Goi Eskola Politeknikoa | Mondragon Unibertsitatea
Course: 2023 / 2024 - Course planning

[MRD102] SENSORS AND MEASUREMENTS

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS	**Subject**	?
Semester	1	**Mention / Field of specialisation**	
Character	COMPULSORY		
Plan	2023	**Modality** Face-to-face	**Language** CASTELLANO/EUSKARA
Credits	3	**Hours/week** 0	**Total hours** 31 class hours + 44 non-class hours = **75 total hours**

Course 1

PROFESSORS

MUXIKA OLASAGASTI, EÑAUT

ALONSO GOMEZ, ARRATE

REQUIRED PREVIOUS KNOWLEDGE

Subjects	**Knowledge**
ELECTRONIC TECHNOLOGY	*(No previous knowledge required)*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M1R215 - [!] *Obtener señales físicas a partir de sensores y diseñar el acondicionamiento adecuado para su transferencia a los sistemas de control tanto en contextos industriales como no industriales*	x			2,2
M1R223 - [!] *Capacidad de trabajar en equipos multidisciplinares y en un entorno multilingüe y de comunicar, tanto de forma oral como escrita, conocimientos, procedimientos, resultados e ideas relacionadas con los temas afines al máster*		x		0,2
M1R224 - [!] *Capacidad para ejercer su profesión con actitud cooperativa y participativa, y con responsabilidad social*		x		0,2
M1R226 - 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		0,4
			Total:	**3**

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

SECONDARY LEARNING RESULTS

RA161 [!] *Evalúa y elige sensores para procesos industriales y sistemas de control autónomos cooperando y trabajando individualmente y en equipos multidisciplinares*

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	8 h.	12 h.	20 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	4 h.	4 h.	8 h.
Reading and personal and/or shared analysis of relevant and current publications (books, articles, catalogues, etc.) related to the speciality	4 h.	8 h.	12 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	75%
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	25%

MAKE-UP MECHANISMS

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

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: 16 h.
NCH - Non-class hours: 24 h.

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Mondragon
Unibertsitatea

Goi Eskola
Politeknikoa
Escuela Politécnica
Superior

TH - Total hours: 40 h.

RA162 **[!]** *Desarrolla y valida un sistema de adquisición de señales para procesos industriales y/o sistemas autónomos resolviendo los problemas asociados a la solución propuesta en entornos nuevos o poco conocidos*

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	4 h.	6 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	5 h.	8 h.	13 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	6 h.	4 h.	10 h.
Reading and personal and/or shared analysis of relevant and current publications (books, articles, catalogues, etc.) related to the speciality	2 h.	4 h.	6 h.

EVALUATION SYSTEM	W
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	25%
Individual written and/or oral tests or individual coding/programming tests	75%

MAKE-UP MECHANISMS

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

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: 15 h.
NCH - Non-class hours: 20 h.
TH - Total hours: 35 h.

CONTENTS

* Introduction
* General characteristics of sensors
  - Theoretical foundations
  - Types of transducers
  - Signal conditioning and calibration
  - Sensor analysis and selection
* Sensor communications
  - Introduction to IoT: from devices to the Cloud
  - Communication concepts review
  - Review of sensor communication protocols
  - Wireless networks
* Practical case study of a smart sensor
  - Real case study

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Slides of the subject	http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_lnk.pl?grupo=MASTERROBOTIKA11&ejecuta=25&_ST
Moodle Platform	
Technical articles	
Topic related web quires	