications for servo-drives; Orthogonal models for electrical machines, Voltage source inverter; Permanent magnet synchronous motor and Induction motor drives; Experimental identifications of parameters; Vector controls: 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; Implementations using microcontroller, DSP: applications, interfaces, programming.


AAI-5-21: Java Programming (Prof. Dr. Eng. Nicolae ROBU) In the first part, the course presents the Java philosophy, the different types of Java programs: standard applications, applets, beans, servlets, aglets, and handlers and the components of JDK programming environment. It continues with the presentation of Java alphabet, constants, types, instructions and elementary program structure. Follow Java object oriented approach, then the arrays and the exceptions. An important part is dedicated to the threads’ problems and methods of synchronization used in concurrent programming in Java. The last part treats the Java facilities for graphical interfaces design, of coarse event oriented. Inclusive the applets development problems is approached.


AAI-5-23: Real Time Operating Systems (T. Assist. Eng. Dan UNGUREANU) The course creates capacities in the field of real time systems. The course presents the base elements of a real time operating system with direct exemplification of RTOS QNX. It follows: the presentation of structure and role of the microkernel; the inter-process communication 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.

AAI-5-25: Database Programming Technologies (Assoc.Prof.Dr.Eng. Ioan FILIP)
Programming technologies used to develop database applications (client side programming): ODBC, ADO, ADO.NET. Database applications development using ADO.NET library and C# language. Delphi database programming based on ODBC and ADO techniques (using Data Access, Data Control, ADO, QReport libraries). Client-server and local database.

AAI-5-26: CASE Tools (Assoc.Prof.Dr.Eng. Ioan FILIP)
The course presents basic issues of software engineering and a set of software tools used to manage the configuration of the software projects, project versioning, fault reports management, automated testing: Clearcase, CVS - Concurrent Versioning System, WinRunner, ARTS. Also there are presented the formal language SDL and the related tool GEODE.

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.

AAI-5-28: Virtual Instrumentation in Control (Assoc.Prof.Dr.Eng. Constantin VOLOSENÇU)

First Year of Study (Master, AS)

AS-1-01: Complements of Systems Theory and Quality Engineering 1 (Prof.Dr.Eng. 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. The competencies created by the course are: Generating basic knowledge in the Quality Engineering, particularly in the frame of quality assurance of control systems, Generating skills in using standards series ISO 9000.

AS-1-02: Modern Control Theory 1 (Prof.Dr.Eng. Radu-Emil PRECUP)
Development of adaptation strategies for fuzzy parameter tuning in case of several controller structures: control structures with parameter tuning of conventional controllers; control structures with fuzzy parameter tuning of PI-fuzzy controllers; stability analysis methods for fuzzy control systems: state-space approach, Popov’s theory, Lyapunov’s theory, circle criterion, harmonic balance method; elements of optimal fuzzy control.

AS-1-03: Artificial Intelligence and Knowledge Engineering (Prof.Dr.Eng. 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.

AS-1-04: Neural Networks (Prof.Dr.Eng. Nicolae ROBU)
The course starts with the main notions in the field. Follows the presentation of McCulloch-Pitts neural model and of the classes and main topologies of neural networks: the feed-forward neural networks (the simple perceptron, the unilayer and the multilayer multiperceptron), the bidirectional neural networks (the “associative memory” network, the “Hopfield” network). Then, it presents the ways in neural networks learning and the main algorithms and techniques for each topology; with a special attention to the error back propagation. Finally, the classical critical aspects related to the neural networks are treated.

AS-1-05: Complements of Systems Theory and Quality Engineering 2 (Prof.Dr.Eng. Toma Leonida DRAGOMIR)
Course content: Knowledge based systems. Interpolative systems in process control (based on fuzzy logic, RIP method and neural networks). Hybrid systems.

AS-1-06: Modern Control Theory 2 (Prof.Dr.Eng. Ștefan PREITL)
Advanced multivariable control design: aproach 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 autotuning of controllers. Modern approaches in predictive control. Modern approaches in 2-DOF control structures.

AS-1-07: Adaptive Control Systems (Prof.Dr.Eng. Octavian PROŞTEAN)
Adaptive systems problematic and principles. Adaptive control structures. Model-reference adaptive control systems. Self-tuning adaptive control systems. Self-tuning control strategies synthesis: Minimum variance basic control strategy, Modified minimum variance control strategy, Minimum variance control strategy with measurable perturbation's compensation,

AS-1-08: Genetic Algorithms (Prof.Dr.Eng. 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.

3.2.A.3 Syllabus of the Courses Taught by Staff of the Other Departments

First Year of Study (SE)

SE-1-01: Mathematical Analysis (Prof.Dr. Octavian LIPOVAN)
The course provides a theoretical introduction and solutions to typical problems in Differential Calculus and Multiple Integrals. The main objectives are to consolidate the student’s knowledge of the following concepts: convergence, limit, continuity, differentiability, partial derivatives, Taylor's and Laurent's series expansion, local extrema and Riemann integrability. The students will gain abilities to encompass the fundamental elements of mathematical reasoning, to distinguish between different levels of abstraction, and a coherent capacity of reasoning based on a sequence of logical deductions.

SE-1-02: Algebra and Geometry (Assoc.Prof.Dr. Dorina -Marieta RENDI)
The objective of the course is to give a theoretical introduction and solutions to typical problems in Algebra and Geometry, such as: linear spaces and subspaces, basis and dimension of a linear spaces, linear mappings, matrix of a linear mapping, eigenvalues and eigenvector, diagonal form of a matrix, quadratic forms and the canonical form, Euclidean linear spaces, orthogonal bases, orthogonal and simetric transformations, affine spaces, the straight line and the plane, conix and quadrix, differential geometry of curves and surfaces.

SE-1-04: Physics (Lect.Dr. Ioan ZAHARIE)
Objective: give to students the basic notions in physics that will allow a better understanding of the physical effects they are bound to encounter during professional life. The students will be able to use the appropriate tools to estimate the consequences of the different effects with the appropriate theoretical tools. Contents: Mechanics – conservation laws; Oscillations - free, damped and forced oscillations; Waves – waves phenomena; Thermodynamics and statistical physics - basics; Quantum mechanics - experimental bases; Solid state physics - electrical, thermal, magnetic and optical properties.

SE-1-05: Fundamentals of Mechanical Engineering (Prof.Dr.Eng. Doina DRÂGULESCU)
Course contents: 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; Static modeling of rigid bodies systems (mechanical torques, 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).

SE-1-10: Special Mathematics (Prof.Dr. Octavian LIPOVAN)
Objectives: to consolidate the student’s knowledge of Integral Calculus (Line Integrals Surface Integrals, Integrals Theorems) Operational Calculus (Laplace Transform, Fourier Transform) and Differential Equations, to identify specific theoretical concepts in practical situations, to analyze practical and mathematical contexts using mathematical language, to formulate a practical problem in mathematical terms, to solve the problem and interpret the result. The competencies created are: computational skills, the ability to discover analogies between heterogeneous situations and to make interdisciplinary connections to use the specialized literature effectively and efficiently.

SE-1-13: Fundamentals of Electrical Engineering (Prof.Dr.Eng. Dumitru RADU)
The main objective of the course is the assimilation of basic knowledge of electrical circuits and electromagnetic field. The basic physical quantities, the main laws and theorems, and the analyzing methods are presented. Linear and nonlinear DC circuits, sinusoidal steady-state linear circuits, and circuits in transient state are studied. Also static electric and magnetic fields, electromagnetic induction phenomenon and electromagnetic wave equations are analyzed.

Second Year of Study (SE)

SE-2-02: Mechanical Systems Modeling (Prof.Dr.Eng. Doina DRÂGULESCU)
Course contents: 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).

SE-2-07: Culture and civilization (T.Assist.Eng. Viorel SÎRBU)
The aim of the course is to provide a grounding in the European civilization and culture as well as the history of the European Union. Contents: introductory elements of culture and civilization, the main European treaties, the institutional structure of the European Union, common and specific elements at European countries, European values and symbols, the future of the European Union, Romania and the European Union.

SE-2-11: Measurements, Sensors and Transducers (Prof.Dr.Eng. Dan STOICIU)
Course contents: 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, pressure, level, flow).

SE-2-16 : Microeconomics (Assoc. Prof. Septimiu POP)
Objective: Study of fundamentals of basic theory of microeconomics and contemporary market economy. Contents: general presentation of microeconomics, the contemporary market economy, economic agents, production factors, economic competition, offer and demand, money, income, profit, production costs.

AAI-3-11: Economy (Assoc.Prof.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.

Fourth Year of Study (AAI)
AAI-4-01: Finances of Trading Companies (Lect.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.

AAI-4-12: Marketing (Prof.Dr.Eng. Anghel TÂROATĂ)
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.

AAI-4-28, AAI-5-29: Communication Skills (Assoc.Prof.Dr. Gabriela PROŞTEAN)
“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).

