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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upf. Universitat Pompeu Fabra Barcelona
UAB Universitat Autònoma de Barcelona
UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

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UPC studies

BACHELOR'S DEGREE IN BIOINFORMATICS

Barcelona School of Informatics
Barcelona School
of Telecommunications Engineering

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

BACHELOR'S DEGREE IN BIOINFORMATICS

1st interuniversity bachelor's degree in Bioinformatics taught in Spain

50 students admitted every year via the public university system

240 ECTS credits on the official degree programme

4 prestigious Catalan public universities coordinate the degree

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 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.

Why this bachelor's degree?

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.

Aimed at

Students should have a good grounding in science, logical reasoning skills, the ability to handle abstract models and good observation, attention and concentration skills. They should also be creative, imaginative and innovative and have an interest in life sciences and medicine.

Academic goals

The bachelor's degree in Bioinformatics:

- Provides students with solid, basic training and appropriate skills to promote innovation and knowledge transfer.
- Offers personalised 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 bioscientists is to manage in an efficient way the huge amount of data that new biotechnologies generate. These data is shown in different formats and researchers and professionals in the field are faced to the problems of extracting data, finding patterns, 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.

Curriculum

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

240 ECTS credits

1st year

1st semester

Introduction fo Bioinformatics	6
Cell Biology	6
Algebra	6
Applied Programming I	6
Physical and Organic Chemistry	6

2nd semester

Molecular Biology	6
Biochemistry	6
Calculus	6
Applied Programming II	6
Computer Architecture and Operating Systems	6

Core subjects

2nd year

1st semester

Discrete Mathematics and Optimisation	6
Databases	6
Genetics and Genomics	6
Applied Programming III	6
Biostatistics and Data Analysis	6

2nd semester

Physiology and Neurobiology	6
Data Visualisation	6
Algorithms in Biology	6
Networks and Systems Biology	6
Statistical Models and Stochastic Processes	6

Other compulsory subjects

3rd year

1st semester

Data Structures and Algorithms	6
Statistical Learning	6
Biophysics	6
Computational Genomics	6
Population Genetics and Molecular Evolution	6

2nd semester

Structural Bioinformatics	6
Machine Learning	6
Omics Techniques	6
High Performance Computing	6
Phylogenomic and Comparative Genomics	6

Other compulsory subjects

4th year

1st semester

Optional Subjects*	30

2nd semester

Ethics and Scientific Communication	6
Bachelor's Thesis	24

* **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.