Master's degree in Cartographic and Geographic Engineering

The master's degree in Cartographic and Geographic Engineering aims to complete the training acquired by all students with an interest in the field of digital cartography. The course allows students to develop in-depth knowledge of theoretical concepts and tools related to geoinformation, including spatial information management, geolocalisation, geoportals, virtual environment development, spatial planning, spatial environmental assessment and natural hazards.

Geoinformation is a strategic discipline with a promising future and offers many areas of specialisation. A growing number of companies are looking for professionals who have the knowledge and skills needed to manage, process and analyse large volumes of geolocated data. As a result, there are many career opportunities for graduates: in companies operating in the field of spatial information and geoservices, consultancies, engineering firms, public bodies and research centres.

GENERAL DETAILS

Duration and start date
1.5 academic years, 90 ECTS credits. Starting September

Timetable and delivery
Afternoons. Face-to-face

Fees and grants
Approximate fees for the master’s degree, excluding degree certificate fee, €4,901 (€7,352 for non-EU residents). More information about fees and payment options More information about grants and loans

Language of instruction
Spanish

Location
Barcelona School of Building Construction (EPSEB)

ADMISSION

General requirements
Academic requirements for admission to master's degrees

Specific requirements
Direct admission:
- Bachelor’s degree in Geoinformation and Geomatics Engineering
- Bachelor’s degree in Geomatics Engineering and Surveying
The academic committee of the master’s degree may also consider admitting students with the qualifications listed below. In such cases, the academic committee will indicate the bridging courses that must be completed, which may not exceed 25 ECTS credits.
- Degrees in civil and environmental engineering (including agriculture, forestry, etc.)
- Degrees in public works engineering and technical architecture
- Bachelor’s degrees in Civil Engineering, Public Works Engineering, Geological Engineering, Building Engineering and Architecture
- Other engineering and architecture qualifications, and degrees in mathematics and physics

Places
30

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.

PROFESSIONAL OPPORTUNITIES

Professional opportunities
- Drafting and development of technical projects
- Project leadership and management
- Consulting, advisory services and technical auditing
- Territorial management, planning, assessment and administration
- Environmental impact studies (spatial assessment, environmental risk assessment)
- Companies that provide geoinformation solutions (geo-applications, etc.)
- Companies that develop new geoinformation technologies
- Public administration: cartographic institutes, city councils, technical departments of ministries, etc.
- Research and 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.

Specific competencies:
- Describe, use and apply new geodetic and photogrammetric instruments, techniques and methods to carry out geomatic studies and projects in engineering and architecture.
- Implement and manage geographic information systems in engineering and architecture to enable advanced data exploitation.
- Develop and apply computer algorithms to tackle complex geomatic problems in engineering and architecture.
- Apply geostatistical techniques in relation to projects and research in engineering, and analyse results.
- Design, plan and manage complex systems for monitoring and non-destructive assessment of structures and civil works.
- Design, calculate and analyse observation of networks using advanced high-precision GNSS technologies at the local, regional and international level, apply the calculation processes, algorithms and tools that are available and analyse results.
- Manage geographic information repositories in different professional settings.
- Use and apply aerial and terrestrial lidar in geomatics projects for engineering and architecture.
- Describe techniques and methods for 2D and 3D visualisation of spatial information and use them in the modelling of scenarios for industrial, civil-engineering and territorial applications.
- Describe data capture and processing techniques and methods used on Earth observation missions, and use them for applications on the ground.
- Design, develop and implement cartography web servers, web applications and geoportals.
- Produce, and individually present and defend before an examination committee, an original work consisting of a project of a professional nature in the field of geomatic engineering that draws on and integrates the competencies acquired on the master’s degree.

ORGANISATION

UPC school
Barcelona School of Building Construction (EPSEB)

Academic coordinator
## CURRICULUM

<table>
<thead>
<tr>
<th>Subjects</th>
<th>ECTS credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIRST SEMESTER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Techniques in 3D Information Capture</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Complex Analysis Using Gis Tools</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Geoinformatics</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Geoservices</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Geostatistic and Multivariate Statistics</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Geovisualization and 3D Models</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>SECOND SEMESTER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Monitoring Techniques</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Development of Geoapplications</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Earth Observation</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Gis Applied to Environmental Sciences</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Heritage Documentation Techniques</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Ide Applications</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Management of Bim/Cim Projects</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Mobile Application Development</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Non-Invasive Techniques for Diagnosis in Engineering</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Photogrammetry in Civil and Architectural Applications</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Precise Geodetic Positioning and Applications</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Process Automation</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Programming for Geoinformation</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Rpas and Geospatial Applications</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Territorial Analysis with Spatial Databases</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>THIRD SEMESTER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master's Thesis</td>
<td>15</td>
<td>Project</td>
</tr>
</tbody>
</table>