Fifth Year of Study (AAI)
AAI-5-04: Non Electrical Actuators (Lect.Dr.Eng. Adriana MANEA)

AAI-5-16: Biomedical Engineering (Prof.Dr.Eng. Mirela TOTH-TAŞCĂU)

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 equipment. There are studied different medical equipment - for diagnosis, therapy and laboratory equipment 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.
### 3.2.C Computer and Software Engineering Section

#### 3.2.C.1 Curricula

Computers and Information Technology Specialization (CTI, 4 years)

**First Year of Study**

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<tr>
<th>Nr. &quot;xx&quot;</th>
<th>Course Name (Code: &quot;CTI-1-xx&quot;)</th>
<th>Credits</th>
<th>Total Hours</th>
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<td>Course</td>
<td>Seminar</td>
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<td>01</td>
<td>Mathematical Analysis</td>
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<td>02</td>
<td>Algebra and Geometry</td>
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<td>03</td>
<td>Physics</td>
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<td>04</td>
<td>Computer Programming</td>
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<td>05</td>
<td>Discrete Logic and Structures</td>
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**Second Year of Study**

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## Computers Specialization (C, 5 years)

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### Master Specialization: Advanced Computing Systems (ACS, 2 years)

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Second Year of Study

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3.2.C.2 Syllabus of the Courses Taught by the Department Staff

First Year of Study (CTI)

CTI-1-04: Computer Programming (Prof.Dr.Eng. Horia CIOCÂRLIE)
The aim of the course is to provide the fundamental programming concepts with C language examples. Thus, of the following notions will be presented: the predefined data types, the constants, the variables, the expressions, the standard writing and reading functions, the statements, the user defined functions, the structured data types, the pointers and the dynamic memory allocation.

CTI-1-05: Logic and Discrete Structures (Prof.Dr.Eng. Marius CRIŞAN)
The course discusses integers, propositions, sets, relations and functions, which are all discrete. The course starts introducing sets, operations on sets, and properties of set operations. Then, graphs and trees, functions, and relations are studied. Finally, propositional and first-order predicate calculus, and computational logic are introduced. After this course students will understand concepts associated with discrete objects, their properties, and relationships among them. Students will obtain skills in discrete structures and logic, to be further used in computer science.

CTI-1-14: Programming Techniques (Prof.Dr.Eng. Horia CIOCÂRLIE)
The object of the course consists of completing the programming knowledge achieved during the initiating programming course, with more C facilities and with programming techniques that are specific to an advanced programming course. Thus, the following notions will be presented: the file, the pointer and the memory dynamic allocation, the dynamic data structures, the interface of UNIX operating system, the abstract data types, the searching and sorting techniques.

CTI-1-15: Digital Logic (T.Assist.Eng. Adrian MIHĂILESCU)
The aim of the course represents the analysis and synthesis of combinational and sequential digital devices providing knowledge of minimization methods of Boolean functions and synthesis techniques of switching functions by means of logic gates, encoders, decoders, multiplexers, FPLA, PROM memories, programmable structures. The sections regarding sequential automatata synthesis provides grounding in the theory of finite state automata, minimization methods, synthesis techniques of sequential synchronous circuits via ASM diagrams using bistables, PROM memories, transfer relations. The theoretical aspects are being associated with series of relevant applications.

Second Year of Study (CTI)

CTI-2-02: Data Structures and Algorithms (Prof.Dr.Eng. Vladimir CREŢU)
It is one of the fundamental courses in the domain. Its main objectives are to present data structures as abstract data types in strong interdependency with the algorithms implementing the specific operators defined on these types. It requires as prerequisite medium level programming knowledge, preferably C. The main topics are: Fundamental Data Structures (Data types, Abstract Data Types-ADT, Objects): Algorithms (Definition, Analysis, Asymptotic Notation, Profiling): Sorting (Internal, External); Strings (ADT, Implementation, String Search); Recursion (Algorithms, Data Structures); Lists (ADT, Implementation, Circular, Double Linked, Stacks, Queues. Multilists, Generalized); Tables (ADT, Implementation Techniques, Hash).

CTI-2-03: Object-Oriented Programming (Prof.Dr.Eng. Ioan JURCA)
This course presents the main concepts and techniques of object-oriented programming, using as a vehicle the Java programming language. At the end of the semester the students must be able to design and implement programs of medium complexity according to the objectual paradigm.

CTI-2-05: Computer Architecture (Prof.Dr.Eng. Mirecu VLĂDUTIU)
This course is aiming at providing knowledge on the structural units as computing system architecture components. Revealing the performance discrepancies between the functional units of the computer is also emphasized, so that searching for its optimal usage becomes possible.
CTI-2-06: Digital Circuits and Signals (Prof.Dr.Eng. Mircea STRATULAT)
The main objectives of the course are: Study of the analysis methods of digital signals (ideal and real-life digital signals, elementary signals); Integral-differential methods of analysis, associated to circuits; Methods of effect superposition; Dynamic parameters of digital devices and circuits; The duality of numeric circuits (logic and electronics, design of numeric circuits).

CTI-2-11: Algorithm Design and Analysis (Prof.Dr.Eng. Vladimir CREŢU)
The course presents aspects related to algorithms design and performance analysis in the context of the advanced data structures. Prerequisite: Data Structures and Algorithms course. Main topics: Trees (Abstract Data Type - ADT Tree, Implementation, Binary, Binary Search, Trie, Balanced, AVL, Optimal Search, Huffman, B-Trees, Binary B-Trees); Sets (ADT Set, Advanced Implementations, Merge&Find, Merge&Split); Graphs (ADT, Implementation, Undirected, Fundamental Traversal, Spanning Trees, Graphs and Connections, Articulation Points, Biconnected Components); Weighted Graphs, Minimum Cost Spanning Trees; Directed Graphs, Directed Acyclic Graphs; Strong Components; Network Flows; Graph Matching.

CTI-2-12: Fundamentals of Software Engineering (Prof.Dr.Eng. Ioan JURCA)
The course presents the main concepts, methods and techniques of software engineering, with an emphasis on object orientation and iterative development. All software process stages (requirements specification, design, implementation and testing, evolution) are briefly covered. At the end of the semester the students must be able to appreciate the importance of applying engineering methods to develop software products of high quality, delivered on time and within budget.

CTI-2-14: Computer Organization (Prof.Dr.Eng. Mircea VLĂDUTIU)
This course presents the way that central processing units function. In that respect, the instruction set design and evaluation principles are provided. At the same time, the microprogramming design techniques for control units are pursued.

CTI-2-15: Integrated Circuits (Prof.Dr.Eng. Mircea STRATULAT)
The main topics of this course are: Definition of the specific parameters of integrated circuits; The TTL family of integrated circuits (the standard series, the TTL series: S, LS, AS, ALS, F); Power, open-collector circuits with high impedance, bus drivers; The NMOS family of integrated circuits; The CMOS family (standard series, HCMOS, ACMOS, BiCMOS).

CTI-2-16: Fundamental Concepts of Programming Languages (Prof.Dr.Eng. Horia CIOCĂRLIE)
The object of course is to study the programming languages. We are interested in studying the fundamental concepts that are at the base of programming language design and the development of these concepts together with the evolution of programming languages. Also we shall categorize the programming languages by family, thus facilitating their study and understanding. The content of the course is: 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.

Third Year of Study (C)

C-3-02: Computer Engineering 1 (Prof.Dr.Eng. Mircea VLĂDUTIU)
The course is focusing on the models and methods that are used for the design and analysis of fault tolerant and highly reliable computer systems. The fault tolerance objective is paramount in implementing application specific systems like communication networks and flight control. This course aims at providing acquaintance with the basic and state-of-the-art concepts for the design and analysis of fault tolerant systems. Some commercial fault tolerant systems will be studied, along with the techniques used for designing them.

C-3-03: Large-Scale Integrated Circuits (Prof.Dr.Eng. Mircea STRATULAT)
Course contents: ECL integrated circuits, ECL family of integrated circuits, other types of ECL integrated circuits, I2L integrated circuits, flip-flop bi-stable integrated circuits, integrated Schmitt triggers, flip-flop mono-stable circuits, flip-flop a-stable circuits, family of integrated circuits.

C-3-04: Data Structures and Algorithm Analysis (Prof.Dr.Eng. Vladimir CREŢU)
The course presents aspects related to algorithms design and performance analysis in the context of the advanced data structures. Prerequisite: Data Structures and Algorithms course. Main topics: Trees (Abstract Data Type - ADT Tree, Implementation, Binary, Binary Search, Trie, Balanced, AVL, Optimal Search, Huffman, B-Trees, Binary B-Trees); Sets (ADT Set, Advanced Implementations, Merge&Find, Merge&Split); Graphs (ADT, Implementation, Undirected, Fundamental Traversal, Spanning Trees, Graphs and Connections, Articulation Points, Biconnected Components); Weighted Graphs, Minimum Cost Spanning Trees; Directed Graphs, Directed Acyclic Graphs; Strong Components; Network Flows; Graph Matching.
C-3-05: Assembly Language Programming (Prof.Dr.Eng. Ionel JIAN)
The course pursues knowing (knowledge of): the 80x86 instruction set, the addressing modes, assembly language programming techniques, the use of subroutines, DOS functions, macro instructions, ASCII to binary and binary to floating point conversion programs, 8087 math coprocessor structure and programming.

C-3-06: Digital Microsystems Design (Prof.Dr.Eng. Mirecea POPA)
The discipline presents typical problems in designing digital micro-systems: microprocessors, 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 (8251 for serial interfaces, 8253 for timing and event counting applications, 8255 for parallel interfaces) digital micro-systems with microcontrollers, typical applications.

C-3-10: Computer Engineering 2 (Prof.Dr.Eng. Mirecea VLĂDUȚIU)
The course is focused on models and methods used for the analysis and design of IO systems, interconnections in digital systems and error control. Error management is crucial for communication and storage networks, while performance is another crucial target. The course provides the basics involved in performance design and methods for performance analysis and also approaches the topics of error detecting and correcting codes and dependable synthesis for memory units and processors.

C-3-11: Microprocessor-Based Systems (Prof.Dr.Eng. Mirecea POPA)
The discipline approaches the following topics: General characteristics of 16 and 32 bits microprocessors, X86 microprocessors (8086 and 80386), 680x0 microprocessors (68000 and 68030), the PC microcomputer: parallel, serial and USB ports, motherboard, interrupt system, typical applications.

