@font-face{ font-family:'Glyphicons Halflings'; src:url("/content/assets/fonts/bootstrap/glyphicons-halflings-regular.eot"); src: url("/content/assets/fonts/bootstrap/glyphicons-halflings-regular.eot?#iefix") format("embedded-opentype"), url("/content/assets/fonts/bootstrap/glyphicons-halflings-regular.woff2") format("woff2"), url("/content/assets/fonts/bootstrap/glyphicons-halflings-regular.woff") format("woff"), url("/content/assets/fonts/bootstrap/glyphicons-halflings-regular.ttf") format("truetype"), url("/content/assets/fonts/bootstrap/glyphicons-halflings-regular.svg#glyphicons_halflingsregular") format("svg") }

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

# Master's degree in Groundwater Hydrology

**BARCELONA SCHOOL OF CIVIL ENGINEERING (ETSECCPB)**

The master’s degree in Groundwater Hydrology offers advanced, specialised training in the efficient and sustainable management of groundwater resources in areas such as utilisation, maintenance, conservation and restoration.

The programme provides multidisciplinary knowledge of the processes that regulate the subsurface water cycle, particularly the movement of water, solutes and contaminants through soil layers and aquifers, and their interaction with the geological environment and other aquatic ecosystems. Students will acquire competencies in advanced technologies in areas such as hydrogeology, hydrogeochemistry, geophysics and hydrogeological modelling, using field and laboratory techniques, instrumentation, and numerical computation and modelling.

## GENERAL DETAILS

### Duration and start date

1 academic year, 60 ECTS credits. Starting September

### Timetable and delivery

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):
€1,162 (€2,700 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.

## ADMISSION

### General requirements

Academic requirements for admission to master's degrees

### Specific requirements

Direct admission:
This master’s degree is aimed at graduates with prior university education in sciences or engineering and basic knowledge of hydrology, hydrogeology, geology, hydraulics or water management.

Bridging courses:
The academic committee of the master’s degree will assess applications from students with other degrees to determine, where needed, the specific bridging courses required (up to a maximum of 12 ECTS credits).

Admission criteria

- English Level B2 according to the Council of Europe’s Common European Framework of Reference for Languages (CEFR).

**Places**

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**Pre-enrolment**

Pre-enrolment for this master’s degree is currently **closed**. Use the “Request information” form to ask for information on **upcoming pre-enrolment periods**.

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.

## PROFESSIONAL OPPORTUNITIES

**Professional opportunities**

- Hydrogeologist: assessment, planning and management of aquifers and groundwater resources; delineation of water bodies; water balance analysis; and hydrological planning in both the public sector and private consultancies.
- Hydrogeological modelling specialist: construction and calibration of numerical models of contaminant flow and transport in aquifers for the sustainable management of groundwater and for decision making in supply or remediation projects.
- Consultant in aquifer quality and contamination: preparation of vulnerability studies, contaminant monitoring and protection plans for recharge areas, in collaboration with public administrations and sanitation or energy companies.
- Groundwater extraction and utilisation project manager: design, execution and maintenance of wells, galleries and pumping systems, as well as optimisation of supply networks dependent on aquifers.
- Engineer: study of groundwater behaviour in interaction with surface water, participation in artificial recharge projects, drought management, saline intrusion prevention and geothermal utilisation.
- Specialist in hydrogeological risk management: analysis and design of strategies to mitigate risks associated with subsidence, aquifer overexploitation, marine intrusion and diffuse contamination, working with water management authorities or infrastructure companies.
- Researcher in hydrogeology: development of new aquifer characterisation techniques, piezometric monitoring systems, managed recharge methods or on-site contaminant treatment technologies.
- Geophysics and hydrogeological prospection technician: responsible for drilling campaigns, pumping tests and geophysical methods used to identify aquifers and characterise their hydraulic properties.
- Groundwater resource sustainability and integrated management supervisor: specialist in integrating groundwater exploitation with spatial planning, climate change adaptation and the protection of aquifer dependent ecosystems.
- University professor or technical instructor in hydrogeology in schools specialising in groundwater, research institutions or water administrations.

**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, teamwork, proper use of information resources, knowledge of a foreign language (preferably English) and gender perspective.

- Propose methodologies for water management and environmental risk assessment related to groundwater, considering economic costs and applicable regulations.
- Manage integrated water resource projects, considering the combined use of groundwater, surface water and alternative sources, applying technical, environmental, economic and regulatory criteria in the evaluation and planning of these projects.
- Prepare technical specifications for hydrogeological projects, including subsurface characterisation reports, hydrogeochemical and piezometric data analyses, conceptual and numerical models and technical reports, in accordance with current regulations.
- Analyse the technical and economic feasibility of hydrogeological projects.

- Assess advanced conventional and non-conventional water management systems and determine their mass and energy balances.
- Assess mitigation and remediation schemes for contaminated soil and aquifers.
- Design solutions to hydrogeological and water resource problems and determine their mass and energy balances.
- Critically assess environmental, social and economic impacts of products and services related to groundwater hydrology, promoting sustainable and socially just actions with relevant stakeholders.
- Make informed and reflective decisions in complex situations, applying ethical principles in academic, professional and social contexts to promote responsibility and social engagement.
- Integrate the gender perspective into discipline-specific solutions, considering identified biases and inequalities.
- Generate creative solutions to social or technological problems while considering sustainability, business models and entrepreneurial requirements.
- Critically and responsibly assess information sources, avoid plagiarism, respect authorship rights and manage information overload.
- Carry out and defend an original, individual piece of work consisting of a study or project in groundwater hydrology that synthesises the knowledge, skills and competencies acquired, incorporates recent advances and developments, and contributes new ideas.

## ACADEMIC ORGANISATION

**UPC school**

Barcelona School of Civil Engineering (ETSECCPB)

**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