

[MRD102] SENSORS AND MEASUREMENTS

GENERAL INFORMATION

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

PROFESSORS

MUXIKA OLASAGASTI, EÑAUT
ALONSO GOMEZ, ARRATE
SESAR GIL, IÑIGO

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
ELECTRONIC TECHNOLOGY	(No previous knowledge required)

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M1R215 - Obtaining physical signals from sensors and designing the adequate conditioning for their transfer to control systems in both industrial and non-industrial contexts.	x			2,2
M1R223 - 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		x		0,2
M1R224 - To be able to do their job in cooperative, participatory environments, with awareness of social responsibility.		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	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%

Comments:

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). If a control point is not passed (less than a 5), the retake is mandatory and the final grade will be the grade obtained in the retake. If an individual or group work is not passed (less than 5), the retake is mandatory and the final grade will be a maximum of 5. 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.

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

50%

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

50%

MAKE-UP MECHANISMS

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

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). If a control point is not passed (less than a 5), the retake is mandatory and the final grade will be the grade obtained in the retake. If an individual or group work is not passed (less than 5), the retake is mandatory and the final grade will be a maximum of 5. 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: 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

Slides of the subject
 Moodle Platform
 Technical articles
 Topic related web quires

Bibliography

http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_Ink.pl?grupo=MASTERROBOTIKA11&ejecuta=25&_ST