The course will introduce the fundamentals of computer graphics programming, various implementations and algorithms for specific operations, with emphasize on analysis and performance evaluation: line algorithms, polygon drawing, clipping and filling, circles and ellipses, 2D and 3D transformations, view transformations, curves and surfaces.

C-3-14: Theory of Computation (Prof.Dr.Eng. Marius CRİŞAN)
The course covers the theoretical principles of informatics and presents the basic models of computation along with the corresponding grammars. The problem of decidability and the classes of decidable problems are also studied. The fundamentals of complexity theory with the complexity classes constitute the second part of the course. Finally, the problem of physical modeling of computation is introduced.

C-3-15: Fundamental Concepts of Programming Languages (Prof.Dr.Eng. Horia CIOCÂRLIE)
The object of course is to study the programming languages. We are interested in studying the fundamental concepts that are at the base of programming language design and the development of these concepts together with the evolution of programming languages. Also we shall categorize the programming languages by family, thus facilitating their study and understanding. The content of the course is: 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.

C-3-16: Semiconductor Memories (Prof.Dr.Eng. Mirecea STRATULAT)
Course contents: Large scale integrated circuits, fixed semiconductor memories, programmable logic devices (PLD), RAM memories, extending memory capacity, other types of semiconductor memories.

C-3-17: Application-Oriented Embedded Systems (Prof.Dr.Eng. Mirecea POPA)
The discipline presents the place and role of microcontrollers, microcontroller structure, microcontroller and microprocessor-programmable dedicated circuit relation, microcontroller-DSP relation. Several families of microcontrollers are described: the 80C51 family (80C51 microcontroller, 8xC552 microcontroller) the PIC microcontrollers (PIC 16F8X microcontrollers), the Motorola M68HC11 family (M68HC11 microcontrollers), the Siemens SAB8xC166 microcontrollers. Typical applications are presented: external memories connection, microcontrollers in the automotive field, embedded Internet.

Fourth Year of Study (C)

C-4-02: Input-Output Systems (Prof.Dr.Eng. Crișan STRUGARU)
This course presents the input-output subsystem in a computer: interrupt controller, DMA controller, keyboard, printers, disk controller, hard disk and floppy disk, video card.

C-4-03: Database Systems (Prof.Dr.Eng. Ionel JIAN)
Relational database systems design and implementation principles are shown. Sequential and direct “access to information” modes are analyzed using different search conditions and looking to database access speed gains and protection. The way the "graphical user interfaces" are implemented using Windows objects is also presented in this course. Database design elements (principles) based on
structure normalization and relational algebra are also covered.

C-4-04: Operating Systems 1 (Prof.Dr.Eng. Ioan JURCA)
This course is an introduction to the main concepts of general-purpose operating systems, illustrated with UNIX and Windows-type implementations. At the end of the semester the students must be able to understand the structure of the different components of an operating system, to write scripts and also programs that use directly operating system calls.

C-4-05: Compiling Techniques (Prof.Dr.Eng. Horia CIOCĂRLIE)
The compilation techniques are specialized programming techniques that are used for both translation program writing and for developing a variety of translator-like programs: operating systems, database management systems, text editors, utility programs and even simple applications which involve, as an user interface, a communication (command) language. Thus, the course presents the most used lexical and syntactic analysis techniques, the semantic analysis and the intermediate code generation.

C-4-06: Digital Signal Processing (Assoc.Prof.Dr.Eng. Mihai MICEA)
During this course, the students will gain detailed knowledge on the main techniques involved in the digital conversion, analysis and processing of signals and systems, both in the time and frequency domains. Students will also gain abilities of using general purpose and specialized digital processing systems (e.g. digital signal processors, DSPs) to apply these techniques and knowledge in various engineering domains.

C-4-07: Software Engineering 1 (Prof.Dr.Eng. Ioan JURCA)
The course presents the main concepts, methods and techniques of software engineering, with an emphasis on object orientation and iterative development. All software process stages (requirements specification, design, implementation and testing, evolution) are briefly covered. At the end of the semester the students must be able to appreciate the importance of applying engineering methods to develop software products of high quality, delivered on time and within budget.

C-4-08: Automated Speech Processing (Lect.Dr.Eng. Marian BOLDEA)
Course contents: introduction, speech producing and modeling, vocal signal analysis, automatic speech synthesis, automated speech recognition, examples.

C-4-09: Computer Aided Design Techniques (Assoc.Prof.Dr.Eng. Doru TODINCA)
The aims of the course are: Modeling and simulation of digital systems using hardware description languages; developing techniques for structural design of computer systems with VHDL; learning VHDL, as a representative hardware description language.

C-4-10: Quality in Information Technology (T.Assist.Dr.Eng. Constantin COSOVAN)
The objectives of the quality characteristics. Quality systems, ISO 9000 and 25000 standards, norms, guides, and the audit of quality systems. The management of total quality, implementation and audit. Hardware and software quality, CMMI methodologies, metrixes. Technology; definitions, its science and functions. Information with the classical, algorithmic and quantic meaning.

C-4-13: Local Area Computer Networks (Prof.Dr.Eng. Crișan STRUGARU)
This course presents the main layers, protocols and applications available in local area networks. Physical, data and networks layers from the OSI model are covered. Different types of LAN and their protocols are covered: Ethernet, Token ring/bus, FDDI, ISDN, ATM.

C-4-14: Basic Concepts of Artificial Intelligence (Prof.Dr.Eng. Stefan HOLBAN)
This course presents many concepts in artificial intelligence (AI) and problem-solving systems in terms of the Prolog language. Its stated purpose is to provide an informal, hands-on approach to learning AI. The main chapters of the course emphasize, in logical progression, on topics including knowledge representation, inferences on the representation, rule-based systems codifying classes of inferences, the search as an abstraction of rule-based systems, extensions of methodology, and evaluation of systems.

C-4-15: Modern Digital Telecommunications (Assoc.Prof.Dr.Eng. Mihai MICEA)
During this course, the students will learn the principles of information transmission over analog and digital channels, the architecture and operation basics of digital fixed and mobile telecommunication standards, with special emphasis on Alcatel systems (Alcatel 1000 E 10 digital switching center, GSM and GPRS equipments, etc.). Students will also gain, through practical workshops on Alcatel training equipments, the necessary abilities to configure and operate the digital telecommunication systems.

C-4-16: Peripheral Equipments (Prof.Dr.Eng. Crișan STRUGARU)
This course presents the input-output devices and equipments, starting from standard busses description, continue with different types of I/O devices (mouse, modem, scanner, fax and CRT monitor) and in the end high level equipments are described like mobile phone, digital TV, weather satellites. Other topics like security, encodings are covered.

C-4-17: Digital Data Acquisition and Processing (Prof.Dr.Eng. Mirecu STRATULAT)
Course contents: operational amplifiers, instrumental amplifiers, isolation amplifiers, signal multiplexing,
signal sampling, digital-to-analogue converter, analogue-to-digital converter, data acquisition systems and interfacing, data distribution system and interfacing.

C-4-18: Database Systems Design (Prof.Dr.Eng. Ionel JIAN)
The course presents the relational (object oriented) database building principles and corresponding implementation methods. Illustration of these principles is done in Visual dBase, SQL and PL/SQL Oracle, looking to database access speed gains and protection. Graphical interfaces are implemented using Windows objects; user defined classes are developed and used. Database design is based on normalized structures and finally on implementation in Oracle Developer.

C-4-19: Operating Systems 2 (Prof.Dr.Eng. Ioan JURCA)
This course presents the concepts and algorithms used in designing the main modules of operating systems: process synchronization and communication, memory management (including virtual memory), scheduling, input/output management, file systems, security.

C-4-20: Programming Systems for Computer Networks (Prof.Dr.Eng. Ioan JURCA)
The course presents the most important techniques for programming distributed software applications: sockets, remote procedure calls, remote method invocations, Enterprise Java Beans, Web services. At the end of the course the students must be able to decide when it is appropriate to use each such technique, and to design and implement such applications.

C-4-21: Internet Technologies (T.Assist.Eng. Carmen HOLOTESCU)
The main objectives of the course are: the design of interactive web pages and the design of the components of a web portal.

C-4-22: Hardware Resource Handling Techniques (Assoc.Prof.Dr.Eng. Marius MARCU)
This course presents the interface between I/O physical devices and modern operating systems (Windows and Linux) using device drivers. The courses of this discipline cover topics like Plug-and-Play, I/O detection, I/O synchronization, I/O request level, power management, thermal management and the main topic is different types of device drivers’ development.

C-4-25: Computer System Security (Assoc.Prof.Dr.Eng. Marius MINEA)
Present the main security problems of computer systems and networks, basic notions in defining security, mathematical methods for modeling and analysis, and the fundamentals of implementation, from cryptography to security protocols and services. Gain the ability to question the security of a system, to evaluate it and to use techniques and tools for detecting security problems and securing systems.

Fifth Year of Study (C)
C-5-01: Computer Network Design (Prof.Dr.Eng. Crișan STRUGARU)
This course presents ATM and GSM computer networks design. ATM model, ATM frames, QOS, traffic control and congestion control, ATM devices are covered at the ATM side. For the GSM networks: GSM architecture and equipments, radio channels allocation, localization, multiplexing, roaming and other aspects are presented.

C-5-02: Fault Tolerant Systems (Lect.Dr.Eng. Lucian PRODAN)
Dependability concerns have to be addressed by engineering design since neither computer hardware nor software can be made totally immune to unpredictable behavior. A key issue in achieving dependable design is fault tolerance. This course presents the causes of computer system failures (impairments to dependability) and techniques for ensuring correct and timely computations despite such impairments. Examples will also be given on checking computing structures for defects and assessing their reliability levels.

