

MASTER'S DEGREE IN  
INTERDISCIPLINARY  
AND INNOVATIVE  
ENGINEERING

Skills for a better future

Further information:  
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Barcelona East School of Engineering

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UPC studies

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International Campus of Excellence



# MASTER'S DEGREE IN INTERDISCIPLINARY AND INNOVATIVE ENGINEERING

Today's society demands breakthrough technologies in emerging areas such as energy management, digital industry and healthcare. Facing such challenges requires that interdisciplinary engineering teams work together to come up with creative, reliable, ethical and sustainable solutions.

One of the key factors in leading successful projects is for professionals from different areas to have strong skills in modern engineering methods such as big data, 3D printing, smart sensors and computer simulation.

This master's degree has been designed to enhance your academic background with such skills, thus preparing you for the future. The specialisations will allow you to face real problems in three emerging areas of application: energy-efficient systems, advanced manufacturing systems and healthcare technologies. A research-oriented master's thesis worth 30 ECTS credits will provide you with the opportunity to collaborate with R&D departments at companies, research centres and hospitals.

## Curriculum

This information may be subject to change. Up-to-date information is available at [upc.edu](http://upc.edu).

120 ECTS

### 1st semester

Data Acquisition and Instrumentation	6
Data Analysis and Pattern Recognition	6
Systems Modelling	6
Simulation and Optimisation	6
Technology Innovation	6

### 2nd semester

Control Systems	6
Computer Vision	6
Risk Analysis	6
Sustainability and Circular Economy	6
Technology Management	6

### 3rd semester

Renewable Energy Systems	6
Electrical Energy Processing	6
Sustainable Materials	6
Fuel Cells	6
Electron Beam Applications	6

Advanced Manufacturing	6
Mechatronics	6
IoT Sensors and MEMS	6
Plant Monitoring and Fault Detection	6
Robotic Systems	6

Compulsory

Efficient Systems Specialisation

Advanced Manufacturing Systems Specialisation

290  
researchers

31  
doctoral thesis

551  
publications

123  
RDI projects

### Aimed at

Students from all over the world with a solid academic background in engineering, science or mathematics who wish to acquire advanced skills in modern engineering.

### Specialisations

These are sample questions that students will be able to address when they are taking the specialisations:

#### Efficient Systems

How can I quantify and improve the efficiency and sustainability of my start-up company? Shall I use renewable energies and advanced power management strategies? Could we reduce the environmental impact of our products by designing new materials or implementing circular economy strategies? Are there EU innovation funding options for small and medium-sized enterprises?

#### Advanced Manufacturing Systems

How do I implement an advanced fault-monitoring system in my production plant? Can I improve the design of my plant in order to reduce queues and increase the usability of my resources? Should I

use autonomous robots and computer vision to increase both safety and speed? Can I integrate mechanical structures and electronic devices using 3D printing technologies?

#### Healthcare and Biomedical Applications

Can a wearable device be designed to monitor the physical activity of patients in a hospital? Can a deep-learning system be developed in the context of personalised medicine? Which materials are better suited for an implantable drug-delivery device? How do I protect the intellectual property rights of my invention?

#### Professional opportunities

Graduates of the master's degree often find employment in the following:

- R&D centres
- Start-up companies
- Technology management and intellectual property
- Digital transformation projects
- eHealth applications
- Business intelligence
- Industry 4.0 and smart factories
- Sustainability management

### Research centres

The master's thesis is carried out in close collaboration with companies and internationally renowned research and innovation such as the Institute for Bioengineering of Catalonia, the Barcelona Research Center in Multiscale Science and Engineering, the Catalonia Institute for Energy Research, the Sant Joan de Déu Research Institute and the University of California, Irvine.

### Engineering software tools

Python, MATLAB, ANSYS, SolidWorks, COMSOL, GaBI, ARENA, among others.

### Language

All courses are taught in English.

### Where you will study

You will study this master's degree at the Barcelona East School of Engineering (EEBE) on the Diagonal-Besòs Campus, one of the most modern technology campuses in Europe with almost 300 researchers, 3,500 students and 31 official research groups.

### 4th semester

Biomedical Signal Analysis	6
Biofunctional Materials	6
Bioinformatics	6
Wearable Devices	6
Biomechanics and Sports Technology	6

Master's Thesis	30
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Healthcare and Biomedical Applications Specialisation