

MOBILITY

We have agreements with institutions that offer similar master programs in the subjects of robotics, graphics and computer vision (including ANU Canberra, University of New South Wales, UTS Sydney, Universität Zürich, TU Wien, TU Berlin, Albert-Ludwigs-Universität Freiburg, TU München, ENSTA Bretagne, UTC Compiègne, Grenoble Institute Of Technology, Université Pierre et Marie Curie, Université Paul Sabatier, Università di Bologna, Università Degli Studi di Roma "La Sapienza", Università di Siena, Saitama University, Técnico Lisboa, Linköpings Universitet). Students have the opportunity to spend a semester in another university in Europe (through the Erasmus+ program), America, Asia, and Oceania (through the NAO program), either taking courses or working on their final degree project.

For the Erasmus+program, applications will be open in S1 (October) for mobility in S2, and in S2 (February) for mobility in S3. For the NAO program, applications will be open in S1 (November) for mobility in S3.

Similar opportunities will be available to carry out internships in some of the local, national and international companies that we are negotiating with (including Ábaco Digital, Atria Innovation, BitBrain, Exovite, Eyelyn, Gas Natural, Indra Sistemas, Infaimón, IT Corporate, Libelium, Robotnik, Scati Labs, Solid Angle, Tecnitop, Telnet, Adobe, Alibaba, Boeing, Disney, Epic Games, Google, Infineon, Kuka, Microsoft, nuTonomy, Nvidia, Oculus VR, Panasonic), as well as within the research groups of the Univerisy of Zaragoza that provide support for this master's program.

CONTACT

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Escuela de
Ingeniería y Arquitectura
Universidad Zaragoza

Master in Robotics, Graphics and Computer Vision

Supported by:



Departamento de
Informática e Ingeniería
de Sistemas
Universidad Zaragoza



Graphics and
Imaging Lab

The goal of the master's degree is to provide training in research, innovation and development at the confluence of the fields of Robotics, Graphics and Computer Vision. The language of instruction is **English**. The **90 ECTS** credits curriculum allows the acquisition of a series of general and specific competences related to these topics through a set of compulsory and elective subjects, including elective professional internships and a compulsory final degree project.

Robotics, autonomous vehicles, drones, computer vision, machine learning, graphic computing, virtual and augmented reality (VR/AR) and computational imaging are all disciplines in strong expansion and have an enormous socioeconomic potential. Applications of great economic and social interest include driving assistance systems or augmented reality systems for medicine. This program leverages the convergence of robotics, computer graphics and computer vision to address such complex and multidisciplinary applications: autonomous vehicles need robotics and computer vision techniques to navigate, and are trained by automatic learning in virtual environments; VR/AR systems use robotics and computer vision techniques to learn the environment and estimate the user's position; computational imaging combines vision technique and graphics computing to obtain and process images impossible to achieve with traditional methods.

ADMISSION

The degrees that provide access to these studies are:

- Computer Science Eng.
- Electronics and Automatic Control Eng. (1)
- Industrial Technologies Eng. (1)
- Telecommunications Eng. (1)
- Mechatronics Eng. (1)
- Electrical Eng. (1)
- Mechanical Eng. (1)
- Physics (1)
- Mathematics (1)
- Other bachelor degrees in science and engineering (1,2)

For all degrees, English proficiency of **at least B2 or equivalent** is required.

For degrees marked (1), (1,2), access to the program is possible if there is sufficient evidence of: (1) 18 ECTS credits (or equivalent experience, for example in the final degree project) in computer programming and (2) 18 ECTS credits (or equivalent experience) in mathematics

CURRICULUM

The curriculum allows the acquisition of a series of general and specific competences related to these topics, through a set of compulsory and elective subjects for a total of **90 ECTS** credits for the student.

COURSE	TYPE	ECTS	SEM
Autonomous Robots	C	6	S1
Computer Vision	C	6	S1
Machine Learning	C	6	S1
Modeling and Simulation of Appearance	C	6	S1
Programming and Architecture of Computing Systems	C	6	S1
Computational Imaging	C	6	S2
Simultaneous Localization and Mapping	C	6	S2
Virtual Reality	E	3	S2
Applications of Deep Learning	E	3	S2
Advanced SLAM	E	3	S2
Multirobot Systems	E	3	S2
Assistive Robotics	E	3	S2
Research Seminars	E	3	S2
Research and Innovation Tools and Activities	E	3	S2
Professional Internships	E	3-6-9	S1-S2-S3
Master Thesis	C	30	S3*

C: Compulsory, E: Elective

* While the standard 90 ECTS itinerary takes 18 months, the master's program offers a fast-paced 90 ECTS itinerary to be completed in 12 months.