

University Master's Degree in Computational Engineering and Mathematics (joint URV, UOC)

ONLINE, ANYTIME

Online University Master's Degree in Computational Engineering and Mathematics (joint URV, UOC)

Start
25 Sep 2024

100%
Online

60
ECTS credits

Language: Catalan, Spanish, English

Official programme

[Request information](#)



Fully online method



World's first ever online university



Personalized guidance and support

Presentation

In most sectors and disciplines, the problems that arise today are complex, due to the large amount of data available and the increasing demand of the market. The Joint University Master's Degree in Computational and Mathematical Engineering (URV, UOC) prepares professionals capable of analyzing the behavior of these systems, creating models that represent them and designing methods that offer the optimal solution.

Why study the master's degree in Computational and Mathematical Engineering at URV and UOC?

- We offer **interdisciplinary training** in current topics in computing and mathematical engineering: computer **modeling and simulation**, **numerical methods** and mathematical modeling, **artificial intelligence**, applied **optimization** and **Big Data**.
- We use virtual laboratories that facilitate the acquisition of the necessary practice and we use the most professionally used tools, such as **Matlab**, **Simio**, **Python** or **R**.
- The teaching team are active **researchers and experts** in their field of teaching.

[See more details about pre-enrolment](#)

1st



1ST SPANISH-LANGUAGE ONLINE MBA IN THE WORLD



Programme quality

The quality of this programme is validated by the [AQU](#) (Catalan University Quality Assurance Agency), which guarantees its rigour and its compliance with the standards required by the [EHEA](#).

+ [Quality](#).

AQU quality seal

[Catalan University Quality Assurance Agency](#)



AQU Catalunya registered on EQAR

Together with:



Programme of Study

60

ECTS

24

ECTS

Optional

18

ECTS

Mandatory

18

ECTS

Final work

Courses

This programme has three types of course: basic courses, compulsory courses and optional courses. Check out the details of the courses you're interested in taking to see how they can adapt to your pace of study depending on when they're available, what the enrolment requirements are and the amount of time you can devote to them.

The UOC is a university seeking to offer a public service by enabling as many people as possible to get a university-level education. This is **why there is no minimum number of credits for enrolment**.

Types of courses	Credits
Basic courses	60
Compulsory courses	60
Optional courses	60
Final Project	60
Total	60

In order to complete the University Master's Degree in Computational and Mathematical Engineering, students must take 18 compulsory course credits, 24 optional course credits and 18 credits for the final master's degree project.

Final Master's Degree Project

The University Master's Degree in Computational and Mathematical Engineering concludes with the preparation of a final project of 18 ECTS credits.

In order to enrol on this course, students must have already passed, or currently be enrolled on (during the same year as the final project), the 42 credits corresponding to the master degree's other courses. The specific prior knowledge required will depend on the final project's subject area.

The final project consists of performing an individual project, product, report and/or study that synthesizes the knowledge acquired in the programme's other courses. This is a compulsory course that students must take in order to complete the programme and is intended to assess the competencies associated with the degree.

Computational and Mathematical Engineering students have the option of doing their final project on different subject areas proposed by the master degree's teaching staff. The available areas can be viewed in the **course plan**. Students must select the field of knowledge in which they want to perform their final master's degree project and submit an application, which must be accepted by the final project's supervisor and the programme's teaching staff.

The final project is done individually, with tutoring and guidance from the final project supervisor, who provides the necessary support to ensure its successful completion. The final project's supervisor is responsible for guiding the student and monitoring the project's progress, and provides advice on each of the following aspects: conceptualization, rationale, methodology, reporting of the results and defence. The time spent by the student on the project is determined by the credits allocated to this course, with each credit being equivalent to 25 hours' work by the student.

The final project concludes with a defence, in which students must make an asynchronous, online presentation (video) to a three-member assessment committee. The video should summarize the results obtained and the project's development.

Some examples of final projects submitted for the master's degree are listed below:

- [An open-source development environment for Self-driving vehicles](#)
- [Análisis de datos clínicos en una Unidad de Cuidados Intensivos](#)
- [Aprendizaje supervisado en conjuntos de datos no balanceados con redes neuronales artificiales](#)
- [Impact evaluation of clustering-based k-anonymity for recommendations](#)
- [Jerarquías emergentes en redes complejas](#)
- [Metaheuristic algorithms for solving the multi-depot arc routing problem](#)
- [Simulación de sistemas flexibles: el caso del aerogenerador](#)
- [Simulation of the mechanical behaviour of a historical church](#)
- [Solució d'alt rendiment per a química computacional](#)
- [Tecnologías que mejoran la privacidad en los sistemas de recomendación](#)
- [The center-focus and ciclicity problems: an implementation of the Lyapunov method and the interpolation technique](#)

Learning resources

Right from the very first day, the programme provides students with learning resources for each of their courses to help them with their studies.

These learning resources come from different sources: they may be course material that the UOC itself orders and develops, or they may be resources available on the Web or already published by third parties.

The degree can be taken in English, Spanish or Catalan. The learning resources are available in Spanish and English, and the classroom content and the teaching staff's activities are available in all three languages.

In order to take this master's degree, students must be able to read scientific and technical texts in English, as some of the teaching materials (books, articles, etc) are written solely in English.

