Master's degree in Civil Engineering

Master's degree in Civil Engineering (**master's degree website**) provides advanced multidisciplinary and technological training that will enable you to work in research, design and analysis of infrastructure and civil engineering projects and will qualify you to practise as a civil engineer.

The curriculum reinforces prior learning in mathematics, physics, science and technology on the bachelor's degree course by teaching students the most advanced and experimental techniques for modelling in engineering. The master's degree includes study abroad at some of the most prestigious engineering schools in the world in the framework of mobility programmes and agreements.

It provides future professionals with a solid technical grounding in designing infrastructure and supervising its development, and in planning and managing environmental services and resources for spatial planning.

Specialisations

- Computational Engineering
- Environmental Engineering and Sustainability
- Geotechnical Engineering
- Structural Engineering and Construction
- Transport Engineering and Urbanism
- Water Engineering

GENERAL DETAILS

Duration and start date

Two academic years, 120 ECTS credits. Starting February and September

Timetable and delivery

Mornings. Face-to-face

Fees and grants

Approximate fees for the master’s degree, excluding other costs, €2,215 (€5,187 for non-EU residents).
More information about fees and payment options
More information about grants and loans

Language of instruction

Check the language of instruction for each subject in the course guide in the curriculum.

Information on language use in the classroom and students’ language rights.

Location

Barcelona School of Civil Engineering (ETSECCPB)

Official degree

Recorded in the Ministry of Education's degree register

ADMISSION

General requirements

Academic requirements for admission to master's degrees

Specific requirements

The following candidates may apply for enrolment:

- Holders of an official bachelor's degree that qualifies them to practise the regulated profession of technical public works engineer or
- Holders of an official bachelor's degree that provides the competencies outlined in Ministerial Order CIN/307/2009, of 9 February, in accordance with the provisions of Section 4.2.2 of Order CIN/309/2009, of 9 February or
- Students on double-degree programmes that include the professional-track master's degree in Civil Engineering under the continuity system.
- Holders of other qualifications, in accordance with the provisions of Section 4.2.3 of Order CIN/309/2009, of 9 February.

Admission criteria and application periods can be consulted on the website of the Barcelona School of Civil Engineering: https://camins.upc.edu/en/Studies/master?set_language=en

Places

120

Pre-enrolment

Pre-enrolment closed (consult the new pre-enrolment periods in the academic calendar).
How to pre-enrol

Enrolment

How to enrol

Legalisation of foreign documents

All documents issued in non-EU countries must be legalised and bear the corresponding apostille.

DOUBLE-DEGREE AGREEMENTS

Double-degree pathways at the UPC

- Master's degree in Civil Engineering + Master's degree in Urban Mobility

With universities around the world

- Bachelor’s degree in Civil Engineering (ETSECCPB) / Bachelor's degree in Public Works Engineering (ETSECCPB) + Master's degree in Civil Engineering (ETSECCPB) + *Diplôme d’ingénieur* (EIVP, Paris)
- Bachelor’s degree in Civil Engineering (ETSECCPB) / Bachelor's degree in Public Works Engineering (ETSECCPB) + Master's degree in Civil Engineering (ETSECCPB) + *Diplôme d’ingénieur* (ESTP, within the specialisation *Travaux Publics*)
- Bachelor’s degree in Civil Engineering (ETSECCPB) + Master's degree in Civil Engineering (ETSECCPB) + *Diplôme d’ingénieur* (from the corresponding École Centrale: Lille, Lyon, Marseille, Nantes or Paris)
- Bachelor’s degree in Civil Engineering (ETSECCPB) + Master's degree in Civil Engineering (ETSECCPB) + *Diplôme d’ingénieur* de l'École Nationale des Ponts et Chaussées (École des Ponts ParisTech)
- Master's degree in Civil Engineering (ETSECCPB) + Master in Management (HEC)
- Bachelor’s degree in Civil Engineering (ETSECCPB) + Master's degree in Civil Engineering (ETSECCPB) + *Laurea Magistrale* (*Ingegneria Civile or Ingegneria per l'Ambiente e il Territorio*) (Politecnico di Milano)
- Master's degree in Civil Engineering + one of the following master's degrees from the Illinois Institute of Technology (IIT):
  - Geotechnical Engineering
  - Geoenvironmental Engineering
  - Structural Engineering
  - Construction Engineering and Management
  - Transportation Engineering
  - Public Works (Infrastructure Engineering Management)
  - Environmental Engineering
- Bachelor's degree in Civil Engineering (ETSECPPB) + Master's degree in Civil Engineering (ETSCCPB) (Tongji University)

PROFESSIONAL OPPORTUNITIES

Professional opportunities

Professionally, civil engineers tend to be involved in activities related to the supervision, execution, maintenance and

management of large-scale infrastructure works in the field of civil engineering. Their responsibilities generally lie in communication and transport channels, building construction and structures, studies of soil and rock mechanics, ports and coastal management, hydraulics and energy, and urbanism and spatial planning—all of which must be informed by the strictest environmental concerns.

