

On campus and e-learning version

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# Master on Numerical Methods in Engineering

[www.cimne.com/mumni/en](http://www.cimne.com/mumni/en)**OFFICIAL MASTER  
of UPC Barcelona Tech**

AQU and EUR-ACE® accreditation



## OFFICIAL UPC MASTER

This Master's degree provides multidisciplinary training in numerical and computational methods for engineering to meet the growing demand for specialists capable of producing accurate and reliable numerical simulations. Both innovative techniques and classical methods, commonly used in engineering practice, will be taught. In particular the finite element method will be studied in detail together with other similar numerical techniques. Students acquire an advanced understanding of calculation methods for product and process design and learn to develop numerical modelling solutions to address real problems in engineering.

Graduates of this master's degree are experts in numerical methods in engineering. They are professionals able to put into practice the acquired knowledge directly to industry and they also have the necessary scientific background to apply for a PhD position successfully.

### PRESENTATION

The Master on Numerical Methods in Engineering is one of the Official Masters of the Technical University of Catalonia (UPC, <http://www.upc.edu>). It is organized by the School of Civil Engineering of Barcelona (ETSECCPB, <http://www.camins.upc.edu>) in collaboration with the International Center for Numerical Methods in Engineering (CIMNE, <http://www.cimne.com>).

This master is focused on the development and application of numerical methods in engineering and in computational mechanics in particular. The basic modules include continuum mechanics, calculus programming, finite element method etc. Applications focus on mechanics of structures, fluid mechanics and dynamics, forming processes and coupled problems, among others.

### BACKGROUND

The Master on Numerical Methods in Engineering was first presented in the 2007-2008 Academic Year in parallel with the Master of Science in Computational Mechanics. These two Master courses share all the modules. The School of Civil Engineering of the UPC and in particular the International Center for Numerical Methods in Engineering (CIMNE) have a wide experience in organizing post-graduate and master courses in the field of numerical methods and engineering. Actually the Master in Numerical Methods in Engineering is the successor of the Master in Numerical Methods for Computation and Design in Engineering that has been offered since 1989 and has achieved an international prestige.

### ENROLLMENT

The number of places is limited to 25. The students must pre-enroll online.

Admission will be subject to approval of the applicant's CV and academic records by the Teaching Committee of the Master's Degree. A sufficient knowledge of English is required to be demonstrated.

All admitted students will be assigned an academic tutor with whom they will have to arrange an interview to formalize their enrollment in the master course. The tutor will help in all academic issues they may have.

### IMPORTANT DATA

**Most relevant academic information:**

**Starting in:** September (yearly)

**Delivery:** on campus and e-learning

**Number of credits:** 120 ECTS

**Duration:** 2 years of 60 ECTS each

**Language:** English

**Pre-enrollment period:**

February - July, the specific date are available on the web page:

<http://www.cimne.com/mumni/en/Admission.asp>

The pre-enrollment period will close once the maximum number of places will be full filled.

## Master on Numerical Methods in Engineering

### ACADEMIC STRUCTURE

The Master on Numerical Methods in Engineering consists of 120 ECTS organized into two academic years. In the first year students must take either mandatory or elective subjects, while in the second one the students should take some subjects and make an industrial training and the Master thesis. This organization is summarized in the table on the right.

### STUDY PLAN

The subjects of the study plan are shared with the Erasmus Mundus Master on Science on Computational Mechanics, offered jointly UPC and the universities of Stuttgart, Swansea and Nantes. Here are the subjects that comprise its workload in ECTS and the academic semester they are taught.

		Subjects	ECTS
YEAR 1	Q1	NUMERICAL METHODS FOR PDEs	5
		FINITE ELEMENTS	5
		CONTINUUM MECHANICS	5
		ADVANCED FLUID MECHANICS	5
		COMMUNICATION SKILLS 1	5
	Q2	COMPUTATIONAL MECHANICS TOOLS	5
		COMPUTATIONAL SOLID MECHANICS	5
		COMPUTATIONAL STRUCTURAL MECHANICS AND DYNAMICS	5
		FINITE ELEMENTS IN FLUIDS	5
		COUPLED PROBLEMS	5
YEAR 2	Q3	DOMAIN DECOMPOSITION AND LARGE SCALE SCIENTIFIC COMPUTING	5
		PROGRAMMING FOR ENGINEERING AND SCIENCE	5
		ENTREPRENEURSHIP	5
		ADVANCED DISCRETIZATION METHODS	5
		COMMUNICATION SKILLS 2	5
	Q4	INDUSTRIAL TRAINING	15
		MASTER THESIS	30