Duration

The Joint University Master's Degree in Computational and Mathematical Engineering has been designed so that it can be completed in one year (two semesters) or two years (four semesters), but there is no maximum time limit for completion of the degree. Each student can adapt the duration and pace of study to the time they have available to dedicate to them.

The student can choose, on an annual basis, the number of subjects of each semester in which he wants to enroll. In fact, when enrolling on courses, students receive personalized advice from their tutor to help them draw up a suitable plan. Aspects such as their needs, interests, time available and prior knowledge are all taken into account. The aim is to consolidate their skills, which will ensure that they make good progress while studying for the degree.

Students are recommended to take the master's degree in two years, particularly if they have to combine their studies with other endeavours. Taking the programme in one year is only recommended if the student can study full-time.

Prior studies assessment

The prior studies assessment is the procedure that students must request if they wish to validate the courses they have completed at the UOC or any other university.

It is not a mandatory procedure. To request the prior studies assessment, only the last adapted academic record is considered valid.

The result of students' prior studies assessment is valid provided they have an open academic record at the UOC. It will be valid for newly admitted students if they enrol on the semester immediately following application for the procedure. Otherwise, their prior studies assessment will expire and they will have to repeat the procedure.

The prior studies assessment is carried out by a committee chaired by the Vice President for Teaching and Learning and whose members are the directors of the UOC's programmes. The secretary's duties are performed by the person responsible for the procedure at the Secretary's Office. The committee's tasks are to evaluate and propose validations, adaptations and recognition of free elective credits.

Academic team

Dean management

Daniel Riera Terrén

Direction programme

Dolors Puigjaner Riba

Josep Prieto Blàzquez

Staff

Agusti Solanas Gómez

Albert Solé Ribalta

Carles Ventura Royo

Carlos García Gómez

Carme Olivé Farré

David Canton Faba

Dolors Puigjaner Riba

Elena Planas Hortal

Gerard Fortuny Anguera

Jordi Villadelprat Yagüe

Josep Jorba Esteve

Juan Alberto Rodríguez Velázquez

Maria Bras Amoros

Oriol Farras Ventura

Sergio Gómez Jiménez

Álvaro Leitao Rodriguez

Objectives

The aim of the master's degree programme is to prepare graduates from different degree programmes to work in their respective areas of interest by providing them with training in computational and mathematical engineering. Graduates will be able to resolve a wide range of problems in the fields of industry, business (services) and scientific research, using the language and tools provided by advanced training in computational and mathematical engineering.

Profiles

This master's degree programme is targeted at candidates who hold a bachelor's degree in: Mathematics, Statistics, Physics and similar areas. It also targets students who hold degrees in Computer Science, Telecommunications, Electronic Engineering, Industrial Engineering, Electrical Engineering, Mechanical Engineering, Aeronautics and similar fields.

Competencies

Joint University Master's Degree in Computational and Mathematical Engineering (URV, UOC) graduates will be able to:

- Understand and apply advanced computing knowledge and numerical or computational methods to engineering problems.
- Apply computational, mathematical and statistical methods to model, design and develop applications, services, intelligent systems and knowledge-based systems.
- Apply mathematical and computational methods to solve technological problems and company engineering problems, particularly in research, development and innovation tasks.
- Ability to model problems using the language of mathematics and solve them with formal reasoning.
- Identify the mathematical theories needed to construct models based on problems from other disciplines.
- Handle mathematics and statistics software.
- Synthesize and present research results verbally and in writing, in accordance with the rules for writing scientific documentation.
- Model, simulate and analyse systems, processes and networks.
- Analyse and process data that enable the generation and management of useful information during decision-making procedures.
- Design, implement and validate algorithms using the most suitable structures.
- Develop a research project proposal using research support tools.
- Understand and apply advanced knowledge in high-performance computing and, specifically, in parallel/distributed computing, to solve scientific and engineering problems.

25 years' experience in e-learning

In 1995 the UOC was launched as the world's **first fully online university**. More than 25 years later, we are still pioneers in digital education.

Our **eLearning Innovation Center** oversees the evolution of our educational model, to ensure unique, high-quality, connected and networked learning experiences.

Enrolment and fees

These prices are subject to discounts (e.g. for disabilities or large family status) and surcharges (e.g. students who are not residents in Spain and are from outside the European Union, or in some cases students who have studied at a Spanish public university before) as specified in the Catalan government's decree on prices. For more details please see the Discounts and Surcharges sections.

Contact us via the Would you like more information? form on the side of the screen and our staff will provide you with a price estimate tailored to your circumstances, including whatever discounts, rebates or surcharges may apply, and the corresponding payment methods.

The UOC is a university seeking to offer a public service by enabling as many people as possible to get a university-level education. This is why there is no minimum number of credits for enrolment.

** Public prices. The public prices for credits and other academic services charged by public universities in Catalonia (including the UOC) are set by the Government of Catalonia. You can consult the prices approved for the 2022-2023 academic year in Decret 128/2022, from 30 June 2022.*

*** Because of the type of methods it employs, the UOC must include charges for the materials, technology, services, infrastructure and personalized support that are required to provide its learning activities.*

UOC

Consult the UOC educational offer uoc.edu/en/studies
