

# Bachelor's degree in Biomedical Engineering

The **bachelor's degree in Biomedical Engineering** provides the knowledge needed to supervise and manage engineering projects related to the design of equipment for monitoring, diagnosis and treatment, and projects involving information and communication systems for healthcare, remote medicine, remote monitoring and equipment quality control. It takes a multidisciplinary approach to equipping students for careers in the fields of e-medicine, the capture of biosignals such as cardiovascular signals, neurosurgery and the treatment of pain, implants for orthopaedic surgery and traumatology, sports medicine, disposable medical devices, the management of biomedical teams and systems and the provision of technical advice, and the assessment and certification of medical technology. You will acquire skills in the analysis and interpretation of biomedical signals and images; biomechanics and biomaterials; sensors; quality-of-care improvement; and equipment and process optimisation. Although the bachelor's degree has been introduced recently, it is very popular, because it trains students to fulfil a new professional role for which the graduate employment rate is very high and in which graduates are quick to find employment.

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## GENERAL DETAILS

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### Duration

4 years

### Study load

240 ECTS credits (including the bachelor's thesis). One credit is equivalent to a study load of 25-30 hours.

### Delivery

Face-to-face

### Fees and grants

Approximate fees per academic year: €1,660 (€2,490 for non-EU residents). [Consult the public fees system based on income \(grants and payment options\)](#).

### Location

[Barcelona East School of Engineering \(EEBE\)](#)

### Official degree

[Recorded in the Ministry of Education's degree register](#)

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## ADMISSION

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### Places

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### Registration and enrolment

[What are the requirements to enrol in a bachelor's degree course?](#)

### Legalisation of foreign documents

All documents issued in non-EU countries must be [legalised and bear the corresponding apostille](#).

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## DOUBLE-DEGREE AGREEMENTS

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### With universities around the world

- Bachelor's degree in Biomedical Engineering (EEBE) + *Grado en Ingeniería Biomédica- Escuela Colombiana Julio Garavito y Colegio Mayor de Nuestra Señora del Rosario* (Bogotá. Colombia)

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## PROFESSIONAL OPPORTUNITIES

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## Professional opportunities

- Supervision and management of projects involving the conception, design, manufacture, assessment and certification of biomedical healthcare products and services.
- Design of equipment for monitoring, diagnosis and treatment for healthcare and remote medicine.
- Supervision and management of projects for quality-of-care and process improvement.
- Assessment and certification of medical technology.
- Biomedical technology companies.
- Departments of clinical engineering for healthcare.
- Teaching and research.
- Professions in which engineering principles are applied to medicine in the fields of biomedical equipment related to e-medicine, cardiovascular signals, neurosurgery and the treatment of pain, implants for orthopaedic surgery and traumatology, dental technology, sports medicine, disposable medical devices, the management of biomedical teams and systems and the provision of technical advice, and the assessment and certification of medical technology.

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## ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

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### Academic calendar

[General academic calendar for bachelor's, master's and doctoral degrees courses](#)

### Academic regulations

[Academic regulations for bachelor's degree courses at the UPC](#)

### Language certification and credit recognition

Queries about [language courses and certification](#)

Barcelona East School of Engineering (EEBE)

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## CURRICULUM

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| Subjects                                      | ECTS credits | Type       |
|---|--------------|------------|
| <b>FIRST SEMESTER</b>                         |              |            |
| Calculus                                      | 6            | Compulsory |
| Chemistry                                     | 6            | Compulsory |
| Graphic Expression                            | 6            | Compulsory |
| Informatics                                   | 6            | Compulsory |
| Physics I: Fundamentals of Mechanics          | 6            | Compulsory |
| <b>SECOND SEMESTER</b>                        |              |            |
| Algebra and Multivariable Calculus            | 6            | Compulsory |
| Environmental Technologies and Sustainability | 6            | Compulsory |
| Materials Science and Technology              | 6            | Compulsory |
| Numerical Calculus. Differential Equations    | 6            | Compulsory |
| Physics II: Fundamentals of Electromagnetism  | 6            | Compulsory |
| <b>THIRD SEMESTER</b>                         |              |            |
| Biology                                       | 6            | Compulsory |
| Electrical Systems                            | 6            | Compulsory |
| Fluid Mechanics                               | 6            | Compulsory |

