Project Acronym: MEDIS

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Context

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WPLeader	Universitat Politècnica deValència (UPV)
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1 Executive summary

This deliverable describes the human and material resources in order to implement the AIISM-PBL methodology.

The AIISM project uses a PBL methodology to instruct the design and implementation of microcontrollers to control industrial processes. The AIISM methodology is designed based on previous experiences of the EU universities on PBL and active learning techniques.

This methodology requires a classroom-laboratory with pertinent equipment.

In this deliverable, guidelines about the different roles of staff are given and recommendations about the material resources requirements are provided.

2 Introduction

This methodology requires classroom-laboratories with general and pertinent equipment: industrial computers, mobile devices, data acquisition cards, microcomputers, prototypes, virtual labs, simulators.

Open source software is used for programming the applications, which will allow reducing the cost of the project.

This deliverable describes the resources required for learning activities and the staff required for supporting this methodology.

3 The classroom-laboratory

The methodology proposed for this project can be enhanced using a single fully equipped classroom-laboratory. These classroom-laboratories are interesting in order to avoid differentiating between theory, problems, and the laboratory practice and providing flexibility in the session development.

Each type of learning activity has different resources requirements as explained in the following subsections.

3.1 Lectures

To present the main ideas of the contents the teacher requires the following typical classroom equipment:

- Board.
- Professor personal computer.
- Digital projector.
- Office applications.
- Internet connection.

To enhance the learning experience the following extra equipment is recommended (but not mandatory)

- Samples of real devices (sensors, actuators, etc.).
- Mobile devices (tablets/smartphones) provided by the institution or by the students.
- Microcontrollers (different manufacturers)

The lectures should be complemented taking into consideration an e-learning materials approach. Education in engineering universities requires a change in its traditional model to adapt to new students of a global knowledge society using new tools and devices for communicating such as smartphones and tablets. Mobiles devices are used to register the most relevant explanations of the lectures, laboratory practices and the mini-project related to the development of the systems.

3.2 Seminars

Seminars require the same equipment as the lectures because the main purpose is to solve problems and discuss possible solutions.

The following equipment is recommended:

- Student personal computer or mobile device.
- Collaborative software environments.
- Office applications.
- Internet connection.
- Development software.

To enhance the learning experience the following extra equipment is recommended:

- Samples of real devices (sensors, actuators, etc.).
- Microcontrollers (different manufacturers).

3.3 Laboratory

In the laboratory session, students implement a practical problem whose main related concepts have been previously presented during the lecture and developed in the seminar.

In order to provide real hands-on, these activities involve the implementation of simplified real industrial processes.

The resources required for the “Microcontroller” module are:

- Student personal computer, with serial interface over USB.
- Two Micro-controllers (e.g. Arduino family, one working as simulator)
- Development environment for Microcontroller.
- DC Power supply.
- Oscilloscope.
- Multimeter.
- Breadboard/Testing board with cables and some resistors, capacitors.
- Scale models, for example a “liquids tank” scale model.
- Internet access.

3.4 Miniprojects

This activity is dedicated to the planning, design and development of an embedded control system based on a microcontroller.

Besides the equipment already mentioned in the previous section (Laboratory), for the

miniproject the following additional equipment will be required:

- Tank model simulators
- Manufacturing process cell model
- Collaborative software environments.
- Office applications.

To enhance the hands on experience, it is recommended that the following extra equipment is also available:

- Samples of real devices (sensors, actuators, etc.).

4 Human resources

The staff is important for a successful application of the AIISM. To implement the proposed methodology, the staff is organized in three categories: teachers, technicians and administrative.

In WP4, resources and training materials for the staff are provided.

4.1 Teachers

Regarding teachers, the assistance consists of resolving questions related to the teaching structure and the synchronization of learning sessions (lectures, labs, seminars) as well as questions of the specific contents of the course.

Teachers will accompany a course beginning with the implementation of the PBL methodology to the organization of the different learning units and the evaluation system for the students.

Part of the training course will deal with the topic how to teach a class applying the proposed methodology to a small group of students. This is a pilot course for testing the proposals.

4.2 Technicians

A laboratory technician is required to set-up all the hardware and software tools.

Technicians will obtain support on aspects related to the installation and configuration of the software and hardware used to develop the laboratories and miniprojects.

Regarding the technicians, the training course shows how to use the necessary development tools (hardware and software) and their installation and configuration for the laboratory and mini-project activities.

4.3 Administrative

The administrative staff will give support to help teachers translate the EU evaluation marks to the PC evaluation system as well as regarding the transfer of the credits system.

The training of the administrative staff explains the use of the ECTS and its transfer to the PC credit system as well as the grades equivalence among EU and the different PC systems.