INTENSIVE PROGRAMME
An Interdisciplinary and Holistic Approach to Engineering Education – Workshops on Advanced Learning Technology in Design and Practice of Embedded Systems
WALT
BTU, Bialystok, POLAND 3-16 July 2011
Dr. Jerzy Kołłątaj, Ph.D.
IP coordinator

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LLP/Erasmus Departmental Coordinator
An Interdisciplinary and Holistic Approach to Engineering Education – Workshops on Advanced Learning Technology in Design and Practice of Embedded Systems

WALT

The partners are:

• 1. Technical University of Ostrava – Czech Republic,
(5 students and 2 lectures – everybody for one week);
• 2. Firat University – Turkey,
(5 students and one lecture for two weeks);
• 3. Kaunas University of Technology – Lithuania,
(5 students and 2 lectures – everybody for one week);
• 4. Bialystok Technical University – Poland
(applicant and coordinator), (15 students and 3 lectures)
DESCRIPTION

⇒ A simple microcontrollers (with easy high level language for the programming) and the embedded systems will be used.

⇒ Students will have to develop a related system design, for example mobile robots.

⇒ The control system, consisting of sensors, actuators, microprocessors, microcontrollers and software is one key component.

⇒ The students can select from different prefabricated electronic and mechanical components to generate their robots.
AIMS

The aim of this intensive course program is to give for the students some **practical engineering knowledge and skills**:

- Cooperation in multidisciplinary teams.
- Coordination of parallel work between the team members.
- Finding engineering solutions under time pressures.
- Applying the theory learned to solve practical problems.
- Learning from failures to finally achieve working solutions.
General assumptions:

The course is for a broad multidisciplinary undergraduate and graduate student body; a wide range of scientific disciplines, for example including electrical and electronic, computer science, mechatronic, mechanical and also biological engineering, agricultural engineering, physics and many others.

The course is Introduction to Robotics, Embedded Systems, Introduction to Microcontrollers and Advanced Microcontrollers.
General assumptions:

The course which are taught in a hands-on-manner, equips students with necessary tools and know-how to make use of powerful technology of microcontrollers within their own disciplines.

Using various pedagogical methods such as team work to achieve the right balance between theory and practice, and to give students from various disciplines an "industry" experience.
The workload during this IP course is equivalent to 4 ECTS
Minimum requirements to apply the IP programme
(IP WALT Coordinator)

**Expected (minimum) level of students**
Undergraduate, **after complete** 2\textsuperscript{nd} year of study in **engineering** profile – it corresponds with 120 ECTS before 1\textsuperscript{st} of July 2011.

The basics for recruitment (weights are in parenthesis):

a. good skills in communication in English (0,4),
b. good level of knowledge in mathematics and **engineering** subjects (0,5),
c. other activities (by teachers opinion) (0,1)

It is expected that every candidate will work in a team at laboratory and will be a good companion for others during the rest of time. Preferable is to encourage girls to take a part in the recruitment process.

On this base, presented above, every partner elaborates its own detailed requirements.

**Please present them to us before 20 of December 2010 !!!**

Information about this recruitment should be presented at university web-side and as a posters in public accessible area of your faculty/department. It must be done **at least 30 days before start of recruitment.**
Minimum requirements to apply the IP programme
(Firat University, Turkey)

1) **Expected (minimum) level of students**
Undergraduate, after complete 2nd year of study in **engineering** profile; (It corresponds with 120 ECTS before 1st of July 2011)
The applicant must **pass all the courses in first and second years** at the department of Electrical-Electronics Engineering.
2) The basics for recruitment (weights are in parenthesis):

a) Good skills in communication in English (% 40):
The applicants will take the English exam with following weighting points;
Reading and writing passages used in the exam will be related to the IP WALT:

b) Good level of knowledge in mathematics and engineering subjects (% 50):
The applicant must pass all the courses in first and second years at the department of Electrical-Electronics Engineering.
The candidate’s minimum cumulative grade point average (CGPA) is 2.00/4.00.
The mathematics and engineering knowledge level will be measured from the candidate’s CGPA, (% 50 of CGPA).

c) Other activities (by teachers opinion) (% 10)
The personal interest of the candidate on the subjects aimed in the intensive programme “WALT”.