C-5-03: Parallel Architectures (Prof.Dr.Eng. Mircea POPA)
The discipline approaches the following topics: Parallel system performance, Pipeline based architectures, Memory organization in parallel systems, Interconnection networks and Algorithms parallelization.

C-5-04: Data Coding Techniques (Lect.Dr.Eng. Marian BOLDEA)
Course contents: introduction, discrete sources of information, data compression, error control.

C-5-05: Distributed Computing Systems (Assoc.Prof.Dr.Eng. Marius MARCU)
The course presents the most important distributed architectures and their technologies: multiprocessor systems, multicore systems, multicomputer systems, computer clusters, grid computing.

C-5-06: Computing Systems Reliability (Lect.Dr.Eng. Mihai UDRESCU)
As the common perspective on computer systems is driven by time and space requirements, this course proposes a reliability-based approach. Investigating the computer reliability issues is now motivated by the problems brought by the emerging computing technologies. The emphasis is put on the methodologies and techniques which are employed for assessing and improving the reliability (and availability) of computer hardware, software and networks.
C-5-07: Image Processing and Recognition (Assoc.Prof.Dr.Eng. Horatiu MOLDOVAN)
The image processing techniques are necessary for two categories of applications: - increasing the image quality to facilitate the human interpretation and – data processing to facilitate the machine perception. To reach the recognition level there are necessary some previous steps: image acquisition, preprocessing, segmentation, representation and description, recognition and interpretation.

C-5-08: Artificial Intelligence Systems (Prof.Dr.Eng. Marius CRiŞAN)
The course presents the theoretical foundations of artificial intelligence (AI). First, representation and methods in artificial intelligence are introduced, followed by elements of logic and resolution-based proving. Finally, some learning concepts and cognitive models are studied. Upon completion of this course students will be able to apply AI techniques for practical solving problems.

C-5-09: Software Engineering 2 (Assoc.Prof. Dr.Eng. Radu MARINESCU)
The objective of the course is to familiarize the students with advanced design techniques for large applications, with an emphasis on the design of object-oriented software systems, enabling the students to learn to define design solutions leading to comprehensive and maintainable software which is immune to future changes of specifications.

C-5-10: Real-Time Programming Systems (Prof.Dr.Eng. Vladimir CREŢU)
The course presents the methodological and theoretical support for analyze, design, implementation, evaluation and testing of the real-time systems and applications. Main topics: Real-Time Systems: Definition; Modeling Issues; Modeling Heuristics; Modeling Transformations; Control Transformations; Data Transformations; Stored Data; Organizing the Model; Essential Model Heuristics; Defining System Context; Modeling External Events; Deriving the Behavioral Model; Implementation Modeling Heuristics.

C-5-11: Modeling and Simulation (Prof.Dr.Eng. Stefan HOLBAN)
Complex problems presented to industry often require the application of modeling techniques, which include a wide array of mathematical optimization approaches, network modeling methods, queuing models and simulation. Discrete event simulation is often used to develop and analyze system models which are too complex, dynamic or stochastic for the efficient application of mathematical optimization. The ability to model, analyze and design complex systems is a key skill that differentiates industrial engineers and engineering management specialists from their counterparts in other engineering disciplines.

C-5-12: Translator Design (Prof.Dr.Eng. Horia CIOCÂRLIE)
The course presents advanced programming techniques that are useful in wide range of applications in which two systems communicate, the most frequent case being that when the two systems are the human user and the computer. This knowledge is important even in the phase of defining and designing a communication language. When correctly applied, they can lead to a simplified language and thus to an efficient translation process.

C-5-13: Artificial Intelligence (Prof.Dr.Eng. Stefan HOLBAN)
This course provides an introduction to search techniques in state space. Students will learn the basics of search algorithm development with an emphasis on real world applications. Topics include Search Problems and State Spaces Blind Search (Depth-First Breadth-First Iterative Deeperen ) Heuristic Search ( Hill Climbing Best First A* Algorithm A* Search with Simple Pruning AND/OR Trees) Game Playing (Game State Evaluation Minimax Method Alpha-Beta Pruning Comparing Alpha-Beta with Minimax ). This course gives a wide exposition of these techniques and their software tools.

C-5-14: Expert Systems (Assoc.Prof.Dr.Eng. Dan PESCARU)
This course concentrates on main expert system implementing methods. It emphasizes domains for applications, strengths and week points of all presented methods. Methods covered: decision support systems based on statistical data, knowledge based systems, fuzzy expert systems, symbolic processing graphs and neural network based expert systems. The course will develop students’ ability to implement complex expert systems. Every method is accompanied by practical real world examples covering multiple domains.

C-5-15: Distributed Database Systems (Prof.Dr.Eng. Ionel JIAN)
This course presents define and use Oracle PL/SQL packages and objects, physical and logical organization of data in databases on RAM and disc memory. Configure and administration Oracle Infrastructure components with enterprise Manager, database optimization, queries optimization by cost and heuristic methods. Distributed database design used Internet access technology. Applications developed by Forms&Reports Builder.

C-5-16: Parallel Computing Algorithms (Assoc.Prof.Dr.Eng. Ioana ŠORA)
This course is an introduction to parallel computing, with a focus on the design of parallel algorithms and on techniques for parallelisation of problem solving. Topics include: Taxonomy of parallel computers; Performance metrics for parallel systems; Principles of parallel algorithm design – decomposition
techniques, mapping techniques, parallel algorithm models; Programming using the message passing paradigm; Programming using shared memory.

C-5-17: Computing Systems Testing (Prof.Dr.Eng. Mircea VLĂDUȚIU)
The course introduces fundamentals of theory and practice of detecting failures in complex digital systems, fault analysis, test generation, and design for testability for digital ICs and systems. Covered topics include circuit and system modeling; fault modeling and simulation methods, automatic test pattern generation (ATPG), algorithms for combinational and sequential circuits, testability measures, design-for-testability, VLSI testing issues and processor and memory testing. Hands-on experience with computer-aided test tools will be provided in the laboratory.

C-5-18: High-End Interfaces and Equipments (Prof.Dr.Eng. Mircea STRATULAT)
Course contents: Optical physics, Optical data recording, Optical date reading, CD playback system, Magneto-optical recording, DVD playback system, Blue-ray disc, HD-DVD and HD-TV.

C-5-19: Fuzzy Logic and Applications (Assoc.Prof.Dr.Eng. Doru TODINCA)
The course presents an introduction to fuzzy logic, fuzzy sets and operations with fuzzy sets, fuzzy inference, applications of fuzzy logic, with a focus on fuzzy logic inference circuits and their performance.

C-5-20: Multiprocessor Systems (Assoc.Prof. Dr.Eng. Marius MARCU)
This course presents the hardware architecture and specific elements used in multiprocessor servers. The course covers topics like SIMD, MIMD architectures, memory in multiprocessor servers, synchronization, interconnection networks, multiprocessor server performance, multiprocessor server sizing.

C-5-21: Optical Fiber Transmissions (Prof.Dr.Eng. Mircea STRATULAT)
Course contents: Optical Physics, Transmission through Optical Fibers, Types of Optical Fibers, Fiber Optics Transmitters, Fiber Optics Receivers, Fiber Optic Networks.

C-5-22: Software Verification and Validation (Assoc.Prof.Dr.Eng. Marius MINEA)
Present the theory and practice of ensuring correct and reliable software. Understand and apply testing techniques in various phases of the development process and complement them with static analysis and formal verification. Gain the ability to evaluate importance and limitations of the verification and validation process, to design and effective test plan, to use appropriate tools and to evaluate the possibilities of formalizing and automating testing in a project.

There are presented modern production systems based on the informational and communications technologies that are computer aided with the adherent software. Integration is ensured by the informational system which shapes the modern reengineering architectures with a view to implement the optimum management strategy. The acquired knowledge enables the implementation of the entities required for the upgrading and computer processing of all the components of the production system; the conceiving, the design, the planning, the manufacture, the quality assurance, and the firm management.

C-5-24: Machine Learning (Prof.Dr.Eng. Marius CRÎȘAN)
Upon completion of the course, students will have a broad understanding of machine learning algorithms and their use in data-driven knowledge discovery and program synthesis. Students will be able to identify, formulate and solve machine learning problems that arise in practical applications. Students will have knowledge of the strengths and weaknesses of different machine learning algorithms and be able to adapt or combine some of the key elements of existing machine learning algorithms to design new algorithms as needed.

C-5-25: Advanced Digital Signal Processing (Assoc.Prof.Dr.Eng. Mihai MICEA)
The course focuses on the advanced techniques and algorithms used in digital signal processing. Students will learn the main design and analysis techniques of advanced types of digital filters such as: efficient FIR and IIR filters, adaptive filters, linear prediction and optimum filters. Students will also gain abilities of designing and implementing advanced digital signal processing algorithms and systems using generic and specialized digital devices (Digital Signal Processors – DSPs).

C-5-26: Hardware-Software Co-Design (Prof.Dr.Eng. Mircea VLĂDUȚIU)
This course tackles the fundamental principles of embedded applications design. Unlike the very complex universal computing systems, the embedded systems design can be performed at both hardware and software levels, at the same time. Therefore, this discipline includes the broad area of aspects which are encompassed by the hardware/software design process: hardware component specification models, instruction sets, reconfigurable computing, heterogeneous computer architectures, system-on-chip, code generators and compiling, system level design.

