

[MRE101] ARTIFICIAL VISION

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	5	Hours/week	0
		Language	CASTELLANO/EUSKARA
		Total hours	45 class hours + 80 non-class hours = 125 total hours

PROFESSORS

MAESTRO WATSON, DANIEL
SEJAR GIL, IÑIGO

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
M1R219 - [!] <i>Seleccionar teorías y métodos relevantes de los campos de percepción y aplicarlos en un nuevo contexto</i>	x			3,6
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		0,6
Total:				5

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

SECONDARY LEARNING RESULTS

RA201 [!] *Diseña una solución de análisis de imágenes basados en fundamentos básicos de visión artificial cooperando para obtener la propuesta de manera participativa y 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		10 h.	10 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	4 h.	30 h.	34 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	20 h.		20 h.
Carrying out exercises and solving problems individually and/or in teams	10 h.	20 h.	30 h.
Practical work in workshops and/or laboratories, individually and/or in teams	11 h.	20 h.	31 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	20%	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	60%	

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: 45 h.
NCH - Non-class hours: 80 h.
TH - Total hours: 125 h.

CONTENTS

Introduction to Computer Vision.

Camera, lenses and components of a vision system.

Camera model and calibration.

Homographies and 2D image rectification.

Introduction to image processing (Histograms, segmentation, filtering, morfological processing, edge detection, ...) .

Image Stitching.

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
Slides of the subject
Specific Master Software

Bibliography

Rafael C. Gonzalez and Richard E. Woods. Digital Image Processing (4th Edition). Pearson Education Limited, 2018.
Szeliski, Richard. Computer vision: algorithms and applications. Springer Science & Business Media, 2010.
Hornberg, Alexander, ed. Handbook of machine and computer vision: the guide for developers and users. John Wiley & Sons, 2017.