

[MRC002] ROBOT PROGRAMMING

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS		Subject	Robotics
Semester	1	Course	1	Mention / Field of specialisation
Character	COMPULSORY		Language	ENGLISH
Plan	2019	Modality	Adapted Face-to-face	Total hours
Credits	6	Hours/week	0	110 class hours + 40 non-class hours = 150 total hours

PROFESSORS

ELKOROBARRUTIA LETONA, XABIER

 ALONSO NIETO, MARCOS

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	Basic programming concepts

SKILLS

VERIFICA SKILLS

SPECIFIC

MRCE12 - Programming a robot to obtain the desired kinematic behaviour

CROSS

MRCTR1 - Ability to work in multidisciplinary teams and in a multilingual environment and to communicate, both orally and in writing, knowledge, procedures, results and ideas related to subjects related to the Master's degree

MRCTR2 - Ability to do their job with a cooperative and participatory attitude, while being socially responsible

BASIC

M_CB7 - To know how to apply the acquired knowledge and competencies and the ability to solve problems in new or unfamiliar contexts within wider (or multidisciplinary) environments related to their field of study

LEARNING RESULTS

RA121 Programs the robot to carry out a task communicating the conclusions in an argued way

LEARNING ACTIVITIES

	CH	NCH	TH
Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	30 h.		30 h.
Individual and/or team computer simulation practice	20 h.	15 h.	35 h.

EVALUATION SYSTEM

	W
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence	20%
Written, coding/programming and individual oral tests for the evaluation of technical skills in the field	80%

MAKE-UP MECHANISMS

Written, coding/programming and individual oral tests for the evaluation of technical skills in the field

Comments: All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). In unapproved training activities (less than 5) the recovery is compulsory and the final grade will be the grade obtained in the recovery. In the activities carried out it is necessary to obtain a minimum mark of 4 to calculate the average mark of the learning result. Otherwise, the note of the learning result will be that of the suspended activity. The system will calculate the final grade with the RA, applying the percentages defined in IKOF.

CH - Class hours: 50 h.

NCH - Non-class hours: 15 h.

TH - Total hours: 65 h.

RA122 Programs the robot to carry out a task in a real or simulated context, solving the problems associated with the proposed solution and actively collaborating to evaluate and assume the social responsibility implicit in the proposal

LEARNING ACTIVITIES		CH	NCH	TH
Practices of problem solving and real or simulated context projects		30 h.	25 h.	55 h.
Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects		30 h.		30 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS		
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence	20%	Written, coding/programming and individual oral tests for the evaluation of technical skills in the field		
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CH - Class hours: 60 h. NCH - Non-class hours: 25 h. TH - Total hours: 85 h.				

CONTENTS

Industrial Robot Case Study: ABB Robot Studio and IRB 140:

1. Robot Programming Environment
2. Basic concepts: Targets, work object, paths, …
3. Programing with RAPID
4. Interacting with the environment with I/Os
5. Interacting with the robot through ETHERNET

ROS

1. Introduction to ROS
2. Publisher/subscriber and client/server models
3. Development tools
4. Simulation: RVIZ/Gazebo

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform Slides of the subject Specific Master Software	(No bibliography)