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3) The candidates has to be in main or pare list:
Based on the marks gained from section 2 (a), (b) and (c) all the applicants will be listed.
The first five will be in the **Main candidates list** and the second five will be in the **Spare candidates list**.
If any problem occurs for the candidates in the main list the following candidates in the spare list will be substuted.
You can find the confirmation of this Intensive Programme at the website of the National Agency (the first position in the pdf file):
http://www.erasmus.org.pl/preview.php/id/223/
### THE SCHEDULE OF REALISATION OF THE INTENSIVE PROGRAMME “WALT”, Bialystok, 3-16 July 2011

<table>
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<tr>
<th>Nr</th>
<th>Activity</th>
<th>Dead line</th>
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<tr>
<td>1</td>
<td>Elaboration of partners detailed requirements for recruitment</td>
<td>20 of December 2010</td>
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<tr>
<td>2</td>
<td>Begin of recruitment (announcements, web-sides, posters, etc.)</td>
<td>20 of January 2011</td>
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<tr>
<td>3</td>
<td>Termination of recruitment</td>
<td>20 of March 2011</td>
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<tr>
<td>4</td>
<td>Sending the lists of students with their <strong>application forms</strong> to coordinator</td>
<td>20 of April 2011</td>
</tr>
<tr>
<td>5</td>
<td>Confirmation of acceptance*</td>
<td>30 of April 2011</td>
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<tr>
<td>6</td>
<td>Purchase of plain/train personal tickets</td>
<td>15 of May 2011</td>
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<tr>
<td>7</td>
<td>Sending tickets to partners</td>
<td>30 of May 2011</td>
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<tr>
<td>8</td>
<td>Confirmation of arrival</td>
<td>15 of June 2011</td>
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<tr>
<td>9</td>
<td>Arrivals of participants</td>
<td>3-4 of July 2011</td>
</tr>
<tr>
<td>10</td>
<td>Departs of participants</td>
<td>16 of July 2011</td>
</tr>
<tr>
<td>11</td>
<td>Preparing final publication</td>
<td>15 of September 2011</td>
</tr>
<tr>
<td>12</td>
<td>Final report</td>
<td>30 of September 2011</td>
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* formal checking of basic requirements
### WORK PROGRAMME (Draft) (Bialystok, 3-16 July 2011)

<table>
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<tr>
<th>Day</th>
<th>The programme of lectures, laboratory sessions and other activities</th>
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<tr>
<td>1</td>
<td>Day 1 (Sunday): Arrivals of participants.</td>
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</table>
| 2   | **Day 2 (Monday):**  
     | Meeting with the authorities of Bialystok Technical University and Faculty of Electrical Engineering.  
     | Lecture: *Application of the embedded systems in the instrumentation, measurement and robotics.*  
     | The visits in the Laboratories in Bialystok Technical University |
| 3   | **Day 3 (Tuesday):**  
     | Introduction to the Laboratory Sessions.  
     | Laboratory Session No. 1: *Professional prototype development system for the testing and designing of embedded systems in the measurement and instrumentation.*  
     | Lecture: *Wireless sensor networks in harsh industrial environments with unpredictable electromagnetic interferences.* |
| 4   | **Day 4 (Wednesday):**  
     | Laboratory Session No. 2: *The advanced LCD displays, expanded outputs and inputs circuits in multichannel measurement and control systems.*  
<pre><code> | Lecture: *Intelligent sensors for new designs in industrial applications* |
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| 5   | **Day 5 (Thursday):**  
The technical excursion to the innovative “PLUM” firm (1) |
| 6   | **Day 6 (Friday):**  
Laboratory Session No. 3: *Analog and digital circuits for the electronic measurement and control system applications.*  
Presentation of the laboratory work results by the student teams. |
| 7   | **Day 7 (Saturday):**  
Regional tourist program (Bialowieza National Park) (2) |
| 8   | **Day 8 (Sunday):**  
Bialystok city tourist program |
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| 9   | **Day 9 (Monday):**  
Laboratory Session No. 4: *Ultrasonic smart sensors for the distance measurements for robotics and automation projects.*  
Lecture: *Piezomechanics - application of piezoelements.* Different developments starting from simple toy applications to more sophisticated developments for positioning systems, robotics, microactuation will be presented (subject is proposed by the author from Kaunas University of Technology (Lithuania)). |
| 10  | **Day 10 (Tuesday):**  
Laboratory Session No. 5: *Programmed controllers for the DC motors and stepper motors used in automation and robotics.*  
Lecture: *Subject will be proposed by author from Technical University of Ostrava (Czech Republic)* |
| 11  | **Day 11 (Wednesday):**  
The technical excursion to the innovative “AC” firm (3)  
Laboratory Session No. 6: *Application of microcontrollers for the digital servos in robotics.*  
Lecture: *Subject will be proposed by the author from Firat University (Turkey)* |
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| 12  | **Day 12 (Thursday):**  
|     | Laboratory Session No. 7: *Micro-Electro-Mechanical Systems (MEMS)*  
|     | Accelerometer Sensors for Measurement and Instrumentation in Industrial Applications.  
|     | Presentation of the laboratory work results by the student teams. |
| 13  | **Day 13 (Friday):**  
| 14  | **Day 14 (Saturday):**  
|     | Departure of participants. |
FINAL REMARKS and SOME POINTS

You can find

a) The student application,

b) More information for IP programme

from the department web page.

The progress will not be effected by the unpredicted problems. It is obligatory to inform me as soon as possible, if any problem occur after you have the place in the Main List.

GOOD LUCK

ANY QUESTIONS?