They may be employed in the private sector and in public administration, and may work as freelance advisors and consultants. They can also be involved in research, development and innovation at public and private research centres, in the R&D departments of large companies, and in teaching.

Competencies

Generic competencies

Generic competencies are the skills that graduates acquire regardless of the specific course or field of study. The generic competencies established by the UPC are capacity for innovation and entrepreneurship, sustainability and social commitment, knowledge of a foreign language (preferably English), teamwork and proper use of information resources.

Graduates of the master's degree in Civil Engineering are highly qualified in the following areas:

- Design, which includes social, economic, technical, environmental and management dimensions.
- Planning, as a stage prior to development, design and construction.
- The sustainable management of large-scale infrastructure, urban and interurban areas and communication and service systems.
- Management and coordination of human teams, including large multidisciplinary teams.

Specific competences

- The ability to address and solve advanced mathematical problems in engineering, from the scope and context of the problem to its statement and implementation in a computer program. In particular, the ability to formulate, program and apply advanced analytical and numerical calculation models to design, planning and management, as well as the ability to interpret the results obtained in a civil engineering context.
- Comprehension and mastery of the laws governing the thermomechanics of continuous media for their application in fields of engineering such as fluid mechanics, the mechanics of materials and structural theory.
- The ability to apply knowledge of soil and rock mechanics to the study, design, construction and operation of foundations, cuts, fills, tunnels and other constructions over or through land, whatever its nature and state, and whatever the purpose of the work.
- Knowledge of and competence in the application of advanced structural design and calculations for structural analysis, based on knowledge and understanding of forces and their application to civil engineering structures, and the ability to assess structural integrity.
- Knowledge of all kinds of structures and materials and the ability to design, execute and maintain civil engineering structures and buildings.
- The ability to plan, dimension, construct and maintain hydraulic works.
- The ability to plan, evaluate and regulate the use of surface water and groundwater resources.
- The ability to plan and dimension water and wastewater processing and treatment systems.
- Knowledge of and the ability to understand dynamic phenomena of the coastal ocean and atmosphere and respond to problems encountered in port and coastal areas, including the environmental impact of coastal interventions, and the ability to carry out maritime works studies and projects.
- Knowledge of transport engineering and planning, transport types and functions, urban transport, management of public transport services, demand, costs, logistics and financing of transport infrastructure and services.
- The ability to analyse and interpret the social, cultural, environmental and economic factors affecting a territory and to carry out spatial and urban planning from the perspective of sustainable development.
- A capacity for the planning, management and operation of civil engineering infrastructure.

ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

UPC school

Barcelona School of Civil Engineering (ETSECCPB)

Academic coordinator

Francesc Soriguera Marti

Academic calendar

General academic calendar for bachelor's, master's and doctoral degrees courses

Academic regulations

Academic regulations for master's degree courses at the UPC

CURRICULUM

Subjects		ECTS credits	Type
FIRST COURSE			
Computational Engineering		6	Compulsory
Geomechanical and Geotechnical Engineering		6	Compulsory
Hydraulic Infrastructure		4.5	Compulsory
Mechanics of Continua		9	Compulsory
Numerical Modelling		9	Compulsory
Planning and Management of Transportation		6	Compulsory
Structural Analysis		7.5	Compulsory
Structural Engineering		6	Compulsory
Water Engineering		6	Compulsory
Specialisation in (Eng) Especialitat en Enginyeria Ambiental i Sostenibilitat	Computational Engineering	6	Compulsory
	Geomechanical and Geotechnical Engineering	6	Compulsory
	Hydraulic Infrastructure	4.5	Compulsory
	Mechanics of Continua	9	Compulsory
	Numerical Modelling	9	Compulsory
	Planning and Management of Transportation	6	Compulsory
	Structural Analysis	7.5	Compulsory
	Structural Engineering	6	Compulsory
	Water Engineering	6	Compulsory
Specialisation in (Eng) Especialitat en Enginyeria Computacional	Computational Engineering	6	Compulsory
	Geomechanical and Geotechnical Engineering	6	Compulsory
	Hydraulic Infrastructure	4.5	Compulsory
	Mechanics of Continua	9	Compulsory
	Numerical Modelling	9	Compulsory
	Planning and Management of Transportation	6	Compulsory
	Structural Analysis	7.5	Compulsory
	Structural Engineering	6	Compulsory
	Water Engineering	6	Compulsory

