Master's degree in Advanced Building Construction

The master's degree in Advanced Building Construction produces graduates for the building construction sector, which is increasingly automated. In the current context, which has seen a decrease in the number of new buildings being built in Spain, concepts such as sustainability and energy efficiency are increasingly important, as are the recovery, conservation and improvement of built heritage. The master's degree therefore provides an education that confronts the sector's new challenges and the skills students need to understand and deepen their knowledge of the construction process and pursue a research career.

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)

Official degree
Recorded in the Ministry of Education's degree register

ADMISSION

General requirements
Academic requirements for admission to master's degrees

Specific requirements
Applicants must have one of the following qualifications:
- A pre-EHEA degree or bachelor's degree in an engineering discipline
- A diploma in technical architecture or a bachelor's degree in building engineering
- A diploma in topography or a bachelor's degree in topography or geomatics
- A diploma in public works
- Another degree (depending on prior learning)

Required documents: university degree certificate, academic record and employment record

Admission criteria
- Academic record
- Employment record
- Knowledge of English, Level B1 (optional)
- Candidates who are not native speakers of Spanish must provide proof of having attained Level B2.

Places
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.

PROFESSIONAL OPPORTUNITIES

Professional opportunities
Graduates of the master’s degree are generally employed as managers or as experts working in the following areas:

- Management of conservation and maintenance of the built heritage
- Project management and supervision
- Energy efficiency and bioclimatic architecture
- Consulting, advisory services and technical auditing
- Drafting and development of technical projects
- Technical management of buildings in the use and maintenance stages
- Building construction production management
- New building construction technologies
- Rehabilitation of existing buildings
- Environmental impact studies and energy auditing
- Public administration
- Teaching and research

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
- Capacity for innovation: understanding the reasons for and mechanisms of technological and technical change.
- Awareness of the construction materials and techniques in each historical period and ability to appraise their influence in architectural design.
- Knowledge of the principles of thermal, optic and acoustic physics.
- Capacity for modelling physical processes and using numerical methods to solve the resulting models.
- Capacity for describing heat exchange phenomena, thermal perception, air quality in interiors, ventilation, lighting conditions, and noise propagation and Control.
- Capacity for designing HVAC installations, lifts, security and surveillance systems, home automation installations, and information and communication networks.
- Capacity for managing installations and their cost and maintenance.
- Capacity for carrying out and managing installation projects.
- Capacity for modelling building structures and evaluating their load-carrying capacity.
- Capacity for evaluating the behaviour of the ground as a function of its characteristics and type of foundation.
- Capacity for designing and dimensioning the reinforcement of structural elements.
- Knowledge of the characteristics of seismic action and the application of prevailing regulations to seismic calculations of building structures.
- Knowledge and application of basic concepts of pre-stressing with post-tensioned reinforcement.
- Capacity for determining the thermal behaviour and energy efficiency of existing buildings.
- Capacity for designing a methodological guide to the assessment, diagnosis and rehabilitation of a building.
- Understanding of the keys to the historical documentation of buildings.
- Capacity for designing rehabilitation interventions with a sufficient historical basis to preserve a building's functional, technical, artistic and historical values.
- Capacity for applying advanced graphic surveying techniques in the assessment of existing buildings.
- Knowledge of material characterisation techniques and ways of solving concrete problems in this area.
- Capacity for analysing and applying the analytical processes studied to solve concrete problems in existing buildings until a final diagnosis is reached.
- Familiarity with evaluation methods based on observed or measured data and the results of numerically supported analytical processes.
- Knowledge of specific techniques for correcting damage to existing buildings and improving them.
- Capacity for applying the knowledge acquired to drafting the corresponding rehabilitation projects.
- Capacity for modelling numerical problems.
- Capacity for implementing models.
- Capacity for making decisions based on results analysis.

ORGANISATION

UPC school
 Barcelona School of Building Construction (EPSEB)

Academic coordinator
 Jesus Abad Puente

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

<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 Facilities</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Building Structures</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Engineering in the Architecture of the 20th and 21st Century</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Introduction to Renovations of Existing Building</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Physical Phenomena in Building Construction</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Prediction Models in Building Construction</td>
<td>5</td>
<td>Compulsory</td>
</tr>
<tr>
<td><strong>SECOND SEMESTER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Added Value Facilities in Smart Cities and Smart Buildings</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Advanced Materials in Building Construction</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Building Management Through Building Information Modelling (Bim)</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Control and Evolution of Building Fires</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Diagnosis Technology and Characterization of Materials</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Energy Renovations and Renewal Energies</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Subjects</td>
<td>ECTS credits</td>
<td>Type</td>
</tr>
<tr>
<td>----------------------------------------------------------------</td>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>Environmental and Architectural Acoustics</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Historical-Architectural-Constructive Analysis of Existing Buildings</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Integral Valuation of the Existing Building. Structural Analysis</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Intervention Techniques in Existing Buildings. Functional Renovations</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Management and Alternatives to Building Heritage</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Reduction, Reutilization and Recycling in Construction</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>THIRD SEMESTER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building and Material Technologies of Low Environmental Impact</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Human Resources Management</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>New Industrialized Techniques Applied to Building Construction</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Real Estate Marketing and Market Research</td>
<td>5</td>
<td>Optional</td>
</tr>
<tr>
<td>Master's Thesis</td>
<td>20</td>
<td>Project</td>
</tr>
</tbody>
</table>