The course will introduce the student to the advanced techniques for generating realistic images. The course will discuss several methods and algorithms and how they can be applied for various purposes, including: hidden surfaces, Z-buffer, color models, illuminating, ray-tracing, radiosity, computer animation.
First Year of Study (Master, ACS)

ACS-1-01: Embedded Systems (Prof.Dr.Eng. Mircea POPA)
The goal of the discipline is to give an overview and also specific knowledge about the Embedded Systems. The following topics are addressed, regarding the Embedded Systems: design requirements, typical structure, hardware design, interrupts, software design (programming language, architectural framework, applicative program), real-time operating systems, testing and debugging, memory management, low power concept and communications between microcontrollers.

ACS-1-02: Mobile Communication Systems (Assoc.Prof. Dr.Eng. Doru TODINCĂ)
The goals of the course are to give an overview of mobile communication systems, with an emphasis on mobile data networks.

ACS-1-03: Advanced Artificial Intelligence and Cognitive Models (Prof.Dr.Eng. Mircea CRISAN)
The course starts with a review of the theory and practice of the most advanced strategies in AI and how to utilize the various techniques in knowledge-based systems. Then, the cognitive processes (perception, memory, language and thought) are investigated. Finally, the main research approaches are presented that may lead to valid cognitive models, suitable for various applications. Upon completion of this course students will be able to provide solutions for solving real human-like problems and develop their own research approaches.

ACS-1-04: Formal Verification (Assoc.Prof. Dr.Eng. Marius MINEA)
Understand the foundations of formal methods and their applicability, be able to model and specify systems formally, use existing languages and tools for modeling, analysis and verification, gain insight into current research. Evaluate the applicability of formal techniques in the verification and validation process, choose and apply appropriate methods and tools.

ACS-1-05: Distributed Systems Design (Prof.Dr.Eng. Ioan JURCA)
This course presents the main theoretical principles underlying the distributed systems, as well as different paradigms used in organizing actual distributed systems. By the end of the course students should be able to analyze and understand various examples of distributed systems, and to find an appropriate paradigm for the architecture of a complex distributed application.

ACS-1-06: Emerging Technologies (Prof.Dr.Eng. Mircea VLĂDĂTUȚIU)
The benefits brought by the new computing technologies are thoroughly explained in this course, along with the difficulties encountered in implementing them. The advent of the first commercial quantum computer (built by D-Wave systems, and presented in the 13th of February 2007) has transformed quantum computation into a trend of paramount importance within the emerging computing technology field. This discipline presents the fundamental features that are making quantum computation able to solve efficiently problems that have inefficient solutions on a classical computer.

ACS-1-07: Software Project Management (Prof.Dr.Eng. Vladimir CREȚU)
The course has as main objective to offer required knowledge and skills for managing software projects. Methods, technologies and specific techniques for software project management are presented. Main topics: SPM definition, objectives, processes, activities, tasks, software developing process, project life cycles, management process; Technologies for SW products development; SW Project Management Fundamentals; SW Size Estimation Methods; SW Costs Estimation Methods; Cost Estimation Models; Parametric Models; The Project Plan; Planning Tools; Acceptance Criteria; The Design Phase.

ACS-1-08: Heuristic Methods (Prof.Dr.Eng. Horia CIOCĂRLIE)
The course presents a class of algorithms that are useful in solving a great variety of programming problems and make a evaluation of efficiency and performance of these algorithms. Thus, the following methods will be presented: the advanced methods of algorithm design, the dynamic programming, the heuristic exploration algorithms, the approximation algorithms, the simulated Annealing, the Tabu Search and the Genetic Algorithms.

ACS-1-09: Software Quality Assurance (Assoc.Prof.Dr.Eng. Radu MARINESCU)
The main objective of the course is to familiarize the students with modern evaluation techniques of software systems, emphasizing on the quality of design and implementation, and approaching in detail the object-oriented software systems.

Second Year of Study (Master, ACS)

ACS-2-01: Component-Based Software Engineering (Assoc.Prof.Dr.Eng. Ioana ŞORA)
The goals of the course are to give an overview of component-based software engineering fundamentals and of the main component technologies. The main topics are: Motivation and concepts of component based software engineering; Definition and specification of components; Component models and software architecture; Software reuse and component based software engineering.

ACS-2-02: Data Mining (Prof.Dr.Eng. Ştefan HOLBAN)
Data mining is a combination of database and artificial intelligence technologies. This course provides the opportunity to learn research skills, practice data structures, and enhance the understanding of
algorithms. It is accessible to students with no prerequisites beyond the traditional data structures course, and allows them to experience both applied and theoretical work in a discipline that straddles multiple areas of computer science. Fundamentally, data mining does two things with data: it finds relationships and makes prototypes.

ACS-2-04: Real-Time UML (Prof.Dr.Eng. Vladimir CRETU)
The course has as main objective to introduce the object-oriented analysis and the design for hard real-time systems using the UML. For these purposes, an object-oriented development approach for real-time systems is introduced as well as the real-time UML. In the last part of the course de MARTE (Modeling and Analysis of Real-Time and Embedded systems) OMG Methodology is presented.

3.2.C.3 Syllabus of the Courses Taught by Staff of the Other Departments

First Year of Study (CTI)

CTI-1-01: Mathematical Analysis (Prof.Dr. Octavian LIPOVAN)
The course provides a theoretical introduction and solutions to typical problems in Differential Calculus and Multiple Integrals. The main objectives are to consolidate the student’s knowledge of the following concepts: convergence, limit, continuity, differentiability, partial derivatives, Taylor’s and Laurent’s series expansion, local extrema and Riemann integrability. The students will gain abilities to encompass the fundamental elements of mathematical reasoning, to distinguish between different levels of abstraction, and a coherent capacity of reasoning based on a sequence of logical deductions.

CTI-1-02: Algebra and Geometry (Assoc.Prof.Dr. Dorina -Marieta RENDI)
The objective of the course is to give a theoretical introduction and solutions to typical problems in Algebra and Geometry, such as: linear spaces and subspaces, basis and dimension of a linear spaces, linear mappings, matrix of a linear mapping, eigenvalues and eigenvector, diagonal form of a matrix, quadratic forms and the canonical form, Euclidean linear spaces, orthogonal bases, orthogonal and simetric transformations, affine spaces, the straight line and the plane, conic and quadrix, differential geometry of curves and surfaces.

CTI-1-03: Physics (Lect. Ioan LUMINOSU)
The objective of the course is to teach the students the basic notions in physics that will allow them to have a better understanding of the physical effects bound to be encountered during their professional life, including: Mechanics (conservation laws), Oscillations (free, damped and forced oscillations), Waves (waves phenomena), Electromagnetism, Quantum mechanics, and Solid state physics

(ACS-2-05: Hardware-Software Codesign (Prof.Dr.Eng. Mircea VLADUȚIU)
This course tackles the fundamental principles of embedded applications design. Unlike the very complex universal computing systems, the embedded systems design can be performed at both hardware and software levels, at the same time. Therefore, this discipline includes the broad area of aspects which are encompassed by the hardware/software design process: hardware component specification models, instruction sets, reconfigurable computing, heterogeneous computer architectures, system-on-chip, code generators and compiling, system level design.

CTI-1-10: Computer-Assisted Mathematics (Assoc.Prof.Dr. Pavel NĂSLĂU)
The course focuses on the theoretical solutions for multiple integrals and differential equations, numerical approximation of curves, numerical calculus in integration, matrix and differential equations. The aim of the course is to provide grounding and skills in mathematics assisted by computer applications, particularly by MATLAB.

CTI-1-11: Special Mathematics (Probability and Statistics) (Prof.Dr. Emilia PETRIȘOR)
Course goals are to introduce the basic concepts of probability theory and statistical inference, with relevance for computer science and computer engineering applications. Topics include: discrete probability space, conditional probability, discrete and continuous random variables, simulation of random variables, finite state discrete time Markov chains, Poisson processes, statistical inference: point estimation, confidence intervals, hypothesis testing.

CTI-1-12: Fundamentals of Electrical Engineering (Prof.Dr.Eng. Dumitru RADU)
The main objectives of the course are to assimilate the basic knowledge of electrical circuits and electromagnetic field. The basic physical quantities, the main laws and theorems, and the analyzing
methods are presented. Linear and nonlinear d.c. circuits, sinusoidal steady-state linear circuits, and circuits in transient state are studied. Also static electric and magnetic fields, electromagnetic induction phenomenon and electromagnetic wave equations are analyzed.

CTI-1-13: Fundamentals of Electronic Engineering (Prof.Dr.Eng. Sabin IONEL)
The course presents in a pragmatic way several types of electronic devices along with their usage within fundamental analogue electronic circuits. Using simple engineering methods and computing approximations, the course develops the basic skills regarding the orders of magnitude. Practical experiments combined with the PSPICE analysis of circuits gain the necessary skills in computer-assisted electronic design. The students will also learn to write engineering reports with the results of measurements, experiments and simulations.

Second Year of Study (CTI)

CTI-2-01: Fundamentals of Mechanical Engineering and Robotics (Prof.Dr.Eng. Dorina DRĂGULESCU)
The main objective of the course is to familiarize the students with the mechanical engineering principles, linking its contents to the knowledge acquired in high school. The basic mechanical movements and their correlations will be analyzed, both from the cinematic and from the dynamics points of view. The study of body systems dynamics is further extended to robots as particular body systems.

CTI-2-04: Measurement Principles and Techniques (Prof.Dr.Eng. Alimpie IGNEA)
The main objectives of this course are: introduction to measurement techniques and metrology; presentation of the main measurement methods and principles in the electric domain and of the blocks specific to electronics instrumentation; electrical measurement of non-electrical values.

CTI-2-07: Communication (Prof.Dr. Georgeta CIOBANU)
This course focuses on providing the students the competences and skills needed for oral and written communication for professional purposes. The main objectives are: development of communicative skills for getting a job; development of optimization strategies for oral expressing and of the team communication skills; development of the skills for correct writing in the future fields of activity.

