Master's degree in Geotechnical Engineering

The master's degree in Geotechnical Engineering (master's degree website) provides students with the training to pursue professional and academic careers in the fields of geotechnical engineering, hydrogeology, geophysics and earthquake engineering. Students develop specialist knowledge of geophysics and earthquake engineering and acquire the skills to predict, evaluate and reduce seismic hazards.

Specialisations
- Geotechnical Engineering
- Groundwater Hydrology
- Earthquake Engineering and Geophysics

GENERAL DETAILS

Duration and start date
2 academic years, 120 ECTS credits. Starting September and February

Timetable and delivery
Mornings and afternoons. Face-to-face

Fees and grants
Approximate fees for the master's degree, excluding other costs (does not include non-teaching academic fees and issuing of the degree certificate):
€3,320 (€8,300 for non-EU residents).
More information about fees and payment options
More information about grants and loans

Language of instruction
Spanish

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

Places
45

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

How to pre-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 with others UPC schools
Master's degree in Geotechnical Engineering + Master's degree in Mining Engineering (EPSEM)

PROFESSIONAL OPPORTUNITIES

Professional opportunities
Graduates of the master's degree are generally employed as managers or as experts working on teams in areas and activities related to geotechnical engineering.

- Management and planning of geotechnical works.
- Management and planning of water resources.
- Modelling, assessment and management of geological resources.
- Assessment and reduction of seismic risk.
- Assessment and reduction geological risk.
- Assessment and reduction of hydrogeological risk, including soil contamination.
- Land survey campaigns.
- Energy resource prospecting campaigns.
- Planning and management of waste storage solutions.
- Civil engineering, geotechnical, geological and seismic consulting.
- Hydrology and hydrogeology consulting.
- Doctoral studies in civil, geotechnical, geological and earthquake engineering.
- Doctoral studies in hydrology and hydrogeology.

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.

Specific competencies
On completion of the master's degree, graduates will be able to:

- Apply scientific and technological concepts in analysing and solving problems.
- Characterise the geological environment and its interaction with civil works.
- Interpret laboratory tests and field observations to identify the mechanisms responsible for the Earth's response.
- Plan laboratory experiment programmes.
- Make, use and interpret models in analysing and solving problems.
- Observe, interpret, quantify and mathematically model the various processes that govern the Earth's response.
- Perform, present and defend, to a university examination board, an original, individually prepared exercise consisting of a study or project in the field of geotechnical engineering that brings together the competencies acquired in their education, adopts advances and new developments in the field and contributes innovative ideas.

Specialisation in Geotechnical Engineering
If they specialise in this area, they will be able to:

- Apply their knowledge of soil and rock mechanics in the study, design, construction and operation of foundations, embankments, slopes, tunnels and other structures.
- Apply advanced scientific and advanced technological concepts in analysing and solving complex geotechnical engineering problems.
- Carry out studies of land and urban area management, including the construction of tunnels and other underground railway infrastructure.

Specialisation in Groundwater Hydrology
If they specialise in this area, they will be able to:
• Evaluate and manage the environmental impact of waste storage and soil and subsoil contamination.
• Calculate, evaluate and regulate surface water and groundwater resources.
• Plan and implement hydraulic installations, including transport, distribution and storage facilities for solids, liquids and gases and water treatment and urban, industrial and hazardous waste management plants.
• Environmentally evaluate projects, plants and facilities.
• Evaluate and manage geological resources, including groundwater and mineral and thermal springs.

Specialisation in Earthquake Engineering and Geophysics
If they specialise in this area, they will be able to:
• Apply their knowledge of soil and rock mechanics in the study, design, construction and operation of foundations, embankments, slopes, tunnels and other constructions over or through land, whatever their nature and state and whatever the purpose of the work.
• Design civil structures considering seismic loads.
• Design remedial solutions.
• Assess seismic risk. Consider and design risk reduction measures.
• Identify all types of structures and materials.
• Design, plan, implement and maintain civil structures and buildings.
• Analyse structures by applying software design and advanced structural design methods.
• Assess structural integrity.

ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

UPC school

Barcelona School of Civil Engineering (ETSECCPB)

Academic coordinator
Jean Vaunat

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

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**SECOND SEMESTER**

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**FOURTH SEMESTER**

| Master's Thesis                                                                            | 30           | Project     |
| Specialisation in (Eng) Especialitat en Enginyeria Geotècnica                              | Master's Thesis | Project     |
| Specialisation in (Eng) Especialitat en Enginyeria Sísmica i Geofísica                     | Master's Thesis | Project     |
| Specialisation in (Eng) Especialitat en Hidrologia Subterrània                            | Master's Thesis | Project     |

December 2023. [UPC](https://www.upc.edu). Universitat Politècnica de Catalunya · BarcelonaTech