

# Erasmus Mundus master's degree in Decentralised Smart Energy Systems (DENSYS)

The **Erasmus Mundus master's degree in Decentralised Smart Energy Systems (DENSYS)** ([master's degree website](#)), within its area of specialisation Thermal Energy 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, the design of thermal systems and equipment, heaters and coolers, etc. The ultimate aim is to produce scientific and technical experts with the necessary knowledge and skills to analyse any engineering problem in the field of thermal energy and fluid dynamics.



CoFunded by  
the European Union

## GENERAL DETAILS

### Duration and start date

2 academic years, 120 ECTS credits

### Timetable and delivery

Face-to-face

### Language of instruction

English

Information on [language use in the classroom and students' language rights](#).

### Location

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

### Official degree

Official title

## ADMISSION

### General requirements

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

### Places

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### Pre-enrolment

To enrol for an interuniversity master's degree coordinated by a university other than the UPC, you must enrol through the coordinating university:

[Institut Nationale Polytechnique de Lorraine \(France\)](#)

## PROFESSIONAL OPPORTUNITIES

### Professional opportunities

Although the DENSYS master's degree is oriented towards research, professional opportunities for its graduates are wide-ranging. Graduates may carry out, coordinate and manage basic and applied research, development and innovation in professional sectors such as the following:

- Research, development and innovation departments of companies that operate in the aforementioned areas of work.
- Universities, technology centres and research centres that operate in the aforementioned areas of work.
- Manufacturers of thermal systems and equipment for air conditioning, ventilation and cooling; heat exchangers and accumulators; low- and medium-temperature solar energy collectors; boilers; turbines; etc. Manufacturers of thermal fluid equipment for the aeronautical and aerospace sector.
- Companies in the renewable energy sector: high-temperature solar concentrators, wind turbines and blades, buoy structures, etc.
- Engineering sectors with significant know-how in activities or projects in which the thermal and fluid dynamics field plays a role.

## 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

- To identify and describe the components of a range of thermal systems and equipment and assess technological solutions in the field of thermal engineering.
- To analyse the behaviour of thermal systems and equipment to improve their energy efficiency.
- 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.
- To develop technical and scientific methodologies and apply them to numerical and/or experimental studies of heat and mass transfer and fluid mechanics phenomena.
- To manage research, development and innovation in the field of thermal engineering in light of knowledge transfer capacities in basic and applied research.
- To carry out and present and defend before an examination committee an original, individual piece of work consisting comprehensive thermal engineering project that synthesises the competencies acquired on the master's degree.

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## ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

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### European programme

Erasmus Mundus

### UPC school

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

### Participating institutions

[Universitat Politècnica de Catalunya \(UPC\)](#)

[Institut Nationale Polytechnique de Lorraine \(France\)](#) - **coordinating** university

[Kungliga Tekniska Högskolan \(Sweden\) \(KTH\)](#)

[Politecnico di Torino \(Italy\)](#)

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## CURRICULUM