CTI-2-10: Micro-Economy (Assoc.Prof.Dr. Septimiu POP)
The main objectives of the course are to provide the basic knowledge of the micro-economy theory in contemporary market economy and of the operating principles of the functional market mechanisms.

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.

Third Year of Study (C)

C-3-01: Economy 1 (Assoc.Prof.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.

C-3-07: System Theory 2 (Prof.Dr.Eng. Toma-Leonida DRAGOMIR)
The objectives of the course are: Knowledge and using of terminology and basic concepts regarding non-linear systems; Knowledge and 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 nonlinear models, and analyzing of some problems regarding the structure of control systems.

C-3-09: Economy 2 (Lect.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.

C-3-18: Industrial Robot Dynamics (Prof.Dr.Eng. Doina DRĂGULESCU)
The course focuses on creating the applicative basis necessary for programming and control techniques to be approached by the students during next years of study. The students will also gain skills of working with real-life autonomous systems with the prospects of using automatic-feedback and fuzzy control...
systems involving mechanical movements, dynamic behavior and movement control.

C-3-19: System Identification (Prof. Dr. Eng. Octavian PROŞTEAN)
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.

Fourth Year of Study (C)

C-4-01: Management (Assoc. Prof. Dr. Eng. Gabriela PROŞTEAN)
The course will involve the students in a demanding process of personal and managerial development, learning to enhance individual managerial understanding and effectiveness and as well to work relationships with a diverse group of colleagues. 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.

C-4-12: Marketing (Prof. Dr. Eng. 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.

C-4-23: Professional Communication (Prof. Dr. Georgeta CIOBANU)
The course of Professional Communication aims at developing skills and abilities of oral and written communication for the present and future professional activity of control engineering students. The courses and seminars include: activities to develop and improve communicative skills in applying for a job, strategies to improve in-company oral and written skills for various communication situations, skills of managing technical documentation.

C-4-24: CASE Tools (Assoc. Prof. Dr. Eng. Ioan FILIP)
The course presents basic issues of software engineering and a set of software tools used to manage the configuration of the software projects, project versioning, fault reports management, automated testing: Clearcase, CVS - Concurrent Versioning System, WinRunner, ARTS. Also there are presented the formal language SDL and the related tool GEODE.
3.2.I Informatics Section (3 years)

3.2.I.1 Curricula

<table>
<thead>
<tr>
<th>Nr. &quot;xx&quot;</th>
<th>Course Name (Code: &quot;IF-1-xx&quot;)</th>
<th>Credits</th>
<th>Total Hours</th>
<th>Course</th>
<th>Seminar</th>
<th>Laboratory</th>
<th>Project</th>
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</table>

3.2.I.2 Syllabus of the Courses Taught by the Faculty Staff

First Year of Study (IF)

IF-1-03: Introduction to Computer Programming (Prof.Dr.Eng. 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 of C language (structure of a program, variables, constants), expressions, operators, standard types, standard functions, statements (compound, association, selection, iteration), functions, structured types (arrays, string, structures).

IF-1-04: Logic and Discrete Structures (Prof.Dr.Eng. Marius CRIŞAN)
The course deals with objects such as integers, propositions, sets, relations and functions, which are all discrete. The course starts introducing sets, operations on sets, and properties of set operations. Then, graphs and trees, functions, and relations are studied. Finally, propositional calculus, first-order predicate calculus and computational logic are introduced. At the end of this course students should be able understand concepts associated with discrete objects, their properties, and relationships among them and others. Students will obtain skills in discrete structures and logic, used in the study and practice of computer science.

IF-1-05: Computer Fundamentals (Prof.Dr.Eng. Mircea VLADUŢIU)
Course contents: Digital Concepts (Positional Number Systems: Decimal, Binary, Hexadecimal, Base r; Number System Conversion; Binary Codes: signed numbers, signed-magnitude, complement codes, BCD codes; Binary arithmetic), Boolean Switching Algebra (Binary Logic, Switching Algebra, Reduction of Switching Equations, Combinational Logic Principles (Canonical Forms, Switching Equations, Truth Tables, Karnaugh maps, Quine-McClusky Minimization, Map-Entered Variables, Mixed Logic Combinational Circuits), Analysis and Design of Combinational Logic (Decoders/encoders, Adders/subtracters, Binary comparators, Tristate Buffers, Logic Hazards), Sequential Logic (Flip-flops, Timing Specifications, Counters and Registers), Programmable Logic Devices.

IF-1-11: Computer Assisted Mathematics (Prof.Dr.Eng. 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; numerical solving of ordinary differential equations and systems; optimization problems in automation and informatics.

**IF-1-12: Programming Techniques (Prof.Dr.Eng. Horia CIOCÂRLIE)**


**IF-1-13: Data Structures and Algorithms (Lect.Dr.Eng. Dorina PETRICĂ)**


**IF-1-14: Computer Architecture (Prof.Dr.Eng. Nicolae ROBU)**

Overview on computer architecture. Memories: definition and unit design. Ports: standard input and output ports. Numbers representation: fixed point and floating point (IEEE 754). Arithmetic-Logic Unit: adder, multiplier and divider devices. The registry unit: case studies including the stack implementation and presentation. The command unit: the von Neumann paradigm and the architectural components of a von Neumann command unit, with case studies; instruction coding, including addressing modes; instruction implementation, with examples. Presentation of the waiting mechanism, the bus giving up mechanism and the interruption mechanism.

### 3.2.1.3 Syllabus of the Courses Taught by Staff of the Other Faculties or Departments

**First Year of Study (IF)**

**IF-1-01: Mathematical Analysis (Prof.Dr. Octavian LIPOVAN)**

The course provides a theoretical introduction and solutions to typical problems in Differential Calculus and Multiple Integrals. The main objectives are to consolidate the student’s knowledge of the following concepts: convergence, limit, continuity, differentiability, partial derivatives, Taylor’s and Laurent’s series expansion, local extrema and Riemann integrability. The students will gain abilities to encompass the fundamental elements of mathematical reasoning, to distinguish between different levels of abstraction, and a coherent capacity of reasoning based on a sequence of logical deductions.

**IF-1-02: Algebra and Geometry (Assoc.Prof.Dr. Dorina -Marieta RENDI)**

The objective of the course is to give a theoretical introduction and solutions to typical problems in Algebra and Geometry, such as: linear spaces and subspaces, basis and dimension of a linear spaces, linear mappings, matrix of a linear mapping, eigenvalues and eigenvector, diagonal form of a matrix, quadratic forms and the canonical form, Euclidean linear spaces, orthogonal bases, orthogonal and symmetric transformations, affine spaces, the straight line and the plane, conix and quadrix, differential geometry of curves and surfaces.

**IF-1-06: Culture and civilization (T.Assist. Viorel SÎRBU)**

The aim of the course is to provide grounding in the European civilization and culture as well as the history of the European Union. Course contents: introductory elements of culture and civilization, the main European treaties, the institutional structure of the European Union, common and specific elements at European countries, European values and symbols, the future of the European Union, Romania and the European Union.

**IF-1-10: Special Mathematics (Probability and Statistics) (Prof.Dr. Emilia PETRIȘOR)**

Course goals: to introduce basic concepts of probability theory and statistical inference relevant for computer science and computer engineering applications. Topics include: discrete probability space, conditional probability, discrete and continuous random variables, simulation of random variables, finite state discrete time Markov chains, Poisson processes, statistical inference: point estimation, confidence intervals, hypothesis testing.

**IF-1-15: Microeconomics (Assoc.Prof.Dr. Septimiu POP)**

Objective: Study of fundamentals of basic theory of microeconomics and contemporary market economy. Contents: general presentation of microeconomics, the contemporary market economy, economic agents, production factors, economic competition, offer and demand, money, income, profit, production costs.
3.2.S Master Specialization: Automotive Embedded Software (2 years, in collaboration with Siemens VDO)

3.2.S.1 Curricula

<table>
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<tr>
<th>Nr. &quot;xx&quot;</th>
<th>Course Name (Code: &quot;AES-1-xx&quot;)</th>
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</table>

3.2.S.2 Syllabus of the Courses Taught by the Faculty Staff

AES-1-02: Software Project Management (Prof.Dr.Eng. Vladimit CREŢU)
The main objective of the course is to provide the knowledge and usage of project management methods and technologies. Content: Introduction, Technologies for SW products development SW Project Management, (Fundamentals, SW Size Estimation Methods, Cost Estimation Models, The Project Plan, Acceptance Criteria), The Design Phase (The Design Specification, Design Guidelines, Design tools), The Programming Phase (Conventional Organization, Team Organization, Programming Tools, Management Activities during Programming Phase), System Test Phase, The Acceptance Phase, The Installation and Operation Phase, Special Considerations, Case Study, A Project Plan Outline.

AES-1-03: Software Engineering (Prof.Dr.Eng. 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, embedded systems and object-oriented technologies.
Content: Definition, objectives and principles, the software life cycle, software development configuration management, real-time UML, Testing.

AES-1-04: Embedded Systems 2 (Prof.Dr.Eng. Nicolae ROBU)
The course presents: An introduction to Embedded Systems; Processes, Tasks, Threads, Multitasking, Multithreading, Multitasking with Multithreading Notions; Context Switching and Tasks Scheduling; Synchronization Problems and Affe rent Mechanisms; Interrupt Handling; Choosing an RTOS; An Embedded Oriented Real-Time Operating System — OSEK: Architecture, Tasks Management, Interrupts Processing, Events Mechanism, Resources Management, Alarms.