Subjects		ECTS credits	Type
Specialisation in (Eng) Especialitat en Enginyeria d'Estructures i Construcció	Computational Engineering	6	Compulsory
	Geomechanical and Geotechnical Engineering	6	Compulsory
	Hydraulic Infrastructure	4.5	Compulsory
	Mechanics of Continua	9	Compulsory
	Numerical Modelling	9	Compulsory
	Planning and Management of Transportation	6	Compulsory
	Structural Analysis	7.5	Compulsory
	Structural Engineering	6	Compulsory
	Water Engineering	6	Compulsory
Specialisation in (Eng) Especialitat en Enginyeria de l'Aigua	Computational Engineering	6	Compulsory
	Geomechanical and Geotechnical Engineering	6	Compulsory
	Hydraulic Infrastructure	4.5	Compulsory
	Mechanics of Continua	9	Compulsory
	Numerical Modelling	9	Compulsory
	Planning and Management of Transportation	6	Compulsory
	Structural Analysis	7.5	Compulsory
	Structural Engineering	6	Compulsory
	Water Engineering	6	Compulsory
Specialisation in (Eng) Especialitat en Enginyeria del Terreny	Computational Engineering	6	Compulsory
	Geomechanical and Geotechnical Engineering	6	Compulsory
	Hydraulic Infrastructure	4.5	Compulsory
	Mechanics of Continua	9	Compulsory
	Numerical Modelling	9	Compulsory
	Planning and Management of Transportation	6	Compulsory
	Structural Analysis	7.5	Compulsory
	Structural Engineering	6	Compulsory
	Water Engineering	6	Compulsory
Specialisation in (Eng) Especialitat en Enginyeria del Transport i Urbanisme	Computational Engineering	6	Compulsory
	Geomechanical and Geotechnical Engineering	6	Compulsory
	Hydraulic Infrastructure	4.5	Compulsory
	Mechanics of Continua	9	Compulsory
	Numerical Modelling	9	Compulsory
	Planning and Management of Transportation	6	Compulsory
	Structural Analysis	7.5	Compulsory
	Structural Engineering	6	Compulsory
	Water Engineering	6	Compulsory
SECOND COURSE			
Mixed and Composite Structures		5	Optional

Subjects		ECTS credits	Type
Seismic Risk Assessment and Reduction		5	Optional
Structural Management		5	Optional
Master's Thesis		25	Project
Specialisation in (Eng) Especialitat en Enginyeria Ambiental i Sostenibilitat	Environmental Modelling	5	Compulsory
	Life-Cycle Analysis and Sustainability Assessment	5	Compulsory
	Sustainability and Development Engineering	5	Compulsory
	Water Treatment	5	Compulsory
	Mixed and Composite Structures	5	Optional
	Seismic Risk Assessment and Reduction	5	Optional
	Structural Management	5	Optional
	Master's Thesis	25	Project
Specialisation in (Eng) Especialitat en Enginyeria Computacional	Computational Engineering for Design and Operation	5	Compulsory
	Machine Learning and Models for Decision Making	5	Compulsory
	Models and Tools for Project and Financial Management	5	Compulsory
	Numerical Models in Civil and Structural Engineering	5	Compulsory
	Mixed and Composite Structures	5	Optional
	Seismic Risk Assessment and Reduction	5	Optional
	Structural Management	5	Optional
	Master's Thesis	25	Project
Specialisation in (Eng) Especialitat en Enginyeria d'Estructures i Construcció	Advanced Design of Concrete Structures	5	Compulsory
	Analysis and Design of Steel Structures	5	Compulsory
	Bridges	5	Compulsory
	Building Structures	5	Compulsory
	Mixed and Composite Structures	5	Optional
	Seismic Risk Assessment and Reduction	5	Optional
	Structural Management	5	Optional
	Master's Thesis	25	Project
Specialisation in (Eng) Especialitat en Enginyeria de l'Aigua	Coastal Engineering and Management	5	Compulsory
	Port and Offshore Engineering	5	Compulsory
	River Dynamics	5	Compulsory
	Urban Hydrology	5	Compulsory
	Mixed and Composite Structures	5	Optional
	Seismic Risk Assessment and Reduction	5	Optional
	Structural Management	5	Optional
	Master's Thesis	25	Project

Subjects		ECTS credits	Type
Specialisation in (Eng) Especialitat en Enginyeria del Terreny	Geomechanics of Breakage	5	Compulsory
	Geotechnical Design and Construction	5	Compulsory
	Interaction Between Groundwater and Civil Works	5	Compulsory
	Tunnels and Rock Mechanics	5	Compulsory
	Mixed and Composite Structures	5	Optional
	Seismic Risk Assessment and Reduction	5	Optional
	Structural Management	5	Optional
	Master's Thesis	25	Project
Specialisation in (Eng) Especialitat en Enginyeria del Transport i Urbanisme	High-Speed Rail Line Management	5	Compulsory
	Road Network Planning and Operation	5	Compulsory
	Urban Mobility	5	Compulsory
	Urban Planning and Urban Service Infrastructure	5	Compulsory
	Mixed and Composite Structures	5	Optional
	Seismic Risk Assessment and Reduction	5	Optional
	Structural Management	5	Optional
	Master's Thesis	25	Project