



## Course guides

# 295202 - ISA - Integration of Automatic Systems

Last modified: 04/06/2021

<b>Unit in charge:</b>	Barcelona East School of Engineering	
<b>Teaching unit:</b>	707 - ESAII - Department of Automatic Control.	
<b>Degree:</b>	BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject). BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).	
<b>Academic year:</b> 2021	<b>ECTS Credits:</b> 6.0	<b>Languages:</b> Catalan, Spanish

### LECTURER

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<b>Coordinating lecturer:</b>	JAVIER FRANCISCO GÁMIZ CARO
<b>Others:</b>	Primer quadrimestre: PEDRO PONSA ASENSIO - M11, M12  Segon quadrimestre: JAVIER FRANCISCO GÁMIZ CARO - T11, T12 MARC LLUVA SERRA - T12

### REQUIREMENTS

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Have studied the subject of Information Systems and Industrial Communication (SICIEIA)

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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#### 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 INFORMATION 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

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## LEARNING OBJECTIVES OF THE SUBJECT

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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.  
 They know how to run and monitor production processes in the plant (MES - Manufacturing Execution System)

## STUDY LOAD

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

**Total learning time:** 150 h

## CONTENTS

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### 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

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## BIBLIOGRAPHY

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### Basic:

- 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.
- Ollero de Castro, Pedro; Fernández Camacho, Eduardo. Control e instrumentación de procesos químicos. Madrid: Síntesis, DL 1997. ISBN 8477385173.
- Bequette, B. Wayne. Process control, modeling, design and simulation. Prentice Hall, 2003. ISBN 9780133536409.
- 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.
- 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.

## RESOURCES

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### 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:

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.