

Master's degree in Thermal Engineering

The **master's degree in Thermal Engineering** is conceived as a response to problems and needs in the field of thermal energy engineering from areas of work such as energy systems and resources, heat and mass transfer and fluid dynamics, numerical and experimental methods in thermal engineering and the design of thermal systems and equipment, heaters and coolers, etc. The aim is to produce scientific and technical experts with the knowledge and skills needed to analyse any engineering problem in the fields of thermal energy and fluid dynamics.

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, €1,660 (€2,490 for non-EU residents).

[More information about fees and payment options](#)

[More information about grants and loans](#)

Language of instruction

English

Location

[Barcelona School of Industrial Engineering \(ETSEIB\)](#)

Official degree

Official degree

ADMISSION

General requirements

[Academic requirements for admission to master's degrees](#)

Specific requirements

Direct admission

The entrance qualifications that provide direct admission, without the requirement to take any bridging courses, are as follows:

Bachelor's degrees:

- Bachelor's degree in Mechanical Engineering
- Bachelor's degree in Energy Engineering
- Bachelor's degree in Aerospace Vehicle Engineering
- Bachelor's degree in Industrial Technology Engineering
- Bachelor's degree in Aerospace Technology Engineering

Pre-EHEA degrees:

- Diploma in Mechanical Engineering
- Degree in Industrial Engineering
- Degree in Aeronautical Engineering
- Diploma in Aeronautical Engineering

In the case of students who have not completed a bachelor's or pre-EHEA degree in mechanical or thermal engineering, the academic committee of the master's degree will review each applicant's academic record to determine whether

any bridging courses are required.

Bridging courses

In the case of qualifications other than those that provide direct admission, the academic committee of the master's degree will review each applicant's academic record to determine what bridging courses, if any, must be taken if the student is admitted.

Any bridging courses to be completed will be in the field of thermodynamics, fluid mechanics or heat transfer (max. 18 ECTS credits).

Students must take any bridging courses required in the first semester of their master's degree. Bridging courses will be bachelor's degree subjects but will be treated as master's degree credits for economic purposes. In no case will they form part of the curriculum as optional credits.

Admission criteria

- Academic record: 60 %
- Professional experience: 10 %
- English-language level: 15 % (proof of a level corresponding to a B2.2 certificate in the Common European Framework of Reference)
- Entrance qualification: 15 %

Places

30

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

Although this master's degree is research-oriented, it offers graduates a wide range of career options, equipping them to carry out, coordinate or manage basic and applied RDI tasks in the following sectors and areas, among others:

- RDI departments of companies that operate in the areas mentioned above.
- Universities, technology centres and research centres that work in the areas mentioned above.
- Companies that manufacture thermal systems and equipment for air conditioning, ventilation and cooling, heat exchangers and accumulators, low- and medium-temperature solar energy systems, boilers, turbines, etc.
- Companies producing thermofluid equipment for the aeronautical and aerospace sectors.
- Companies in the renewable energy sector: high-temperature solar concentrators, wind turbines and shovels, buoy structures, etc.
- Engineering firms with expertise in activities and projects in the thermal and fluid dynamics field.

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

- The ability to identify and describe the components of a range of thermal systems and equipment and assess

technological solutions in the field of thermal engineering.

- The ability to analyse the behaviour of thermal systems and equipment to improve their energy efficiency.
- The ability to understand, describe and analyse numerical methods in the field of thermal engineering clearly and broadly and to evaluate advances and new developments in this field.
- The ability to apply technical and scientific methods to the numerical and/or experimental study of phenomena related to heat and mass transfer and fluid mechanics.
- The ability to manage research, development and innovation in the field of thermal engineering in light of knowledge transfer capacities in basic and applied research.
- The ability to carry out and present and defend before an examination committee an original, individual piece of work consisting of a comprehensive thermal engineering project that synthesises the competencies acquired on the degree.

ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

UPC school

[Barcelona School of Industrial Engineering \(ETSEIB\)](#)

Academic coordinator

[Joaquim Rigola Serrano](#)

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 SEMESTER		
Advanced Course on Heat and Mass Transfer	5	Compulsory
Computational Methods in Energy Technology	5	Compulsory
Energy Resources	5	Compulsory
Experimental Energy Technology	5	Optional
Heat Engines and Combustion	5	Optional
Heat Exchangers	5	Optional
Thermal Equipments for Heat and Cold Generation	5	Compulsory
Turbulence: Phenomenology, Simulation, Aerodynamics	5	Optional
SECOND SEMESTER		
Master's Thesis	30	Project