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

[GJD102] MICROPROCESSORS

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING			**Subject**	?
Semester	2	**Course**	3	**Mention / Field of specialisation**	
Character	OPTIONAL				
Plan	2020	**Modality**	Adapted Face-to-face	**Language**	CASTELLANO
Credits	4,5	**Hours/week**	2.58	**Total hours**	46.5 class hours + 66 non-class hours = **112.5 total hours**

PROFESSORS

MUXIKA OLASAGASTI, EÑAUT

AZPI-GARCIA ARROYO, JOSE LUIS (SOMORROSTRO)

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
FOUNDATIONS OF ELECTRONIC ENGINEERING	*(No previous knowledge required)*

SKILLS

VERIFICA SKILLS

SPECIFIC

GJCE38 - Design, simulate and implement programmable logical systems

GENERAL

GJCG05 - Developing and designing products, equipment and mechatronic systems while complying with the technical, economic, quality and safety requirements established in the specifications and required by current legislation

GJCG06 - Implement and materialize projects of automation and control of equipment, processes and flexible industrial systems, through the integration of hardware and software in order to optimize the operation of the different units that make up the system to meet the needs of the productive sector

BASIC

G_CB5 - To have developed learning abilities required to embark on subsequent studies with a high level of autonomy.

LEARNING RESULTS

RG301 **They assume responsibilities in the team, organizing and planning the tasks to be developed, dealing with contingencies and encouraging the participation of its members.**

LEARNING ACTIVITIES	CH	NCH	TH
Individual and team solving of exercises, problems, and practices	1 h.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices	100%	Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices **Comments:** Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.
NCH - Non-class hours: 2 h.
TH - Total hours: 3 h.

RG302 **They analyze the variables involved in the problem and propose actions for a stable situation.**

LEARNING ACTIVITIES	CH	NCH	TH
Individual and team solving of exercises, problems, and practices	1 h.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices	100%	Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices **Comments:** Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.

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NCH - Non-class hours: 2 h.
TH - Total hours: 3 h.

RG304 **They define the problem, the development of the solution, as well as the conclusions in an effective way, arguing and justifying each of them, making a correct use of the language, in writing.**

LEARNING ACTIVITIES	CH	NCH	TH
Individual and team solving of exercises, problems, and practices	1 h.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices	100%	Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices
Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.
NCH - Non-class hours: 2 h.
TH - Total hours: 3 h.

RG305 **They define the problem, the development of the solution, as well as the conclusions in an effective way, arguing and justifying each one of them, and making a correct use of the language, orally.**

LEARNING ACTIVITIES	CH	NCH	TH
Individual and team solving of exercises, problems, and practices	1 h.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices	100%	Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices
Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.
NCH - Non-class hours: 2 h.
TH - Total hours: 3 h.

RGJ3326 **They prepare the electronic schematic of a microprocessor-based logic system**

LEARNING ACTIVITIES	CH	NCH	TH
Individual study and work, tests and evaluations and check points	2 h.	2 h.	4 h.
Classroom presentations of relevant concepts and procedures in participatory environments	5 h.	5 h.	10 h.
Individual and team solving of exercises, problems, and practices	5 h.	7 h.	12 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and oral tests to assess technical skills of the subject
Comments: The exercises and practices are mandatory to attend the individual tests	100%	Individual written and oral tests to assess technical skills of the subject

CH - Class hours: 12 h.
NCH - Non-class hours: 14 h.
TH - Total hours: 26 h.

RGJ3327 **They select a microprocessor/microcontroller for a specific application**

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LEARNING ACTIVITIES	CH	NCH	TH
Individual study and work, tests and evaluations and check points	1 h.	2 h.	3 h.
Classroom presentations of relevant concepts and procedures in participatory environments	4 h.	5 h.	9 h.
Individual and team solving of exercises, problems, and practices	4 h.	6 h.	10 h.

Comments: The exercises and practices are mandatory to attend the individual tests

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and oral tests to assess technical skills of the subject	100%	Individual written and oral tests to assess technical skills of the subject

Comments: The exercises and practices are mandatory to attend the individual tests

CH - Class hours: 9 h.
NCH - Non-class hours: 13 h.
TH - Total hours: 22 h.

RGJ3328 **They carry out the complete SW development of a microprocessor based application, diagnosing and correcting**

LEARNING ACTIVITIES	CH	NCH	TH
Individual study and work, tests and evaluations and check points	2 h.	4 h.	6 h.
Classroom presentations of relevant concepts and procedures in participatory environments	7 h.	10 h.	17 h.
Individual and team solving of exercises, problems, and practices	12,5 h.	17 h.	29,5 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices	50%	Written, coding/programming and individual oral tests for the evaluation of technical skills in the field
Written, coding/programming and individual oral tests for the evaluation of technical skills in the field	50%	

Comments: The exercises and practices are mandatory to attend the individual tests

CH - Class hours: 21,5 h.
NCH - Non-class hours: 31 h.
TH - Total hours: 52,5 h.

CONTENTS

1. Concepts and foundations
    1.1 What is a microcontroller?
    1.2 Microcontroller families
    1.3 Microcontroller applications

2. Microcontroller boards
    2.1 Components and design requirements
    2.2 Circuit design and interconnections
    2.3 Circuit interpretation and analysis

3. Architecture of microcontrollers
    3.1 Architecture of microcontrollers
    3.2 Execution sequence (Pipeline)
    3.3 Peripherals and memory map

4. Time sequencing
    4.1 Purpose of timers in a microcontroller
    4.2 Clock System
    4.3 Timers
    4.4 ARM Cortex M family internal timer (Systick)
    4.5 Manufacturer specific timers

5. Interruptions and exceptions
6. Other peripherals

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LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Specific Master Software Computer practical training Slides of the subject Moodle Platform	http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_lnk.pl?grupo=MECATRONICA31&ejecuta=55&_ST