[MRE001] ARTIFICIAL VISION

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS			**Subject**	Artificial Vision
Semester	1	**Course**	1	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2019	**Modality**	Adapted Face-to-face	**Language**	ENGLISH
Credits	4	**Hours/week**	0	**Total hours**	38 class hours + 62 non-class hours = **100 total hours**

PROFESSORS

MAESTRO WATSON, DANIEL

REQUIRED PREVIOUS KNOWLEDGE

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

SKILLS

VERIFICA SKILLS

SPECIFIC

MRCE20 - Selecting relevant theories and methods of the fields of perception and applying them in a new context

CROSS

MRCTR1 - 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

MRCTR2 - Ability to do their job with a cooperative and participatory attitude, while being socially responsible

BASIC

M_CB9 - To share knowledge, conclusions and their rationale with specialised and lay audiences in a clear, unambiguous manner

LEARNING RESULTS

RA201 Designs an image analysis solution based on basic fundamentals of artificial vision cooperating to obtain the proposal in a participatory way and communicating his/her conclusions in an argumented way

LEARNING ACTIVITIES	*CH*	*NCH*	*TH*
Development, writing and presentation of memorandums, reports, audiovisual material, etc. Relating to projects/POPBLs carried out individually or in teams	8 h.	20 h.	28 h.
Individual study and work, tests and evaluations and check points	2 h.	20 h.	22 h.
Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	17 h.		17 h.
Individual and team exercises	7 h.	16 h.	23 h.
Individual or team workshop and/or lab practice	4 h.	6 h.	10 h.

Comments: Mandatory practical exercise submissions.

EVALUATION SYSTEM	*W*
Individual written and oral tests to assess technical skills of the subject	60%
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices	20%
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence	20%

Comments: One writen control point. Two graded practital control points. It is mandatory to hand in the practical exercices and their documents to be able to attend the exams (pass / not pass).

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject

Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices

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: 38 h.
NCH - Non-class hours: 62 h.
TH - Total hours: 100 h.

CONTENTS

Introduction to Artificial 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	Bibliography
Moodle Platform	Szeliski, Richard. Computer vision: algorithms and applications. Springer Science & Business Media, 2010.
Slides of the subject	Rafael C. Gonzalez and Richard E. Woods. Digital Image Processing (4th Edition). Pearson Education Limited, 2018.
Specific Master Software	David A. Forsyth, Jean Ponce. Computer vision: a modern approach. Pearson, 2003.
	Hornberg, Alexander, ed. Handbook of machine and computer vision: the guide for developers and users. John Wiley & Sons, 2017.