

[MRE102] PERCEPTION

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS		Subject	?	
Semester	2	Course	1	Mention / Field of specialisation	AUTONOMOUS SYSTEMS - EIT
Character	OPTIONAL		Modality	Face-to-face	
Plan	2023	Hours/week	0	Language	CASTELLANO/EUSKARA
Credits	6	Total hours	55 class hours + 95 non-class hours = 150 total hours		

PROFESSORS

IZAGUIRRE ALTUNA, ALBERTO

MAESTRO WATSON, DANIEL

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	Programming Calculus basics Linear algebra basics Statistics basics

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M1R220 - [!] <i>Diseñar y evaluar algoritmos en base al análisis el contenido de los datos, especialmente imágenes y vídeos</i>		x		4,4
M1R223 - [!] <i>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</i>		x		0,4
M1R224 - [!] <i>Capacidad para ejercer su profesión con actitud cooperativa y participativa, y con responsabilidad social</i>		x		0,4
M1R228 - 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		0,8
Total:				6

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

SECONDARY LEARNING RESULTS

RA211 [!] *Diseña un sistema de percepción para una aplicación robótica comunicando sus conclusiones de manera argumentada*

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		12 h.	12 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	20 h.	22 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	14 h.		14 h.
Carrying out exercises and solving problems individually and/or in teams	7 h.	20 h.	27 h.
Practical work in workshops and/or laboratories, individually and/or in teams		10 h.	10 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	10%	Individual written and/or oral tests or individual coding/programming tests
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	20%	
Individual written and/or oral tests or individual coding/programming tests	70%	

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: 23 h.

NCH - Non-class hours: 62 h.

TH - Total hours: 85 h.

RA212 [!] *Implementa un sistema de percepción para navegación autónoma de un robot móvil colaborando de manera activa para evaluar y asumir la responsabilidad social implícita en la propuesta*

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		10 h.	10 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	12 h.	14 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	14 h.		14 h.
Carrying out exercises and solving problems individually and/or in teams	12 h.	7 h.	19 h.
Practical work in workshops and/or laboratories, individually and/or in teams	4 h.	4 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

10%

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

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

20%

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

70%

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: 32 h.

NCH - Non-class hours: 33 h.

TH - Total hours: 65 h.

CONTENTS

1. 3D triangulation scanners
2. Two-view geometry
3. Geometry of multiple views
4. Resolution of the Robot-World Hand-Eye calibration problem

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
 Specific Master Software
 Lecture notes

Bibliography

Hartley, Richard, and Andrew Zisserman. Multiple view geometry in computer vision. Cambridge university press, 2004.
 Faugeras, Olivier. Three-dimensional computer vision: a geometric viewpoint. MIT press, 1993.