

**1. General information****Course:** INDUSTRIAL ROBOTS**Type:** CORE COURSE**Degree:** 417 - UNDERGRAD. IN INDUSTRIAL ELECTRONICS AND AUTOMAT. ENGINEERING**Center:** 602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL**Year:** 3**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 56506**ECTS credits:** 6**Academic year:** 2022-23**Group(s):** 20**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** ANDRES SALOMON VAZQUEZ FERNANDEZ PACHECO - Group(s): 20

Building/Office	Department	Phone number	Email	Office hours
Edificio Politécnico 2-B02	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	Via Teams	andress.vazquez@uclm.es	

2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

Not established

4. Degree competences achieved in this course**Course competences**

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CEE09	Knowledge of the principles and applications of robotic systems.
CG03	Knowledge of basic and technological subjects to facilitate learning of new methods and theories, and provide versatility to adapt to new situations.
CG04	Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of industrial engineering.
CG06	Ability to handle specifications, regulations and mandatory standards.
CT01	Knowledge of a second language.
CT02	Knowledge and application of information and communication technology.
CT03	Ability to communicate correctly in both spoken and written form.

5. Objectives or Learning Outcomes**Course learning outcomes**

Description

Ability to use the main programming languages of industrial robots.

Knowledge of the work space of a robot and its limitations.

Knowledge of applications of industrial robots.

Ability to apply the main software tools for robots.

Capacity to generate paths within the work environment.

Capacity to identify different types of robots.

Capacity to dynamically model the structure of a rigid robot.

6. Units / Contents**Unit 1: Introduction****Unit 2: Robot Morphology****Unit 3: Mathematical Tools****Unit 4: Robot Kinematics****Unit 5: Differential Kinematics****Unit 6: Static Forces in Manipulators**

7. Activities, Units/Modules and Methodology							
Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB01 CB02 CB03 CEE09 CG03 CG06	1.2	30	N	-	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CB01 CB02 CB03 CEE09 CG03 CG04 CG06	0.4	10	Y	Y	
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CB01 CB02 CB03 CB04 CB05 CEE09 CG03 CG04 CG06 CT02 CT03	0.6	15	Y	Y	
Final test [ON-SITE]	Assessment tests	CB01 CB02 CB03 CB04 CB05 CEE09 CG03 CG04 CG06 CT01 CT03	0.2	5	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 CB04 CB05 CEE09 CG03 CG04 CG06 CT01 CT02 CT03	3.6	90	N	-	
Total:			6	150			
Total credits of in-class work: 2.4				Total class time hours: 60			
Total credits of out of class work: 3.6				Total hours of out of class work: 90			

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System			
Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Laboratory sessions	25.00%	25.00%	
Projects	35.00%	35.00%	
Final test	40.00%	40.00%	
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	30
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	10
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	15
Final test [PRESENCIAL][Assessment tests]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Global activity	
Activities	hours
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	10
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	15
Final test [PRESENCIAL][Assessment tests]	5
Class Attendance (theory) [PRESENCIAL][Lectures]	30
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
ABB	Manual de RobotStudio http://www.abb.es/product/seitp327/df90f6fe2c1ffc64c125725100252d4d.aspx?productLanguage=es&country=ES				2013	
Bruno Siciliano	HandBook of Robotics	Springer		978-3540303015	2008	
J.J. Craig.	Introduction to Robotics	Addison-Wesley		978-1292164939	1998	
Peter Corke	ROBOTIC TOOLBOX https://petercorke.com/toolboxes/robotics-toolbox/				2008	
Richard M. Murray	A Mathematical Introduction to Robotic Manipulation http://www.cds.caltech.edu/~murray/mlswiki	CRC		978-0849379819	1994	
The MathWorks	MATLAB Reference Guide https://es.mathworks.com/help/matlab/				1993	
A. Barrientos, L.F. Peñín, C. Balaguer y R. Aracil.	Fundamentos de Robótica	Mc Graw-Hill		978-8448156367	2007	