MEDIS: A Methodology for the Formation of Highly Qualified Engineers at Masters Level in the Design and Development of Advanced Industrial Informatics Systems

WP1.3: Design AIISM - Human and material resources

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Context

WP 1	Design of the AIISM-PBL methodology
WPLeader	Universitat Politècnica deValència (UPV)
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Table of Contents

1 Executive summary

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

Like all other modules of the AIISM project uses a PBL methodology to instruct the design, implementation and use of industrial informatics systems in the control of 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 requirements as explained in the following subsections.

3.1 Lectures

To present the main ideas of the contents we require 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

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

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 and problems

Seminars require the same equipment than 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, it is recommended the following extra equipment

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

Using this extra equipment it is feasible optimize the sharing of proposals, being possible to show the different student solutions in the digital projector and reworking some solution with a feedback from the professor underlining the main concepts of the previous lecture.

For example, for code development, it is possible to use code sharing tools such as http://pastebin.com service in order to implement this idea.

3.3 Laboratory

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

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

The resources required for the “Industrial computers” module are:

- Student personal computer.
- Power source.
- Oscilloscope.
- Multimeter.
- Scale models, for example a “liquids tank” scale model.
- DAQ boards.
- Testing board.
- Qt development environment software.
- Simulators.
- Internet access.

3.4 Miniprojects

This activity is dedicated to the planning, design and development of an industrial control system.

Besides the equipment already mentioned in the previous section, for the miniproject, the following additional equipment will be required:

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

To enhance the hands on experience, it is recommended the following extra equipment

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

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 follow a course about the implementation of the PBL methodology, the organization of the different learning units, the evaluation system for the students.

Part of the training course will deal with 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

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 have support to help them translate the EU evaluation marks to the PC evaluation system as well as regarding the transference credits system.

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