

[GJH101] INTRODUCTION TO AUTOMATION

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING		Subject ?
Semester	2	Course	2
Character	OPTIONAL	Mention / Field of specialisation	
Plan	2020	Modality	Face-to-face
Credits	3	Hours/week	2.5
		Language	CASTELLANO/EUSKARA
		Total hours	45 class hours + 30 non-class hours = 75 total hours

PROFESSORS

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REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

SKILLS

VERIFICA SKILLS

SPECIFIC

GJCE32 - Basic knowledge of the foundations of automation

GENERAL

GJCG06 - Implement and materialize projects of automation and control of equipment, processes and flexible industrial systems, through the integration of hardware and software in order to optimize the operation of the different units that make up the system to meet the needs of the productive sector

CROSS

GJCTR2 - To be able to understand and apply knowledge to problem solving in complex work situations or specialised and professional environments calling for creative and innovative ideas, using self-developed arguments and procedures;

BASIC

G_CB5 - To have developed learning abilities required to embark on subsequent studies with a high level of autonomy.

LEARNING RESULTS

RG202 They make decisions and assess the possible consequences of the selected alternative.

LEARNING ACTIVITIES

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

CH

1 h.

NCH

1 h.

TH

2 h.

EVALUATION SYSTEM

Observation (technical capacity, attitude and participation)

W

100%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.

NCH - Non-class hours: 1 h.

TH - Total hours: 2 h.

RGJ227 They design and develop the program of a programmable control device (relay or controller), according to the IEC-61131-3 standard on programming languages, to implement and start up a sequential automatic system according to the specifications.

LEARNING ACTIVITIES

Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

CH

3 h.

NCH

2 h.

TH

5 h.

Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning

2 h.

3 h.

5 h.

Practical work in workshops and/or laboratories, individually and/or in teams

19 h.

11 h.

30 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%	Individual written and/or oral tests or individual coding/programming tests Comments: In case of a make-up, 100% of the final mark will be the mark of the individual make-up test.
Individual written and/or oral tests or individual coding/programming tests	50%	
CH - Class hours: 24 h. NCH - Non-class hours: 16 h. TH - Total hours: 40 h.		

RG204 They define the problem, the development of the solution, as well as the conclusions in an effective way, making a correct use of the language, in writing.

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.	1 h.	3 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS	
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems Comments: Revision and correction of the written report of the semester project	
CH - Class hours: 2 h. NCH - Non-class hours: 1 h. TH - Total hours: 3 h.			

RG205 They define the problem, the development of the solution, as well as the conclusions in an effective way, making a correct use of the language, orally.

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.	1 h.	3 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS	
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	100%	(No mechanisms) Comments: Continuous assessment. Retake is not foreseen.	
CH - Class hours: 2 h. NCH - Non-class hours: 1 h. TH - Total hours: 3 h.			

RGJ228 They assemble pneumatic/electro-pneumatic and hydraulic/electro-hydraulic automatisms, interpreting the technical documentation, and carrying out tests and functional adjustments.

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out	12 h.	8 h.	20 h.

individually and/or in teams				
Computer simulation exercises, individually and/or in teams		3 h.	2 h.	5 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS		
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%	Individual written and/or oral tests or individual coding/programming tests		
Individual written and/or oral tests or individual coding/programming tests	50%			
CH - Class hours: 15 h.				
NCH - Non-class hours: 10 h.				
TH - Total hours: 25 h.				

RG201 They coordinate their work with the other members of the team, contribute in their team to the development of the tasks to be carried out and the creation of a good working climate.				
LEARNING ACTIVITIES				
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		CH	NCH	TH
		1 h.	1 h.	2 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS		
Self-assessment	30%	(No mechanisms)		
Co-assessment	35%	Comments: Continuous assessment. Retake is not foreseen.		
Observation (technical capacity, attitude and participation)	35%			
CH - Class hours: 1 h.				
NCH - Non-class hours: 1 h.				
TH - Total hours: 2 h.				

CONTENTS

1. Design of electrical diagrams
2. Design of electro-pneumatic diagrams
3. Assembly of electropneumatic diagrams
4. Introduction to programmable controllers
5. PLC programming
 - 5.1. Introduction to Tia Portal software
 - 5.2. Basic programming with logic equations
 - 5.3. Timers
 - 5.4. Counters
 - 5.5. Assembly of electronic pneumatic systems with PLC programming
 - 5.6.5.6. Programming with Grafcet language

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	MANDADO, E. MARCOS, J. FERNÁNDEZ, C. ARMESTO, J. 2009. Autómatas programables y sistemas de automatización. Barcelona. Marcombo.
Slides of the subject	PECIÑA, L. 2018. Programación de controladores avanzados SIMATIC S7 1500 con TIA Portal AWL y SCL. Marcombo Formación
Video projections	MENGUAL, P. 2009. Step 7: una manera fácil de programar PLC de Siemens. Barcelona. Marcombo
Labs	YUSTE, R. L. 2017. Autómatas programables SIEMENS Grafcet y Guía Gemma con TIA Portal. Barcelona. Marcombo
	http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_Ink.pl?grupo=MECATRONICA22&ejecuta=20&_ST