Project Acronym: MEDIS

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

Contract Number: 544490-TEMPUS-1-2013-1-ES-TEMPUS-JPCR

Starting date: 01/12/2013 **Ending date:** 30/11/2016

Deliverable Number: 1.3

Title of the Deliverable: Design of the AIISM-PBL methodology - Human and material resources

Task/WP related to the Deliverable: Design of the AIISM-PBL methodology - - Human and material resources

Type (Internal or Restricted or Public): internal

Author(s): Mário de Sousa

Partner(s) Contributing: Design of the AIISM-PBL methodology - - Human and material

Contractual Date of Delivery to the CEC: 31/03/2014

Actual Date of Delivery to the CEC: 31/03/2014

Project Co-ordinator

Company name :	Universitat Politecnica de Valencia (UPV)
Name of representative :	Houcine Hassan
Address :	Camino de Vera, s/n. 46022-Valencia (Spain)
Phone number :	+34 96 387 7578
Fax number :	
E-mail :	husein@upv.es
Project WEB site address :	http://medis.upv.es/

Context

WP 1	Design of the AIISM-PBL methodology
WPLeader	Universitat Politècnica deValència (UPV)
Task 1.3	Design AIISM - Human and material resources
Task Leader	UP
Dependencies	USTUTT, TUSofia, MDU, UP
Starting date	
Release date	

Author(s)	Mário de Sousa
Contributor(s)	UPV Team
Reviewers	

History

Version	Date	Author	Comments
0.03	2014/03/19	Mario de Sousa	Initial draft
1.0	2014/03/31	Mario de Sousa	Final version
1.1	2014/03/31	UPV Team	Cover corrections

Table of Contents

1 Executive summary

This deliverable describes the human and material resources in order to implement the Advanced Industrial Networks and Fieldbuses Modules (AINFM) of the AIISM course, using the PBL methodology.

Like all other modules of the AIISM project, AINFM uses a PBL methodology to instruct the design and implementation and use of industrial communication networks 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 resource 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 (but not mandatory)

- Samples of real fieldbus networked devices (RTUs - Remote Terminal Units, sensors, actuators, etc.).
- Samples of networked industrial control devices (PLCs – Programmable Logic Controllers).

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.

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 networks, followed by the control of industrial processes in the moniprojects.

The resources required for the Advanced Industrial Networks and Fieldbuses Modules (AINFM) are:

- Student personal computer with serial interface (possibly over USB).
- Micro-controller (e.g: Arduino)
- RS232 serial interface for Micro-controller (possibly over USB)
- RS485 serial interface for Micro-controller
- CAN interface for Micro-controller
- RS232, RS485, CAN, and Ethernet network cables
- DC Power Supply.
- Oscilloscope.
- Multimeter.
- Scale models, for example a “liquids tank” scale model.

- Testing board.
- POSIX compatible development environment software for PC.
- Development environment for micro-controller (preferably using C)
- Simulators.
- Internet access for computers.

3.4 Miniprojects

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

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

To enhance the hands on experience, it is recommended (but not mandatory) that the following extra equipment also be available

- Samples of real fieldbus networked devices (RTUs - Remote Terminal Units, sensors, actuators, etc.).
- Samples of networked industrial control devices (PLCs – Programmable Logic Controllers).

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.