AES-1-07: Intelligent Control in Automotive Embedded Systems (Prof.Dr.Eng. Radu-Emil PRECUP)

3.2.S.3 Syllabus of the Courses Taught by Staff of the Other Faculties or Departments

AES-1-01: Embedded Systems 1 (Prof.Dr.Eng. Virgili TIPONUT)
Course contents: Structures and general characteristics of an “embedded” system. Microarchitectures for numerical processing. Interfaces and standard buses used in automotive field. General therms regarding real time “embedded” operating systems. Sensors and transducers used in automotive field.

AES-1-05: Communications Skills (Assoc.Prof.Dr.Eng. Gabriela PROŞTEAN)
"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).

AES-1-06: Basic Application Know-How (Eng. Alina ILIN)
The course objective is to develop basic skills for managing and organizing a project. The course provides an overview about basic methods and techniques applied during the whole project lifecycle, from project initiation to project closure, with special emphasis on project monitoring and controlling, risk management, stakeholder analysis, decision analysis and resolution, quality management and continuous process improvement. All the methods and concepts presented will be supported by examples from real projects.

3.3 Complementary Courses Offered by the Department for Training of Teaching Personnel

3.3.1 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.
3.3.2 Department Staff and Curricula

<table>
<thead>
<tr>
<th>Staff Name</th>
<th>Curricula</th>
<th>Year of Study</th>
<th>Semester</th>
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<tr>
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<td>The Didactic of the Specialty</td>
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<td>T.Assist. Monica POPESCU-MITROI</td>
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</table>

3.3.3 Syllabus of the Courses Taught by the Department Staff

**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.
4 Research and Development Activity

4.1 Faculty Research Centers

4.1.A Research Division in Automation and Industrial Informatics

Director: Prof. Dr. Eng. Radu-Emil PRECUP  
"Politehnica" University of Timisoara  
Faculty of Automation and Computers  
Department of Automation and Applied Informatics  
2, Vasile Parvan Blvd., 300223, Timisoara, Romania  
Tel: +40 256 403226, Fax: +40 256 403214  
E-mail: radu.precup@aut.upt.ro

Domain: Engineering Sciences – Systems Engineering

Main Research Areas:
- Process Control
- System Identification and Adaptive Systems
- Applied Informatics
- Real-Time Control Systems

4.1.A.1 Research Group in Process Control

Director: Prof. Dr. Eng. Ștefan PREITL  
"Politehnica" University of Timisoara  
Faculty of Automation and Computers  
Department of Automation and Applied Informatics  
2, Vasile Parvan Blvd., 300223, Timisoara, Romania  
Tel: +40 256 403224, Fax: +40 256 403214  
E-mail: stefan.preitl@aut.upt.ro


Research Fields: Control systems with conventional controllers; Advanced control systems

Keywords: Fuzzy logic control; sliding mode control; intelligent systems; 2-DOF control; stability analysis; sensitivity analysis; mobile robots; servo systems; embedded systems.
Main 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.

Published Papers:


Research Grants and Contracts:

[1] Bilateral research contract, 2006-2007, between Politehnica University of Timisoara (P.U.T.) Romania and Budapest Tech Polytechnical Institution (B.M.F.), Hungary; Theme: Analysis and development of Intelligent Systems; Directors Prof. Dr. Eng. Ştefan PREITL (P.U.T., Romanian partner) and Prof. Dr. Janos FODOR (B.M.F., Hungarian partner) (The Agreement of the Third Romanian-Hungarian Session of Scientific and Technologic Co-operation, signed in Budapest, nov. 2005, Appendix II, crt nb. 35 ID nb.17)


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

Strategic Priorities: Control systems ensuring low sensitivity; Tools for computer-aided design of 2-DOF controllers; Computer-aided techniques in Iterative Feedback Tuning and Iterative Learning Control; Low cost solutions for control problems dedicated to mobile robots; Methods and tools to enable the systematic development of fuzzy control systems.

4.1.A.2 Research Group in System Identification and Adaptive Systems

Director: Prof.Dr.Eng. Octavian PROŞTEAN
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Automation and Applied Informatics
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 403225, Fax: +40 256 403214
E-mail: octavian.prostean@aut.upt.ro


Research Fields: System’s modeling, identification and simulation; Unconventional energetic; Neural networks and fuzzy systems; Adaptive control systems.

Keywords: Modeling, identification and simulation of systems, neural networks and fuzzy systems, wind energy conversion systems, unconventional energetic, adaptive control, self-tuning

Main Activities: Modeling, simulation and development of wind energy conversion systems (WECS); Identification and parameter estimation of electrical machines (asynchronous and synchronous); Development of new enhanced electrical machines types; Development of control systems for WECS; Control software development in industrial applications; Modeling and simulation of systems with neural networks; Development of WECS software; Development of adaptive control structures; Development of data acquisition systems.

Published Papers:


Research Grants and Contracts:

[1] National University Research Council CNCSIS, Romania, research grant “Researches regarding new electromechanical energy conversion automatic systems, with induction machines, with application to wind aggregates”, Grant Type A, Theme no. 29, code 628, Contract no. 2738/19.05.2006, Director: Prof.dr.eng. Octavian Prostean, Financed value 16,000 RON

[2] National University Research Council CNCSIS, Romania, research grant “Researches regarding the synthesis and implementation on digital signal processors of fuzzy control strategies with application to the excitation’s command of synchronous generators”, Grant Type A, theme no. 6, code 349, Director: Assoc. prof.dr.eng. Ioan Filip, Financed value 15,000 RON

[3] National University Research Council CNCSIS, Romania, research grant “Researches regarding identification and control methods of systems with induction generators for ecological energetics resources”, Grant Type TD, Theme no. 11, code 97, Contract no. 2739/19.05.2006, Director: Assist.Prof.eng. Iosif Szeidert, PhD student, Financed value 13,000 RON
**Perspective Domains:** Real time control of induction machines using LabView (LabWindowsCVI) using the National Instruments Data Acquisition Systems; Advanced control of wind aggregates; Neural network control systems.

**Strategic Priorities:** Study of innovative control systems for wind aggregates: improved adaptive step Hill climbing method (HCC); Tools for statistical wind measurement related data, for short-term forecasting used in wind speed prediction based windmill’s control systems and for simulation of autonomous wind farms aggregates (new Matlab tools).

**4.1.A.3 Research Group in Applied Informatics**

**Director:** Prof.Dr.Eng. Vasile STOICU-TIVADAR  
"Politehnica" University of Timisoara  
Faculty of Automation and Computers  
Department of Automation and Applied Informatics  
2, Vasile Parvan Blvd., 300223, Timisoara, Romania  
Tel: +40 256 403234, Fax: +40 256 403214  
E-mail: vasile.stoicu-tivadar@aut.upt.ro

**Research Team:** Prof.Dr.Eng. Lăcrămioara STOICU-TIVADAR, Eng. Dorin BERIAN

**Research Fields:** Health Information Systems, E-Health, Telemedicine; Embedded and Real-time Systems; Distributed and Mobile Applications.

**Keywords:** Distributed medical informatics; applied informatics; telemedicine; e-administration

**Main Activities:** Implementation of a telemedicine application between the Timis County Hospital and Italian Hospitals; Improvement of a distributed document flow– based software for the Timis County Council administration; Development of mobile applications in medical informatics; Study and development of different solutions for integrated healthcare networks.

**Published Papers:**


**Research Grants and Contracts:**

[1] Bilateral project Italy-Romania: *System for teleconsultation between hospitals*. Participants: Francesco Sicurello (@ITIM Associazione Italiana di Telemedicina e Informatica Medica, University Milano-Bicocca), Lacramioara Stoicu-Tivadar (Politehnica University Timisoara), Vasile Stoicu-Tivadar (Politehnica University Timisoara), Gianni Pellicano (Hospital Careggi
Florence), Victor Moga (County Hospital Timisoara), Mariana Moga (County Hospital Timisoara), Gianluca Ronco (Sirse Italy).


**Perspective Domains:** 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 and for rapid development of embedded applications; Solutions for integrated healthcare networks and interoperability and for e-administration (document flow and data collecting).

**Strategic Priorities:** The Education and Training of high level healthcare managers and policy makers on the strategic role of ICT in Healthcare and change management; To implement programmes on education and training, and other actions to promote awareness and to reduce resistance to change of healthcare professionals; To set up specific awareness actions addressing sensitive groups, such as: academic circles, high reputation specialists at university hospitals and other local medical opinion leaders, clinical research groups, medicine and nursing students; To improve mutual learning for the transferring part too, particularly to avoid cultural mismatches.

4.1.A.4 Research Group in Real-Time Control Systems

**Director:** Prof.Dr.Eng. Nicolae ROBU
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Automation and Applied Informatics
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 403001, Fax: +40 256 403214
E-mail: nicolae.robu@aut.upt.ro


**Research Fields:** Advanced Control of AC drives: Sensorless Control of IPMSM; Fault-tolerant Control; Applied Informatics; Solar Energy; Automotive Electric Actuation Technologies; Applications to Electric and Hybrid Vehicles.

**Keywords:** Sensorless direct torque and flux control; State and disturbance observers; Variable structure flux-observer, Fault-tolerance; Fuzzy-interpolating implementation, Signal injection; Real-time implementation; AC drives; Electric and hybrid vehicles (EHV)

**Main Activities:** Control systems in Automotive electric actuation technologies; 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; Wind power generator control; Real-time implementation and testing using dSpace for Sensorless control system of AC drives.

**Published Papers:**


Research Grants and Contracts:

Platform for study of phisycal, energetical, electrical, electronical and chemical concurrent phenomena that occur in the thermo-solar conversion process and in the photo-voltaic effect. Automation of functioning and exploitation of solar assets based on thermo-solar and photo-voltaic conversion. – Director Prof. Dr. Eng. Nicolae ROBU (3000000 RON) MEC03/15.09.2006, Cod CNCSIS 38.


