BACHELOR’S DEGREE IN BIOINFORMATICS

Offered jointly by the four most prestigious Catalan public universities: the UPC, the UB, the UAB and the UPF. Coordinated by the Barcelona School of Informatics (FIB) of the Universitat Politècnica de Catalunya (UPC).

Once you’ve graduated, you’ll be able to choose from a number of master’s degrees offered by the four universities.

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Barcelona School of Informatics
Barcelona School of Telecommunications Engineering
The bachelor’s degree in Bioinformatics, which is taught entirely in English, forms professionals in an interdisciplinary field that encompasses computer science, biology, chemistry, physics, mathematics, statistics, and information technologies. It has become a strategic field because of the enormous amounts of biological data that health professionals have to deal with: the ability to manage, visualize and interpret these big data offers opportunities for improving the understanding of the occurrence and progression of diseases, identifying new treatment strategies, and improving health and healthcare.

On the degree, you will be trained in subjects that are computational and scientific in nature, and you will gain a solid grounding in biology, including integrated knowledge of biological systems and their design principles, with an emphasis on mathematical and biostatistical processing of large amounts of data and its biomedical applications.

The bachelor’s degree in Bioinformatics offers comprehensive and solid training at the crossroads of computing, biomedical sciences and physics and chemistry. Students are provided with mathematical skills, biological knowledge, statistics and machine learning abilities with an interdisciplinary focus and an emphasis on biomedical applications. Optional subjects add complementary knowledge in areas such as medical and pharmaceutical research, molecular biology, data science and genomics. The aim of this degree is to provide students with a global view of life sciences, challenges that rarely fall within a single discipline, and the necessary tools to work with them.

### Academic goals
- Provides students with solid, basic training and appropriate skills to promote innovation and knowledge transfer.
- Offers personalized and high-quality education.
- Has an international vocation: the use of English as a lingua franca is encouraged and complemented by possible stays at foreign institutions.
- Offers applied and interdisciplinary studies so that students can tackle real questions they will encounter in their careers.
- Equips students with critical thinking skills and the open-mindedness with which to address cross-disciplinary problems in companies and research centres.
- Applies knowledge in combination with the principles of ethical and responsible professional practice.

### A world of opportunities
The main current challenge of bio-scientists is to manage in an efficient way the huge amount of data that new biotechnologies generate. These data is shown in different formats and visualizing them. Analysing data successfully is crucial for advancing in the fields of medicine, biotechnology, agriculture and food industry. All new discoveries in the field of bioinformatics quickly translate into health improvements, more efficient healthcare, and greater economic and social progress.

### The degree
- It is the first interuniversity bachelor’s degree in Bioinformatics in Spain. It is taught by the Barcelona School of Informatics and the Barcelona School of Telecommunications Engineering of the UPC, the University of Barcelona, the Universitat Autònoma de Barcelona and the Pompeu Fabra University.
- It is the first interuniversity bachelor’s degree programme in Bioinformatics in Spain. It is taught by the Barcelona School of Informatics taught in Spain.
- Can be taken in the 7th and 8th semesters. A total of 30 ECTS credits must be obtained from a combination of any of the following activities:
  - Taking optional subjects from the degrees in Biology, Genetics, Data Science, Artificial Intelligence, etc. at the promoting universities.
  - Going to a university abroad on a mobility programme.
  - Doing internships in companies, research entities and university departments.

### Curriculum

#### 1st year
**1st semester**
- Introduction to Bioinformatics
- Cell Biology
- Algebra
- Applied Programming I
- Physical and Organic Chemistry

**2nd semester**
- Molecular Biology
- Biochemistry
- Calculus
- Applied Programming II
- Computer Architecture and Operating Systems

#### 2nd year
**1st semester**
- Discrete Mathematics and Optimisation
- Database Systems
- Genetics and Genomics
- Applied Programming II
- Biostatistics and Data Analysis

**2nd semester**
- Physiology and Neurobiology
- Data Visualisation
- Algorithms in Biology
- Networks and Systems Biology
- Statistical Models and Stochastic Processes

#### 3rd year
**1st semester**
- Data Structures and Algorithms
- Statistical Learning
- Biophysics
- Computational Genomics
- Population Genetics and Molecular Evolution

**2nd semester**
- Structural Bioinformatics
- Machine Learning
- Omics Techniques
- High Performance Computing
- Phylogenetic and Comparative Genomics

#### 4th year
**1st semester**
- Optional Subjects

**2nd semester**
- Ethics and Scientific Communication
- Bachelor’s Thesis

* Optional Subjects
  - Can be taken in the 7th and 8th semesters. A total of 30 ECTS credits must be obtained from a combination of any of the following activities:
  - Taking optional subjects from the degrees in Biology, Genetics, Data Science, Artificial Intelligence, etc. at the promoting universities.
  - Going to a university abroad on a mobility programme.
  - Doing internships in companies, research entities and university departments.

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**Key information:**
- **Degree programme:** 240 ECTS credits on the official degree programme.
- **Study mode:** 5 years, 6 credits per year, via the public university system.
- **Institution:** Public universities.
- **Career:** Students admitted every year in the 1st semester.
- **Language:** Provided in English.

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**1st interuniversity bachelor’s degree in Bioinformatics taught in Spain**

**Your programme:**
- **Academic goals**
- **A world of opportunities**

**240 ECTS credits on the official degree programme**

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