

Bachelor's degree in Data Science and Engineering

The **bachelor's degree in Data Science and Engineering** responds to the need for graduates who have a multidisciplinary view of engineering and who are able to take on the challenges posed by technological advances that are based, in large part, on computational systems that generate and analyse massive amounts of data. The degree aims to produce professionals who are experts in analysing and engineering structured and unstructured data (text, audio, video, medical tests, financial indicators, etc.) and who have a solid grounding in mathematics and the engineering skills to model and solve complex problems. Data science and engineering is an emerging field that has applications as diverse as financial analysis, the study of physical phenomena, e-commerce, smart cities, biomedical information, genomics and social networks.

GENERAL DETAILS

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

Language of instruction

Check the language of instruction for each subject (and timetable) in the course guide in the curriculum.

Information on [language use in the classroom and students' language rights](#).

Fees and grants

Approximate fees per academic year: €1,107 (€2,553 for non-EU residents). [Consult the public fees system based on income \(grants and payment options\)](#).

Location

[Barcelona School of Informatics \(FIB\) \(coordinating school\)](#)

[Barcelona School of Telecommunications Engineering \(ETSETB\)](#)

[School of Mathematics and Statistics \(FME\)](#)

ADMISSION

Places

50

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](#).

DOUBLE-DEGREE AGREEMENTS

Within the framework of the courses offered by the Interdisciplinary Higher Education Centre (CFIS)

You can also take an interdisciplinary double degree coordinated by the CFIS at two UPC schools.

Further information on the [CFIS website](#)

PROFESSIONAL OPPORTUNITIES

Professional opportunities

- Leading and managing projects in multinational companies and new, specialised companies in sectors as diverse as finance, medicine, automotive engineering, internet distribution and sales, and video games.
- Analysing data for the financial sector and insurance companies and public administrations that work with large amounts of information.
- Optimising the use of resources and planning processes in companies, transport systems and public administrations.

ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

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 School of Informatics (FIB)
- Barcelona School of Telecommunications Engineering (ETSETB)
- School of Mathematics and Statistics (FME)

CURRICULUM

Subjects	ECTS credits	Type
FIRST SEMESTER		
Algebra	7.5	Compulsory
Algorithmics and Programming I	7.5	Compulsory
Calculus	7.5	Compulsory
Logic and Discrete Mathematics	7.5	Compulsory
SECOND SEMESTER		
Advanced Algebra and Calculus	7.5	Compulsory
Algorithmics and Programming II	7.5	Compulsory
Computers	7.5	Compulsory
Probability and Statistics 1	7.5	Compulsory
THIRD SEMESTER		
Algorithmics and Programming III	6	Compulsory
Cooperation Project with Wifi Technologies	2	Optional
Databases	6	Compulsory
Information Theory	6	Compulsory
Machine Learning for Satellite Imagery	2	Optional
Probability and Statistics 2	6	Compulsory
Signals and Systems	6	Compulsory
FOURTH SEMESTER		
Data Analysis	6	Compulsory

Subjects	ECTS credits	Type
Introduction to Audiovisual Processing	6	Compulsory
Machine Learning 1	6	Compulsory
Mathematical Optimization	6	Compulsory
Parallelism and Distributed Systems	6	Compulsory
FIFTH SEMESTER		
Advanced Databases	6	Compulsory
Entrepreneurship and Innovation	6	Compulsory
Information Retrieval and Analysis	6	Compulsory
Information Visualization	6	Compulsory
Machine Learning 2	6	Compulsory
SIXTH SEMESTER		
Advanced Topics in Data Engineering 1	6	Compulsory
Engineering Projects	12	Compulsory
Image Processing and Machine Vision	6	Compulsory
Smart Optical Networks	6	Optional
Spoken and Written Language Processing	6	Compulsory
SEVENTH SEMESTER		
Acoustics and Electroacoustics	6	Optional
Advanced Topics in Data Engineering 2	6	Compulsory
Audiovisual Technology and Production	6	Optional
Challenge Based Innovation	6	Optional
Computational Biophysics	6	Optional
Computer Simulation of Condensed Matter	6	Optional
Data Science in Bioinformatics and Computational Biology	6	Optional
Description and Retrieval of Audiovisual Content	6	Optional
Digital Design	6	Optional
Ethics in Science and Engineering	6	Optional
Internet of Things	6	Optional
Introduction to Deep Learning	2	Optional
Introduction to Research in Data Science Engineering	6	Optional
Matlab and Its Applications in Engineering	6	Optional
Music Signal Processing	2	Optional
Programming for Multimedia Applications	6	Optional
Quantum Computing	6	Optional
Reinforcement Learning and Deep Learning	6	Optional
Remote Sensing and Earth Observation Systems	6	Optional
Seminar on Advanced Statistics I	3	Optional
Seminar on Advanced Statistics II	3	Optional

Subjects	ECTS credits	Type
Sensors, Actuators and Microcontrollers in Mobile Robots	6	Optional
Social and Environmental Issues of Information Technologies	6	Optional
EIGHTH SEMESTER		
Bachelor's Thesis	18	Project

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