

Course guide

340638 - AUDI-R3P10 - Automation and Industrial Digitization

Last modified: 17/05/2023

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.
710 - EEL - Department of Electronic Engineering.
744 - ENTEL - Department of Network Engineering.

Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012). (Optional subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Raya Giner, Cristobal

Others: Rio Fernandez, Joaquin Del
Raya Giner, Cristobal
Vidal Ferré, Rafael

PRIOR SKILLS

Recommended basic knowledge of PLCs, electronics and communications

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CEV08. CEV08 - Ability to select sensors and preparation for the design of measurement systems.
CEV03. CEV03 - Analyze and evaluate the different protocols and wireless networks in the field of robotics and automated systems
CEV10. CEV10 -Identify solutions in smart environments through design and implementation of sensor networks and services environment.

TEACHING METHODOLOGY

In the learning sessions of this subject, the professor will introduce theoretical explanations and illustrative examples, concepts, methods and basic results of the matter. These sessions are made of theoretical classes and sessions of laboratory. Along the course the method of project/problems based learning (PBL) will be applied.

In the theoretical classes the theoretic explanations and the basic concepts of the subject of study will be introduced, and in the practical sessions of laboratory the professor will increase the knowledge with the concepts and necessary methods to be able to carry out the problems or projects to solve in the practical work. The practices of laboratory will come true individually, or in reduced groups.

The tasks outside of the classroom that one must carry out or individually or in group, they are the base of the activities, and obligatory to be able to progress appropriately in the subject.

LEARNING OBJECTIVES OF THE SUBJECT

Learn the basics of industrial scanning or Industry 4.0.
Know and identify the appropriate smart sensors to optimize processes and increase efficiency or functionality.
PLC programming oriented industrial digitization.
Remote monitoring of digitized processes, Smart Data and Cloud Computing
Cybersecurity in industrial digitization.

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	33.33
Hours large group	30,0	66.67

Total learning time: 45 h

CONTENTS

Introduction to industry 4.0

Description:

Introduction to industry 4.0 or industrial digitalization. Definitions and applications.

Full-or-part-time: 2h

Theory classes: 2h

Monitoring and data acquisition

Description:

Monitoring and data acquisition sensors by DAQ (Data Acquisition) systems, and data storage using LabView for further analysis.

Full-or-part-time: 12h

Theory classes: 12h

Automation with PLCs

Description:

Programming of PLCs and use of GRAFCET.

Full-or-part-time: 12h

Theory classes: 12h

SCADA systems

Description:

Automated systems supervision using SCADA (Supervisory Control And Data Acquisition). Data storage in registers and databases using SQL, for further analysis.

Full-or-part-time: 12h

Theory classes: 12h

Industrial control systems: Interconnection and cybersecurity

Description:

Secure interconnection of industrial control systems (ICS) with information technology (IT) infrastructures and Internet of a production center, from the network point of view.

Full-or-part-time: 12h

Theory classes: 12h



GRADING SYSTEM

This evaluation is formed by practical works, and works or problems in a group or individual.

BIBLIOGRAPHY

Basic:

- Mandado Pérez, Enrique. Sistemas de automatización y autómatas programables. 3a ed. Barcelona: Marcombo, 2018. ISBN 9788426725899.
- Torres, Jordi. Python deep learning : introducción práctica con Keras y TensorFlow 2 [on line]. Barcelona: Marcombo, 2020 [Consultation : 11/11/2022]. Available on : <https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,uid&db=nlebk&AN=2749560&site=ehost-live>. ISBN 9788426728289.

RESOURCES

Hyperlink:

- <http://www.industriaconectada40.gob.es>. Resource
- <http://www.infoplc.net/industria-4>. Web Industrial Automation, Robotics and Industry 4.0