| <b>Subjects</b>   | <b>ECTS credits</b> | <b>Type</b> |
|---|---------------------|-------------|
| Mechanical Systems  | 6                   | Compulsory  |
| Statistics  | 6                   | Compulsory  |
| <b>FOURTH SEMESTER</b>  |                     |             |
| Business  | 6                   | Compulsory  |
| Electronic Systems  | 6                   | Compulsory  |
| Industrial Control and Automation                                   | 6                   | Compulsory  |
| Physiology  | 6                   | Compulsory  |
| Thermodynamics and Heat Transfer                                    | 6                   | Compulsory  |
| <b>FIFTH SEMESTER</b>   |                     |             |
| Biomechanics  | 6                   | Compulsory  |
| Biomedical Signal Processing  | 6                   | Compulsory  |
| Engineering Design  | 6                   | Compulsory  |
| Information Systems and Communications for Health Services          | 6                   | Compulsory  |
| Sensors and Signal Conditioners                                     | 6                   | Compulsory  |
| <b>SIXTH SEMESTER</b>   |                     |             |
| Biomaterials  | 6                   | Compulsory  |
| Biomedical Image Processig  | 6                   | Compulsory  |
| Clinical Engineering  | 6                   | Compulsory  |
| Monitoring, Diagnostic and Therapeutic Equipment                    | 6                   | Compulsory  |
| Safety in Hospitals   | 6                   | Compulsory  |
| <b>SEVENTH SEMESTER</b>   |                     |             |
| Additive Manufacturing 1  | 3                   | Optional    |
| Additive Manufacturing 2  | 3                   | Optional    |
| Advanced Simulation of Materials for Engineering and Bioengineering | 6                   | Optional    |
| Applied Photonics   | 6                   | Optional    |
| Audio and Video Electronics   | 6                   | Optional    |
| Biostatistical Learning   | 6                   | Optional    |
| Communication in Technical English                                  | 9                   | Optional    |
| Computational Engineering   | 6                   | Optional    |
| Data Engineering and a Business Analytics                           | 6                   | Optional    |
| Design and Implementation of Electronics Prototypes                 | 6                   | Optional    |
| Design of Medical Wearables Devices                                 | 6                   | Optional    |
| Design Validation   | 6                   | Optional    |
| External Practice   | 12                  | Compulsory  |
| Implementation of Arduino-Based Acquisition Systems                 | 6                   | Optional    |
| Innovation Management   | 6                   | Optional    |
| Leadership and Management   | 6                   | Optional    |
| Management Skills   | 6                   | Optional    |

| <b>Subjects</b>                             | <b>ECTS credits</b> | <b>Type</b> |
|---|---------------------|-------------|
| Movement Simulation                         | 6                   | Optional    |
| Physical Chemistry                          | 6                   | Optional    |
| Planning, Programming and Control Project   | 6                   | Optional    |
| Production Organisation                     | 6                   | Compulsory  |
| Programming for Engineers                   | 6                   | Optional    |
| Project Development I                       | 6                   | Optional    |
| Project Development II                      | 6                   | Optional    |
| Telecommunications and Internet             | 6                   | Optional    |
| Tissue Engineering                          | 6                   | Optional    |
| Transport Phenomena                         | 6                   | Optional    |
| <b>EIGHTH SEMESTER</b>                      |                     |             |
| Biomedical Implants                         | 6                   | Optional    |
| Modelling and Control of Biomedical Systems | 6                   | Optional    |
| Bachelor's Thesis                           | 24                  | Project     |