

## [GBH203] CONTROL TECHNOLOGY AND ROBOTICS

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN BIOMEDICAL ENGINEERING	<b>Subject</b>	?
<b>Semester</b>	1	<b>Course</b>	3
<b>Character</b>	COMPULSORY	<b>Mention / Field of specialisation</b>	
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face
<b>Credits</b>	6	<b>Language</b>	ENGLISH
		<b>Total hours</b>	99.65 class hours + 50.35 non-class hours = <b>150 total hours</b>

### 2030 AGENDA GOALS



### PROFESSORS

AZKARATE FERNANDEZ, IGOR

### REQUIRED PREVIOUS KNOWLEDGE

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

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>GBR304</b> - To develop automation systems in the field of medical equipment		x		5,08
<b>G-RTR1</b> - To develop interdisciplinary projects specific to their specialty and of gradual complexity, - becoming aware of respect for human rights and fundamental rights, and analyzing and assessing the impact of the proposed solutions on the SDGs - to acquire and/or apply basic, advanced and/or avant-garde, demonstrating the ability to work in multidisciplinary teams and/or undertake further studies with a high degree of autonomy		x		0,44
<b>G-RTR2</b> - To express information, ideas and the arguments that support them in an orderly, clear and coherent manner, orally and in writing, based on quality information, self-made or obtained from different sources, using inclusive and non-discriminatory language		x		0,48

**Total:** 6

KC: Knowledge or Content / SK: Skills / AB: Abilities

### SECONDARY LEARNING RESULTS

#### 1RGB394 (1 sem)

#### 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 3,75 h. NCH 2,25 h. TH 6 h.

#### EVALUATION SYSTEM

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

W

100%

#### MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

**CH - Class hours:** 3,75 h.

**NCH - Non-class hours:** 2,25 h.

**TH - Total hours:** 6 h.

#### RGB312 [!] *Comprende y aplica los principios de la robótica en el diseño de equipamientos médicos*

#### LEARNING ACTIVITIES

Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints  
Computer simulation exercises, individually and/or in teams  
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects

CH 3 h. NCH 14 h. TH 3 h.  
13 h. 27 h.  
12 h. 12 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests	100%	Individual written and/or oral tests or individual coding/programming tests
<b>Comments:</b> It is mandatory to have previously submitted the requested exercises to be allowed to take the test.		<b>Comments:</b> It will be mandatory to retake those individual tests that at the first attempt have a grade lower than 5. The final grade will be 25% of the first test and 75% of its retake.
<b>CH - Class hours:</b> 28 h. <b>NCH - Non-class hours:</b> 14 h. <b>TH - Total hours:</b> 42 h.		

1RGB392 (1 sem)				
LEARNING ACTIVITIES		CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		1,9 h.	1,1 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%	Observation (technical capacity, attitude and participation)		
CH - Class hours: 1,9 h.				
NCH - Non-class hours: 1,1 h.				
TH - Total hours: 3 h.				

1RGB393 (1 sem)			
LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	3,75 h.	2,25 h.	6 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%	Observation (technical capacity, attitude and participation)	
CH - Class hours: 3,75 h.			
NCH - Non-class hours: 2,25 h.			
TH - Total hours: 6 h.			

RGB311 [!] <i>Diseña y dimensiona los procesos de automatización de equipamientos médicos</i>			
LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	3 h.		3 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	24 h.	15 h.	39 h.
Computer simulation exercises, individually and/or in teams	13 h.	13 h.	26 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	17 h.		17 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS	
Reports on the completion of exercises, case studies,	46%	Individual written and/or oral tests or individual	

computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems  
Individual written and/or oral tests or individual coding/programming tests  
**Comments:** It is mandatory to have previously submitted the requested exercises to be allowed to take the test. A grade lower than 3.5 in one of the assessment systems will lock the sub-competence to that value, and the average will not be applied.

54%

coding/programming tests  
Observation (technical capacity, attitude and participation)  
**Comments:** It will be mandatory to retake those individual tests that at the first attempt have a grade lower than 5. The final grade will be 25% of the first test and 75% of its retake.

**CH - Class hours:** 57 h.  
**NCH - Non-class hours:** 28 h.  
**TH - Total hours:** 85 h.

### 1RGB390 (1 sem)

#### 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**

2,75 h.

**NCH**

1,25 h.

**TH**

4 h.

#### EVALUATION SYSTEM

**W**

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

100%

#### MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

**CH - Class hours:** 2,75 h.  
**NCH - Non-class hours:** 1,25 h.  
**TH - Total hours:** 4 h.

### 1RGB391 (1 sem)

#### 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**

2,5 h.

**NCH**

1,5 h.

**TH**

4 h.

#### EVALUATION SYSTEM

**W**

Self-assessment

25%

Co-assessment

25%

Observation (technical capacity, attitude and participation)

50%

#### MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

**CH - Class hours:** 2,5 h.  
**NCH - Non-class hours:** 1,5 h.  
**TH - Total hours:** 4 h.

## CONTENTS

ROBOT PROGRAMMING: Introduction to robotics. Introduction to RobotStudio (ABB). Definition of points and trajectories. Work objects. Complex geometries. RAPID programming: procedures, offset, variables, digital inputs and outputs. Intelligent tools and components for simulation. AUTOMATION: Introduction to industrial automation. Introduction to PLC. Programming in structured text and contact diagram. Virtual commissioning.

## LEARNING RESOURCES AND BIBLIOGRAPHY

### Learning resources

- [!] *Apuntes de la asignatura*
- [!] *Consultas en páginas web relacionadas con el tema*

### Bibliography

Robot Modeling and Control - Mark W. Spong, Seth Hutchinson, M. Vidyasagar - Wiley - 2005  
Autómatas programables SIEMENS Grafset y Guía Gemma con TIA

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[!] *Presentaciones en clase*

Portal - R. Yuste, V. Guerrero - Marcombo - 2017

[!] *Proyección de videos*