Goi Eskola Politeknikoa | Mondragon Unibertsitatea
Course: 2024 / 2025 - Course planning

[MMB100] CONTROL SYSTEMS AND EMBEDDED ANALYSIS LABORATORY

GENERAL INFORMATION

Studies	MASTER'S DEGREE IN BIOMEDICAL TECHNOLOGIES	**Subject**	?
Semester	1	**Course** 1	
Character	COMPULSORY	**Mention / Field of specialisation**	
Plan	2023	**Modality** Face-to-face	**Language** CASTELLANO
Credits	3	**Hours/week** 2.66	**Total hours** 47.8 class hours + 27.2 non-class hours = **75 total hours**

PROFESSORS

OSA AROZENA, JOSEBA

REQUIRED PREVIOUS KNOWLEDGE

Subjects	**Knowledge**
(No specific previous subjects required)	*(No previous knowledge required)*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MMRA03 - To develop embedded systems for medical use		x		2,1
MMRA26 - 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		0,72
MMRA28 - 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		0,18
			Total:	**3**

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

SECONDARY LEARNING RESULTS

RMM107 [!] *Implementar y analizar sistemas de control y embebidos para uso médico*

LEARNING ACTIVITIES	CH	NCH	TH
Practical work in workshops and/or laboratories, individually and/or in teams	17 h.	9,25 h.	26,25 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests	100%	Individual written and/or oral tests or individual coding/programming tests

Comments: The final grade of the exam that evaluates the contents of this learning outcome must be higher than 4 to count the grade of the individual work. Otherwise, this learning outcome will be assessed 100% with the exam grade.

Comments: If the score of the exam is lower than 5, it Will be mandatory to repeat the exam

CH - Class hours: 17 h.
NCH - Non-class hours: 9,25 h.
TH - Total hours: 26,25 h.

RMM147 [!] *Define los objetivos, realiza la planificación para su consecución y su seguimiento sistemático coordinando su trabajo con los demás miembros del equipo.*

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	1,3 h.	,7 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	50%	Observation (technical capacity, attitude and participation)
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree	50%	

project, master's thesis, challenges and problems

CH - Class hours: 1,3 h.
NCH - Non-class hours: ,7 h.
TH - Total hours: 2 h.

RMM145 [!] *Conoce y es capaz de aplicar las herramientas de resolución de problemas en el campo de la Ingeniería Biomédica con iniciativa, toma de decisiones, creatividad y razonamiento crítico.*

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	5,5 h.	3,5 h.	9 h.

EVALUATION SYSTEM	W
Individual written and/or oral tests or individual coding/programming tests	40%
Co-assessment	5%
Prototype / Product	55%

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

Comments: If the defense grade is lower than 5, this sub-learning outcome will be evaluated in its entirety (100%) with the defense. A co-evaluation system will be implemented to adjust the final grade of this sub-learning outcome based on the student's participation in the project.

CH - Class hours: 5,5 h.
NCH - Non-class hours: 3,5 h.
TH - Total hours: 9 h.

RMM144 [!] *Analiza las variables intervinientes en la solución de los problemas y plantea acciones para lograr una situación estable asumiendo responsabilidades en el equipo de trabajo, afrontando contingencias y organizando y planificando tareas.*

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	5,5 h.	3,5 h.	9 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	40%
Co-assessment	5%
Prototype / Product	55%

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

Comments: If the score of the defense is lower than 5, this evaluation item will be evaluated in its entirety (%100) with the score of the defense. A co-evaluation system will be implemented to adjust the score of the student based on his or her participation in the Project.

CH - Class hours: 5,5 h.
NCH - Non-class hours: 3,5 h.
TH - Total hours: 9 h.

RMM106 [!] *Comprender los fundamentos de los sistemas de control y de los sistemas embebidos*

LEARNING ACTIVITIES	CH	NCH	TH
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	7 h.	4,25 h.	11,25 h.
Practical work in workshops and/or laboratories, individually and/or in teams	10 h.	5 h.	15 h.

EVALUATION SYSTEM	W
Individual written and/or oral tests or individual coding/programming tests	100%

Comments: The final grade of the exam that evaluates the contents of this learning outcome must be higher than 4 to count the grade of the individual work. Otherwise, this learning outcome will be assessed 100% with the exam grade.

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

Comments: If the score of the exam is lower than 5, it Will be mandatory to repeat the exam

CH - Class hours: 17 h.
NCH - Non-class hours: 9,25 h.
TH - Total hours: 26,25 h.

RMM146 [!] *Define el problema, el desarrollo de la solución, así como las conclusiones de manera eficaz, argumentando y justificando cada una de ellas, y haciendo un uso correcto del lenguaje, por escrito y de manera oral.*

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	1,5 h.	1 h.	2,5 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	50%
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

CH - Class hours: 1,5 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 2,5 h.

CONTENTS

1- Introduction to embedded systems

2- Analog inputs and outputs

3- Analog-to-digital and digital-to-analog converters4- UARTs5- Servomotors6- Interrupts

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LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Labs	C Programming for Arduino. John Bayle. Ed. Pack Publishing
Class presentations	
Subject notes	
Lab practical training	