

MASTER'S DEGREE IN BIOMEDICAL ENGINEERING

ETSEIB

Barcelona School of Industrial Engineering



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

International Campus of Excellence

MASTER’S DEGREE IN BIOMEDICAL ENGINEERING

The master’s degree in Biomedical Engineering is designed to offer postgraduate training in the following areas:

- The design, manufacture, evaluation, marketing, installation and maintenance of health services and products, and the operation of medical equipment.
- Research in a particular field of biomedical engineering.

Experts in biomedical engineering must be able to respond to engineering problems that arise in the fields of biology and medicine. For this reason, the programme includes a technical-scientific component and a practical technology component, in addition to general training in the basic disciplines of medicine. This is an interuniversity master’s degree organised by the Universitat Politècnica de Catalunya (UPC) and the Universitat de Barcelona (UB). It is coordinated by the UPC’s Barcelona School of Industrial Engineering (ETSEIB) and the UB’s Faculty of Physics.

Curriculum

This information may be subject to change.
Up-to-date information is available at upc.edu.

60 ECTS credits

Delivery: face-to-face

Language: at least 25% of the master’s degree must be taken in English; the rest can be taken in English or Spanish

Teaching periods: from mid-September to the end of June

Places offered: 50

The subjects are distributed as follows:

| Semester | Subjects | ECTS credits |
|----------|-----------------|--------------|
| 1st | Compulsory | 15 |
| | Optional | 15 |
| 2nd | Optional | 20 |
| | Master’s thesis | 10 |

Students who do not have an undergraduate degree in biomedical engineering must take up to 30 ECTS credits in bridging courses. In this case, the master’s degree lasts three semesters and the subjects are organised as follows:

| Semester | Subjects | ECTS credits |
|----------|------------------|--------------|
| 1st | Bridging courses | 20 |
| | Compulsory | 10 |
| 2nd | Bridging courses | 10 |
| | Optional | 20 |
| 3rd | Compulsory | 5 |
| | Optional | 15 |
| | Master’s thesis | 10 |

93%

UPC graduate employment rate

Source: 2nd graduate employment survey of master’s degree graduates of the Catalan universities by the Catalan University Quality Assurance Agency (AQU Catalunya)

Master’s degree taught jointly by the UPC and the UB since 2005

Recommended applicant profile

The master’s degree in Biomedical Engineering is primarily aimed at graduates in biomedical engineering, but is also open to students from other academic backgrounds, subject to completion of the necessary bridging courses and computer science skills. Applicants should have a solid understanding of physics, chemistry and mathematics, as well as a good working knowledge of English and user-level IT skills.

Specific requirements

Since this master’s degree is aimed at graduates in biomedical engineering, these students will not be required to complete bridging courses and will be given priority in the admission process. The master’s degree is also open to holders of degrees in engineering, technical disciplines and physics. These students are required to complete bridging courses, with a total study load of 30 credits, to ensure that they have the basic knowledge for the main master’s degree curriculum. Students with an academic background in other fields may also be admitted at the discretion of the coordinating committee.

Teaching methodology

The teaching methodology is based on masterclasses, seminars, conferences,

Biomedical engineering research groups: the CREB, the IBEC and other University of Barcelona groups

group work, problem-based learning, information research, study based on practical cases, practical exercises, simulations and projects. These methodologies are used in classrooms, laboratories and the virtual campus. All the professors on the master’s degree are employed at biomedical engineering and biomedicine institutes and research centres or university hospitals.

Grants and financial aid

There are a variety of grants and special funding options for students at all stages of their university studies, including grants for research, exchange programmes, summer courses, work placements and academic study and research in other countries; for those interested in assistant professor positions; and for a series of other options.

Career opportunities

The three areas of professional application for biomedical engineering are industry, healthcare, and research, development and innovation.

Industry

All healthcare area as electromedicine, *in vitro* diagnostics, nephrology, cardiovascular surgery, neurosurgery and pain treatment, implants for orthopaedic surgery and traumatology, orthopaedics, single-use medical devices, health services, dental technology, optics and ophthalmology, etc.

30%

of international students

Healthcare

The acquisition, maintenance, operation and rationalisation of technology, strongly associated with increased efficiency and improved quality of care, are tasks generally distributed among numerous staff members (managers, department heads and a range of health personnel). Furthermore, standard training is generally provided by the sales representatives of product distributors. In this setting, biomedical engineering graduates with the knowledge and skills to define optimum policies that take into account the specific requirements of individual healthcare centres will have a key role to play in simplifying and improving the current situation.

Research, development and innovation

New graduates in biomedical engineering can join internationally renowned research groups and university research centres. The master’s degree is designed to match the scientific sector’s demands for research, development and innovation. Scientific activity in biomedical engineering is grouped into the following major areas: bioelectronics, biomaterials, biomechanics, biosystems, biomedical imaging, nanobioengineering, biomedical signals and medical technology.

| | |
|---|----|
| Biosystems and Nanobioengineering | 5 |
| Biomedical Systems and Equipment | 5 |
| Innovation and Business in Biomedical Engineering | 5 |
| Master’s Thesis | 10 |

| | |
|---|---|
| Physiology | 5 |
| Molecular and Cellular Biology | 5 |
| Biomedical Instrumentation | 5 |
| Biomedical Signals | 5 |
| Biomaterials | 5 |
| Biosystems Modelling and Simulation Methods | 5 |

| | |
|---------------------------------------|------|
| Bioelectronics and Nanobioengineering | 12.5 |
| Biomechanics and Biomaterials | 12.5 |
| Biomedical Technology | 45 |
| Biomedical Signal and Images | 27.5 |

Compulsory subjects

Bridging courses

Optional subject areas

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The ETSEIB, the school that opens doors for you!

Further information:

upc.edu/en/masters/biomedical-engineering
escola.etseib@upc.edu



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