Goi Eskola Politeknikoa | Mondragon Unibertsitatea
Course: 2022 / 2023 - Course planning

Mondragon
Unibertsitatea
Goi Eskola
Politeknikoa
Escuela Politécnica
Superior

[MHA202] ELECTRONIC SYSTEMS

GENERAL INFORMATION

Studies	UNIVERSITY MASTER IN INDUSTRIAL ENGINEERING	**Subject**	?
Semester 2	**Course** 1	**Mention / Field of specialisation**	
Character COMPULSORY			
Plan 2022	**Modality** Face-to-face	**Language**	CASTELLANO/EUSKARA
Credits 4,5	**Hours/week** 2.5	**Total hours**	45 class hours + 67.5 non-class hours = **112.5 total hours**

PROFESSORS

OLAIZOLA ALBERDI, JON

CABEZUELO ROMERO, DAVID

CARNEIRO ARBIDE, SANTIAGO

MARKUERKIAGA OLABE, IRATI

REQUIRED PREVIOUS KNOWLEDGE

Subjects	**Knowledge**
ELECTRONICS FUNDAMENTALS	[!] *Matlab básico*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MHRA08 - To design and project automated production systems and advanced process control		x		3,78
MHRA27 - To demonstrate the ability to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on the social, health and safety, environmental, economic and industrial implications and responsibilities		x		0,12
MHRA28 - To communicate your conclusions and the knowledge and ultimate reasons that support them to specialized and non-specialized audiences in a clear and unambiguous way		x		0,12
MHRA30 - To work with people, involving and directing them in a dynamic aimed at a common objective that includes reflection on their ethical and social responsibility, with a global vision of the work to be carried out and the characteristics that it requires (quality, deadlines,...), assuming responsibility for the decisions made		x		0,12
MHR125 - To possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context		x		0,12
MHR126 - To apply the knowledge acquired and your problem-solving skills in new, little-known or changing environments within broader (or multidisciplinary) contexts related to your area of ??study		x		0,12
MHR129 - To possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous		x		0,12
Total:				**4,5**

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

ENAEE LEARNING RESULTS	ECTS
ENA124 - Knowledge and comprehension: Deep knowledge and comprehension of the engineering disciplines of their speciality, at the level necessary to acquire the rest of the competencies of the degree.	0,5
ENA126 - Knowledge and comprehension: Critical knowledge of the broad multidisciplinary context of engineering and the interrelations existing between the knowledge of the different fields.	0,5
ENA130 - Analysis in engineering: Ability to identify, formulate and solve engineering problems in emerging areas of their speciality.	0,7
ENA132 - Engineering projects: Ability to project while applying the knowledge and cutting-edge understanding of their engineering speciality.	0,7
ENA133 - Research and innovation: Ability to identify, find and obtain the required data.	0,6
ENA139 - Practical application of engineering: Practical skills, such as the use of computer tools to solve complex problems, carry out complex engineering projects, and design and guide complex investigations.	0,5
ENA140 - Practical application of engineering: Complete knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations.	0,5
ENA146 - Communication and Teamwork: Ability to employ different methods to communicate their conclusions, clearly and unambiguously, and the knowledge and logical foundations that support them, to audiences specialised and not specialised in the issue, in domestic and international contexts.	0,5
Total:	**4,5**

SECONDARY LEARNING RESULTS

RMH121 [!] *Diseña sistemas de adquisición de datos y realiza mediciones*

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LEARNING ACTIVITIES

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.	2 h.
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning		2,5 h.	2,5 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.	2 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	2 h.	2 h.	4 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	2 h.	2,5 h.	4,5 h.
Carrying out exercises and solving problems individually and/or in teams	3 h.	4 h.	7 h.
Practical work in workshops and/or laboratories, individually and/or in teams	1 h.	1 h.	2 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	25%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
Individual written and/or oral tests or individual coding/programming tests	75%	Individual written and/or oral tests or individual coding/programming tests

Comments: All activities (control points, individual and group assignments, etc...) must have a minimum mark (5 minimum) and there will be an opportunity to retake every activity. In case of retake of the control point, the final mark will be the mark of the retake. Failed assignments, practices, etc... must be retaken and will be graded with a maximum mark of 5. It is mandatory to do the practices to pass.

CH - Class hours: 9 h.
NCH - Non-class hours: 16 h.
TH - Total hours: 25 h.

RMH122 **[!]** *Aplica funciones de tratamiento, análisis, control y presentación de datos*

LEARNING ACTIVITIES

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	,5 h.	3,5 h.	4 h.
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	,5 h.	3,5 h.	4 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 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	4 h.	4 h.	8 h.
Computer simulation exercises, individually and/or in teams		2,5 h.	2,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	5 h.	7,5 h.	12,5 h.
Carrying out exercises and solving problems individually and/or in teams	4 h.	6 h.	10 h.
Practical work in workshops and/or laboratories, individually and/or in teams	2 h.		2 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	25%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
Individual written and/or oral tests or individual coding/programming tests	75%	Individual written and/or oral tests or individual coding/programming tests

Comments: All activities (control points, individual and group assignments, etc...) must have a minimum mark (5 minimum) and there will be an opportunity to retake every activity. In case of retake of the control point, the final mark will be the mark of the retake. Failed assignments, practices, etc... must be retaken and will be graded with a maximum mark of 5. It is mandatory to do the practices to pass.

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CH - Class hours: 18 h.
NCH - Non-class hours: 27 h.
TH - Total hours: 45 h.

RMH123 [!] *Implementa aplicaciones mediante un sistema de prototipado rápido*

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	1 h.	3 h.	4 h.
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	1 h.	2,5 h.	3,5 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	3 h.	5 h.	8 h.
Computer simulation exercises, individually and/or in teams	2 h.	3 h.	5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	6 h.	8 h.	14 h.
Carrying out exercises and solving problems individually and/or in teams	5 h.	3 h.	8 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	25%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
Individual written and/or oral tests or individual coding/programming tests	75%	Individual written and/or oral tests or individual coding/programming tests

Comments: All activities (control points, individual and group assignments, etc...) must have a minimum mark (5 minimum) and there will be an opportunity to retake every activity. In case of retake of the control point, the final mark will be the mark of the retake. Failed assignments, practices, etc... must be retaken and will be graded with a maximum mark of 5. It is mandatory to do the practices to pass.

CH - Class hours: 18 h.
NCH - Non-class hours: 24,5 h.
TH - Total hours: 42,5 h.

CONTENTS

1. Instrumentation

- Electronic instrumentation systems

- Resistive sensors and conditioners

- Active sensors and conditioners

2. Analog processing

- Signals in time and frequency

- Linear time invariant systems

- Analog filters

3. Digital processing

- Introduction

- Sampling theory

- Digital to analog converters

- Digital filters

4. Rapid prototyping

- Programming in LabVIEW: basic knowledge, proper programming, arrays, clusters, files...

- Selection of a National Instruments ADQ System.

LEARNING RESOURCES AND BIBLIOGRAPHY	
Learning resources	**Bibliography**
(No resources)	“Instrumentación electrónica” [Miguel Ángel Pérez García] “Instrumentación electrónica: transductores y acondicionadores de señal” [Mercedes Granda Miguel y Elena Mediavilla Bolado] “Sensores y acondicionadores de señal” [Ramón PallásAreny] “Measurementand Instrumentation: Theoryand Application” [Alan S. Morris, Reza Langari]