Course guide
295202 - ISA - Integration of Automatic Systems

Last modified: 25/06/2026

Unit in charge: Barcelona East School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: JAVIER FRANCISCO GÁMIZ CARO

Others:

Primer quadrimestre:
ANTONIO LÓPEZ FERNÁNDEZ - Grup: M12
PEDRO PONSA ASENSIO - Grup: M11, Grup: M12

Segon quadrimestre:
JAVIER FRANCISCO GÁMIZ CARO - Grup: T11, Grup: T12
MARC LLUVA SERRA - Grup: T12

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEEIA-26. Understand automatic regulation and control techniques and their application to industrial automation.
CEEIA-27. Understand the principles and applications of automated systems.
CEEIA-28. Apply their knowledge to industrial informatics and communications.
CEEIA-29. Design automatic control systems.

Generical:
CG-03. (ENG) Conocimiento en materias básicas y tecnológicas, que les capacite para el aprendizaje de nuevos métodos y teorías y les dote de versatilidad para adaptarse a nuevas situaciones.
CG-04. (ENG) Capacidad de resolver problemas con iniciativa, toma de decisiones, creatividad, razonamiento crítico y de comunicar y transmitir conocimientos, habilidades y destrezas en el campo de la Ingeniería Industrial.

Transversal:
06 URI N2. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.
07 AAT N3. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

Learn about the different technologies for production automation.
Meet and implements the various processes to be developed to when designing and implementing an automation project.
Design and known techniques of communication between applications in SCADA systems.
Apply criteria Industrial safety and prevention of occupational hazards in designing solutions to problems Automation
Select and know how to implement control methods in multidisciplinary applications.
Learn how to integrate PLCs, robots, vision equipment and SCADA systems for production automation.

STUDY LOAD

Type	Hours	Percentage
Hours large group	15,0	10.00
Self study	90,0	60.00
Hours small group	45,0	30.00

Total learning time: 150 h

CONTENTS

AUTOMATED SYSTEMS INTEGRATION

Description:
Advanced Programming Software Drivers PLC and Scada's
Process simulation techniques
intelligent field instrumentation
Communication techniques between applications (DDE and OPC).
advanced automation systems.
Evaluation and selection of equipment in flexible manufacturing systems.
Industrial systems perception.
Redundancy and security of computer systems automation.
Distributed control systems.
Deterministic systems.

Full-or-part-time: 150h
Theory classes: 15h
Laboratory classes: 45h
Self study : 90h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

BIBLIOGRAPHY

Basic:
- Love, Jonathan. Process Automation Handbook : A Guide to Theory and Practice [on line]. London: Springer London, 2007 [Consultation: 29/05/2020]. Available on: http://dx.doi.org/10.1007/978-1-84628-282-9. ISBN 9781846282829.
- Boy, Guy A. The Handbook of human-machine interaction [on line]. Farnham: Ashgate, 2011 [Consultation: 29/05/2020]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=674526. ISBN 9781409411710.
- Krutz, Ronald L. Securing SCADA Systems [on line]. Indianapolis: Wiley, 2006 [Consultation: 29/05/2020]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=240721. ISBN 9780764597879.
- Bequette, B. Wayne. Process control, modeling, design and simulation. Prentice Hall, 2003. ISBN 9780133536409.
- Ollero de Castro, Pedro; Fernández Camacho, Eduardo. Control e instrumentación de procesos químicos. Madrid: Síntesis, DL 1997. ISBN 8477385173.

RESOURCES

Computer material:
- Servidor de màquines virtuals. In a second stage of the course (setember 2017), when the flexible manufacturing cell will need to design and implement an architecture with a network server so that students can work remotely be integrated.

Other resources:
PLC 1769-L16ER
Gateway IoT2040