

## MOBILITY

We have agreements with institutions that offer similar master's programmes in robotics, graphics, and computer vision. These institutions include ANU Canberra, UTS Sydney, Universität Zürich, TU Wien, TU Berlin, Albert-Ludwigs-Universität Freiburg, TU München, Polytech Angers, ENSTA Bretagne, UTC Compiègne, Grenoble Institute of Technology, Université Pierre et Marie Curie, Université Paul Sabatier, Università di Bologna, Università degli Studi di Padova, Università degli Studi di Roma "La Sapienza", Università di Siena, University of Twente, Instituto Superior Técnico, Linköping University, and Örebro University. Students have the opportunity to spend a semester at another university in Europe (through the Erasmus+ programme), or in America, Asia or Oceania (through the NAO programme), either taking courses or working on their final degree project.

Applications for the Erasmus+ programme will open in S1 (September) for mobility in S2 and in S2 (December) for mobility in S3. For the NAO programme, applications will be open in S1 (November) for mobility in S3.

Similar opportunities are available for internships at local, national and international companies, including Atria Innovation, Bitbrain, BSH, Deusens, Dive Medical, Epic Power, Etqmedia, Fersa, Imascono, Infinitia, Inycom, ITAINNOVA, Moontech, Nettrim, Predictland, Radetec, Zebra Ventures, Arcturus Industries, Seddi Labs, Ericsson, Voca, Orbem, Leica and DLR KUKA. Internships are also available within the research groups of the University of Zaragoza that run this master's programme.

## 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 Master's degree aims to provide training in research, innovation and development at the intersection of Robotics, Graphics and Computer Vision. The language of instruction is English. The curriculum, comprising 90 ECTS credits, enables students to acquire a range of general and specific competencies related to these topics through compulsory and elective subjects, including professional internships and a final degree project.

Robotics, autonomous vehicles, drones, computer vision, machine learning, graphics computing, virtual and augmented reality (VR/AR), and computational imaging are all rapidly expanding disciplines with enormous socioeconomic potential. Applications of great economic and social interest include driving assistance systems and augmented reality systems for medicine. This programme capitalises on the convergence of robotics, computer graphics and computer vision in order to address such complex, multidisciplinary applications. For example, autonomous vehicles require robotics and computer vision techniques in order to navigate, and they are trained using machine learning in virtual environments. VR/AR systems also use robotics and computer vision techniques in order to learn about their surroundings and estimate the user's position. Furthermore, computational imaging combines vision techniques and graphic computing in order to obtain and process images that would be impossible to achieve using traditional methods.

## ADMISSION

The degrees that provide access to these studies are:

- Computer Science Eng.
- Data Engineering (1)
- 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.