UPC studies

MASTER'S DEGREE IN DATA SCIENCE

FIB
Barcelona School of Informatics

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

MASTER'S DEGREE IN DATA SCIENCE

200 universities have international mobility programs with the FIB

The master's degree in Data Science equips graduates with solid foundations and hands-on experience in fundamental aspects of data management and analysis so that they can extract hidden knowledge from structured and unstructured big data and build adaptive analytical systems that are able to exploit that knowledge in modern organisations. In particular, graduates will be prepared to address the new challenges of the so-called data-driven society and develop systems based on data to tackle relevant topics such as fraud detection, bioinformatics and eHealth, information extraction from highly unstructured data, real-time analysis of sensor data and social networks, customer relationship management, etc.

The master's degree in Data Science has been designed with the objective of training highly qualified professionals who will be provided with fundamental knowledge and the required competencies (knowledge and skills) to apply their learning in the demanding field of data science. The programme generates highly innovative, interdisciplinary professionals who have a strong research-oriented perspective and are especially prepared to face the challenges identified by industry.

Curriculum

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

120 ECTS credits

1st year

1st semester

Algorithms, Data Structures and Databases	6
Data Warehousing	6
Multivariate Analysis	6
Process-Oriented Data Science	6
Statistical Inference and Modelling	6

2nd semester

Big Data Management	6
Semantic Data Management	6
Machine Learning	6
Unstructured Data Mining	6
Optional Subject*	6

Compulsory

2nd year

Optional Subject*	30
Master's Thesis	30

***Optional Subjects**:
1) Specific Aspects of Data Science area: Advanced Statistical Modelling, Algorithmics for Data Mining, Optimisation Techniques for Data Mining, Advanced Machine Learning, Advanced Multivariate Analysis, Information Retrieval and Recommender Systems, Complex and Social Networks, Data Analysis and Knowledge Discovery, Cloud Computing, Big Data Analytics, Data Visualisation and Machine Learning Systems in Production.
2) Applications of Data Science in Specific Domains area: Bioinformatics and Statistical Genetics, Human Language Engineering and Data Management for Transport.
3) Innovation and Research area: Viability of Business Projects, Debates on Ethics of Data Science, Interdisciplinary Innovation Project, Techniques and Methodology of Innovation and Research in Informatics.

3.5

million job vacances, as stated in the European Union's data economy strategy

1st

Spanish university in Computer Science and Information Systems

Source: QS World University Rankings by Subject 2024

Aimed at

The master's degree in Data Science is an interdisciplinary programme that bridges computer science and mathematics. The recommended entrance qualifications are the following:

- Computer science and equivalent degrees.
- Mathematics and equivalent degrees.
- Classic engineering degrees or equivalent degrees with a strong mathematical component covering algebra, calculus and statistics in depth, with at least a minor in Computer Science.

Other backgrounds might be considered provided they guarantee solid foundations in mathematics and computer science that enable candidates to follow the programme.

Admission

For the degree to be pursued successfully, candidates should have the following personal and academic characteristics.

Technical competencies

- Knowledge of algorithmics, data structures, programming and databases that is at least equivalent to that of a degree with a minor in Computer Science.
- Knowledge of algebra, calculus and statistics that is equivalent to the fundamental knowledge obtained in a computer science degree or in the first years of the main engineering degrees.
- Comprehension and oral and written expression in English (B2 level or equivalent).

Abilities

- An aptitude for studying and for organising one's learning.
- Advanced logical reasoning and problem-solving skills.

Capabilities

- The ability to analyse and synthesise information.
- The ability to argue, reason and express ideas.

Attitudes

- An organised, curious and enterprising attitude and a willingness to apply knowledge to real situations.
- A capacity for creativity and innovation in the face of the evolution of technological advances.
- An interest in information and communication technologies.

Double degrees and mobility

You will have access to international double degrees taught in conjunction with top-level institutions, from which you graduate with a master's degree in Data Science from the UPC and a master's degree from the partner institution. In addition, you can make the most of the mobility programmes that the Barcelona School of Informatics has around the world.

Professional opportunities

Data science has emerged as a significant field at the crossroads between science and technology. Data scientists help businesses, government and society to leverage oceans of available data using very powerful and relatively cost-effective analytic technology. The ability to achieve the full potential of data analytics requires not just data, tools and infrastructure but also quantitative skills to traverse the huge mountains of data.

Data is nowadays at the heart of a myriad of data-centric fields, such as eHealth, next-generation services, digital twins, smart cities, smart mobility, regulation compliance, etc. Currently, all leading tech companies create, store, transform and analyse huge amounts of data, and this can be applied to every economic sector.

A world of opportunities

The master's degree in Data Science will allow you to:

- Build a multidisciplinary background in data science and foster the holistic view that is needed to meet the requirements set by industry and academia.
- Carry out your master's thesis or work placement and get paid for it at a company.
- Collaborate with many research centres and research groups linked to the Barcelona School of Informatics.
- Participate in mobility and double degree programmes with top international institutions.
- Participate in sports, cultural, development cooperation and leisure activities organised by student associations.

MASTER'S DEGREE IN

DATA SCIENCE

The **Barcelona School of Informatics (FIB)** has been a leading computer science school in Spain since 1976. It has ties to the best companies in the field and provides well-equipped facilities and the latest technologies to support the most modern teaching methods. At the FIB, you can take a double master's degree with a foreign university and collaborate with research centres and research groups.

The **FIB** is a school of the Universitat Politècnica de Catalunya - BarcelonaTech (UPC), a benchmark public institution of research and higher education in the fields of engineering, architecture, science and technology. With 50 years of history and more than 30,000 students, the UPC has the greatest concentration of research and innovation in IT in southern Europe. It is the best Spanish university in Computer Science and Information Systems, according to the 2024 QS World University Rankings by Subject.

FIB There's much more to IT

Further information:
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