Perspective Domains: Automotive control; Advanced control of electric drives, Robotics; Real-time control using LabView (LabWindows CVI); Applications with FPGA using VHDL, Xilinx; Solar energy; Distributed data procing.

Strategic Priorities: Control of EHV and Automotive Electric Actuator Technologies; dSpace platform, LabView real-time platform; Advanced control of electric drives, Automotive, Robotics, Mechatronic systems, Applications with solar energy usage, Distributed data processing, Collaborations with the automotive industry.
4.1.C  Research Center of Computer Science and Engineering and Information Technology (CC-SICTI-UPT)

**Director:** Prof. Dr. Eng. Vladimir CREȚU
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Computer and Software Engineering
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 403255, Fax: +40 256 403214
E-mail: vladimir.cretu@cs.upt.ro

**Domain:** Engineering Sciences – Computers and Information Technology

**Main Research Areas:**
- Computers Architecture, Bio-Inspired Computing, Computers Reliability, Quantum Calculus
- Software Engineering, Distributed Systems, Computing Systems Security
- Real-Time and Embedded Systems, Digital Signal Processing
- Databases, Artificial Intelligence
- Data Acquisition and Processing Systems for Electrical Machines and Equipments

4.1.C.1  Research Laboratory of Advanced Computer Systems and Architectures

**Director:** Prof. Dr. Eng. Mircea VLĂDUȚIU
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Computer and Software Engineering
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 403258, Fax: +40 256 403214
E-mail: mircea.vladutiu@cs.upt.ro

**Setup Date:** 1982


**Research Objectives:** Fundamental researches in computer testing, reliability, fault tolerant structures as well as in the direction of development of non-conventional architectures and bio-inspired design of the application on re-configurable platforms
Published Papers:


4.1.C.2 Research Laboratory of Databases and Artificial Intelligence

Directors: Prof.Dr.Eng. Ștefan HOLBAN  
"Politehnica" University of Timisoara  
Faculty of Automation and Computers  
Department of Computer and Software Engineering  
2, Vasile Parvan Blvd., 300223, Timisoara, Romania  
E-mail: stefan.holban@cs.upt.ro

Prof.Dr.Eng. Ionel JIAN  
"Politehnica" University of Timisoara  
Faculty of Automation and Computers  
Department of Computer and Software Engineering  
2, Vasile Parvan Blvd., 300223, Timisoara, Romania  
E-mail: ionel.jian@cs.upt.ro

Setup Date: 1975


Research Objectives: Fundamental researches in distributed databases, artificial intelligence, simulation and modeling, cognitive systems, intelligent agents for e-learning applications, development of video surveillance applications based on wireless sensor networks technology
Published Papers:


Research Grants and Contracts:


4.1.C.3 Research Laboratory of Software Engineering

Director: Prof.Dr.Eng. Ioan JURCA  
"Politehnica" University of Timisoara  
Faculty of Automation and Computers  
Department of Computer and Software Engineering  
2, Vasile Parvan Blvd., 300223, Timisoara, Romania  
E-mail: ioan.jurca@cs.upt.ro

Setup Date: 1978


Research Objectives: Development of Integrated Evolving Environments for Software System Analysis

Published Books:

Published Papers:

Research Grants and Contracts:
[1] Research and training in software testing, verification and validation, contract with Oce Software SRL, No. 479/27.06.2006, 19500 RON, Director: Marius MINEA.
[2] Quality evaluation in distributed software systems, CNCSIS TD grant No. 58GR/2006, Director: Cristina MARINESCU.
[3] Methods for analysis the relations between the architectural components in OCE applications, Contract with Oce Software SRL, No.197/22.02.2006, Director: Cristina MARINESCU.
4.1.C.4 Research Laboratory of Real-Time and Embedded Systems and Digital Signal Processing

Director: Prof.Dr.Eng. Vladimir CREŢU
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Computer and Software Engineering
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 403255, Fax: +40 256 403214
E-mail: vladimir.cretu@cs.upt.ro

Setup Date: 1976


Research Objectives: Fundamental and applied researches in the domain of real-time and embedded systems, design and implementation of hard real-time systems and executives, as well as digital signal processing applications, methods, techniques and structures for development of real-time embedded applications, integration of applications using grid technology and services oriented software architectures

Published Books:
[1] Cretu, V., Structuri de date şi algoritmi: Curs pentru invatamant deschis la distanta (Data structures and algorithms : Course for online education), 186 pages, UPT Publ. Center, 2006

Published Papers:


**Research Grants and Contracts:**


[5] Programming milieu for developing real-time distributed applications for embedded systems), CNCSIS grant No. 58GR/19.05.2006, 24000 RON/2006, Director: Horia Ciocârlie

Design and implementation of a scalable dedicated system for wireless message communication with many mobile receivers located in a limited area – contract with S.C Luxten-AEM Timisoara, 6613.5 lei Director: Mircea Popa.

Methods for temperature and power reducing in mobile embedded systems, grant CNCSIS 2738/19.05.2006, grant CNCSIS. Director: Marius Marcu, Collaborator: Sebastian Fuicu.

Software application for IP communication monitoring in the GSM B10 system, contract No. 505/05.01.2006 with Alcatel Timisoara, Director: Marius Marcu, Collaborator: Sebastian Fuicu.

Ethereal plugins set for IP protocols monitoring in the GSM B10 system, contract No. 504/03.04.2006 with Alcatel Timisoara Director: Sebastian Fuicu, Collaborator: Marius Marcu.

4.1.C.5 Research Laboratory of Electrical Machine and Equipment Testing Using Digital Signal Acquisition and Processing Systems

Directors: Acad. Toma DORDEA
"Politehnica" University of Timisoara
Faculty of Electrical Engineering
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
E-mail: toma.dordea@et.upt.ro

Prof.Dr.Eng. Marius BIRIESCU
"Politehnica" University of Timisoara
Faculty of Electrical Engineering
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
E-mail: marius.biriescu@et.upt.ro

Setup Date: 1987


Research Objectives: Researches regarding elaboration of testing procedures and dedicated software for electrical machines, in accordance with European standards and methods, modeling, design and development of real-time applications in the domains of acquisition, processing and embedded digital control

4.2 Autonomous Research Groups

4.2.A Department of Automation and Applied Informatics

4.2.A.1 Research Group in Applied Systems Theory

Director: Prof.Dr.Eng. Toma-Leonida DRAGOMIR
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Automation and Applied Informatics
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 403222, Fax: +40 256 403214
E-mail: toma.dragomir@aut.upt.ro


Research Fields: System theory applications in fault detection and diagnosis; System analysis using sensitivities; Development of control system devices; Fuzzy and neural systems; Virtual
instrumentation in control; Control of electrical drives; Management of the innovation and creativeness.

Keywords: Fault detection, identification and diagnosis, modeling, system safety and availability, controller design, process control, interpolating strategies, fuzzy logic, neural networks, control of electrical drives, virtual instruments.

Published Books:

Published Papers:

Research Grants and Contracts:
[1] CNCSIS Grant, No. 309/33062, Research theme in cooperation with the University of Craiova, The development of automated structures for increase the dependability of the control systems with applications in industrial systems (energetics, chemistry, aviation, robotics), 2004 (continued in 2005 and 2006)

4.2.A.2 Research Group in Process Control

Director: Lect.Eng. Florin DRĂGAN
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Automation and Applied Informatics
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 288254, Fax: +40 256 403214
E-mail: florin.dragan@aut.upt.ro

Research Fields: Chaotic systems; Programmable Logic Controllers; Remote control; Operating Systems; Real-time Programming.

Keywords: Fault detection, identification and diagnosis, modeling, system safety and availability, controller design, process control, interpolating strategies, fuzzy logic, neural networks, control of electrical drives, virtual instruments.

Published Papers:

4.2.A.3 Research Group in Cryptology and Information Security

Director: Lect.Dr.Eng. Dorina PETRICĂ
"Politehnica" University of Timisoara
Faculty of Automation and Computers
Department of Automation and Applied Informatics
2, Vasile Parvan Blvd., 300223, Timisoara, Romania
Tel: +40 256 403244, Fax: +40 256 403214
E-mail: dorina.petrica@aut.upt.ro


Research Fields: Authentication protocols; Public-key cryptography; Foundations of cryptography; Applied cryptography; Number theory.

Keywords: Authentication protocols, digital signatures, public-key cryptography, entity authentication, message authentication, cryptography, cryptanalysis, one-way functions, trapdoor one-way functions, number theory, complexity theory.

Published Papers:


**Research Grants and Contracts:**


[2] Cooperation with University of Craiova under MEĐC-CNCSIS Grant A-309/2006, Title: The development of automated structures for increase the dependability of the control systems with applications in industrial systems (energetics, chemistry, aviation, robotics).

## 5 Faculty Events

**Organized conferences:**

- **CONTI 2006:** The 7th International Conference on Technical Informatics, 08-09 June 2006, 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: Octavian Proștean ("Politehnica“ University of Timișoara, Romania).

6 Student League of the Faculty of Automation and Computers

League leader: Simona MICULESCU-DRĂGILĂ
Correspondence address: Students' League of the Faculty of Automation and Computers
"Politehnica" University of Timisoara
2, Vasile Pârvan Blvd., Room 221
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Fax: +40 256 403214
E-mail: ligaac@cs.upt.ro, md_simona@yahoo.com
Web: http://www.ligaac.upt.ro

6.1 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 things we are organizing social and cultural events.

6.2 What Have We Done in the Last 16 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.


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, political 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**

Since 1991, each autumn the freshmen have to face different tests, so they can become "real" students. After the show, the real party begins.

**Parties**

Christmas Party: 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.