

[MRD001] ANALYSIS OF SUSTAINABLE DIGITAL CONTROL SYSTEMS

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS		Subject	Interoperability Control Systems	
Semester	1	Course	1	Mention / Field of specialisation	
Character	COMPULSORY		Language	ENGLISH	
Plan	2019	Modality	Adapted Face-to-face	Total hours	65 class hours + 85 non-class hours = 150 total hours
Credits	6	Hours/week	0		

PROFESSORS

MUXIKA OLASAGASTI, EÑAUT
MARKUERKIAGA OLABE, IRATI

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
ELECTRONIC TECHNOLOGY BASIC INDUSTRIAL AUTOMATION MICROPROCESSORS	(No previous knowledge required)

SKILLS

VERIFICA SKILLS

SPECIFIC

MRCE15 - Build a tailored device for the control of a process or autonomous system

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_CB10 - To have learning skills and the capacity for self-guided or independent subsequent learning.

LEARNING RESULTS

RA151 The ability to evaluate and to choose digital control systems for industrial processes and autonomous systems cooperating to obtain the proposal in a participatory way and analysing its sustainability

LEARNING ACTIVITIES

	CH	NCH	TH
Development, writing and presentation of memorandums, reports, audiovisual material, etc. Relating to projects/POPBLs carried out individually or in teams	6 h.	8 h.	14 h.
Individual or team workshop and/or lab practice	8 h.	12 h.	20 h.
Classroom presentations of relevant concepts and procedures in participatory environments	4 h.	2 h.	6 h.
Solving of multidisciplinary exercises or team study cases	8 h.	12 h.	20 h.

EVALUATION SYSTEM

W

Individual written and oral tests to assess technical skills of the subject 50%

Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices

Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence 50%

Comments: Practice and exercise reports need to be delivered to be able to attend individual tests.

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject

Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence

Comments: All assessment activities (control points, individual and group assignments, etc...) must have a minimum grade of 5 and there will be an extra opportunity for those who do not pass in the first try (except for the PBL project). In all activities with a grade less than 5 resits are mandatory and the final grade will be the resit grade. In the assessment activities, it is necessary to obtain a minimum grade of 4 to calculate the average grade of the learning outcome. Otherwise, the learning outcome grade will be the grade of the failed activity.

CH - Class hours: 26 h.

NCH - Non-class hours: 34 h.

TH - Total hours: 60 h.

RA152 The ability to designs and to validate a customized digital control system working individually and in multidisciplinary teams and ensuring his/her ability to adapt to situations where new knowledge is required to be learned

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Development, writing and presentation of memorandums, reports, audiovisual material, etc. Relating to projects/POPBLs carried out individually or in teams	9 h.	12 h.	21 h.
Individual or team workshop and/or lab practice	12 h.	18 h.	30 h.
Classroom presentations of relevant concepts and procedures in participatory environments	6 h.	3 h.	9 h.
Solving of multidisciplinary exercises or team study cases	12 h.	18 h.	30 h.

EVALUATION SYSTEM

W

Individual written and oral tests to assess technical skills of the subject 50%

Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices

Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence 50%

Comments: Practice and exercise reports need to be delivered to be able to attend individual tests

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject

Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence

Comments: All assessment activities (control points, individual and group assignments, etc...) must have a minimum grade of 5 and there will be an extra opportunity for those who do not pass in the first try (except for the PBL project). In all activities with a grade less than 5 resits are mandatory and the final grade will be the resit grade. In the assessment activities, it is necessary to obtain a minimum grade of 4 to calculate the average grade of the learning outcome. Otherwise, the learning outcome grade will be the grade of the failed activity.

CH - Class hours: 39 h.

NCH - Non-class hours: 51 h.

TH - Total hours: 90 h.

CONTENTS

1. Introduction
2. Commercial and custom digital systems for control applications
3. Evaluation of control system development time
 - 3.1 Custom Digital Control System Design
 - 3.2 Practical analysis for custom systems and rapid prototyping tools
4. Managing the development of control systems
 - 4.1 Alternatives in the development of control systems
 - 4.2 Budget estimation
5. Analysing the impact of control system design
 - 5.1 An introduction to the analysis of the impacts of digital control systems
 - 5.2 Life Cycle Analysis: A quantitative approach for environmental impact assessment
6. Case Studies
 - 6.1 Manufacturing process control systems
 - 6.2 Autonomous systems

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Topic related web quires
 Slides of the subject
 Moodle Platform
 Specific Master Software
 Class presentations

Bibliography

http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_in k.pl?grupo=MASTERROBOTIKA11&ejecuta=20&_ST