

# Bachelor's degree in Informatics Engineering

## Barcelona School of Informatics (FIB)

The **bachelor's degree in Informatics Engineering** provides the knowledge needed to conceive, design, develop, maintain and manage computer systems, services, applications and architectures and to understand and apply relevant legislation. You will also become an expert in new methods and technologies in the field of ICTs. You can choose one of five majors:

### Major in Computing

You will acquire the scientific and technical fundamentals that will enable you to design efficient solutions to computing challenges, particularly in artificial intelligence, bioinformatics and virtual reality.

### Major in Computer Engineering

You will be trained in the design of computers and digital devices that integrate hardware, software and communications, such as supercomputers, mobile phones, mp3 players, medical equipment, robots and image processing systems.

### Major in Software Engineering

You will learn to build reliable, efficient software systems that meet user and corporate requirements and to manage the people, resources and stages in a project, from the definition of the client's needs to the construction and deployment of a system.

### Major in Information Systems

You will specialise in using information technologies to improve organisational processes in ways that enable the organisation to deploy its strategies and meet its aims, making it more efficient, innovative and competitive.

### Major in Information Technologies

You will be trained in the design and installation of computer networks and the applications needed to satisfy the needs of organisations in keeping with security requirements.

## Majors

- Computing
- Computer Engineering
- Software Engineering
- Information Systems
- Information Technologies

## 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

### Timetables

Mornings / Afternoons

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

### **Location**

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

### **Official degree**

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

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## **ADMISSION**

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### **Places**

400

### **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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### **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 [web del CFIS](#)

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## **PROFESSIONAL OPPORTUNITIES**

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### **Professional opportunities**

- Management, innovation and supervision of informatics in all kinds of organisations.
- Software development, advice, consulting and technological support in ICT companies and others.
- Teaching and research.
- Management posts such as information systems manager, development manager, production and commercialisation manager, and head of informatics.
- Technical or middle management posts such as project supervisor; functional analyst; head of department; consultant; database architect; quality, methodology or organisational officer; and systems architect.
- Technical posts such as database administrator, network and systems officer, and information systems security officer.

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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 School of Informatics (FIB)

### **This bachelor's degree is also taught at**

## CURRICULUM

Subjects		ECTS credits	Type
<b>FIRST SEMESTER</b>			
Fundamentals of Mathematics		7.5	Compulsory
Introduction to Computers		7.5	Compulsory
Physics		7.5	Compulsory
Programming I		7.5	Compulsory
<b>Major in Computer Engineering</b>	Fundamentals of Mathematics	7.5	Compulsory
	Introduction to Computers	7.5	Compulsory
	Physics	7.5	Compulsory
	Programming I	7.5	Compulsory
<b>Major in Computing</b>	Fundamentals of Mathematics	7.5	Compulsory
	Introduction to Computers	7.5	Compulsory
	Physics	7.5	Compulsory
	Programming I	7.5	Compulsory
<b>Major in Information Systems</b>	Fundamentals of Mathematics	7.5	Compulsory
	Introduction to Computers	7.5	Compulsory
	Physics	7.5	Compulsory
	Programming I	7.5	Compulsory
<b>Major in Information Technologies</b>	Fundamentals of Mathematics	7.5	Compulsory
	Introduction to Computers	7.5	Compulsory
	Physics	7.5	Compulsory
	Programming I	7.5	Compulsory
<b>Major in Software Engineering</b>	Fundamentals of Mathematics	7.5	Compulsory
	Introduction to Computers	7.5	Compulsory
	Physics	7.5	Compulsory
	Programming I	7.5	Compulsory
<b>SECOND SEMESTER</b>			
Computer Organization		7.5	Compulsory
Mathematics I		7.5	Compulsory
Mathematics II		7.5	Compulsory
Programming II		7.5	Compulsory
<b>Major in Computer Engineering</b>	Computer Organization	7.5	Compulsory
	Mathematics I	7.5	Compulsory
	Mathematics II	7.5	Compulsory
	Programming II	7.5	Compulsory

Subjects		ECTS credits	Type
<b>Major in Computing</b>	Computer Organization	7.5	Compulsory
	Mathematics I	7.5	Compulsory
	Mathematics II	7.5	Compulsory
	Programming II	7.5	Compulsory
<b>Major in Information Systems</b>	Computer Organization	7.5	Compulsory
	Mathematics I	7.5	Compulsory
	Mathematics II	7.5	Compulsory
	Programming II	7.5	Compulsory
<b>Major in Information Technologies</b>	Computer Organization	7.5	Compulsory
	Mathematics I	7.5	Compulsory
	Mathematics II	7.5	Compulsory
	Programming II	7.5	Compulsory
<b>Major in Software Engineering</b>	Computer Organization	7.5	Compulsory
	Mathematics I	7.5	Compulsory
	Mathematics II	7.5	Compulsory
	Programming II	7.5	Compulsory
<b>THIRD SEMESTER</b>			
	Computer Interfacing	6	Compulsory
	Data Structures and Algorithmics	6	Compulsory
	Databases	6	Compulsory
	Operating Systems	6	Compulsory
	Probability and Statistics	6	Compulsory
<b>Major in Computer Engineering</b>	Computer Interfacing	6	Compulsory
	Data Structures and Algorithmics	6	Compulsory
	Databases	6	Compulsory
	Operating Systems	6	Compulsory
	Probability and Statistics	6	Compulsory
<b>Major in Computing</b>	Computer Interfacing	6	Compulsory
	Data Structures and Algorithmics	6	Compulsory
	Databases	6	Compulsory
	Operating Systems	6	Compulsory
	Probability and Statistics	6	Compulsory
<b>Major in Information Systems</b>	Computer Interfacing	6	Compulsory
	Data Structures and Algorithmics	6	Compulsory
	Databases	6	Compulsory
	Operating Systems	6	Compulsory
	Probability and Statistics	6	Compulsory

Subjects		ECTS credits	Type
<b>Major in Information Technologies</b>	Computer Interfacing	6	Compulsory
	Data Structures and Algorithmics	6	Compulsory
	Databases	6	Compulsory
	Operating Systems	6	Compulsory
	Probability and Statistics	6	Compulsory
<b>Major in Software Engineering</b>	Computer Interfacing	6	Compulsory
	Data Structures and Algorithmics	6	Compulsory
	Databases	6	Compulsory
	Operating Systems	6	Compulsory
	Probability and Statistics	6	Compulsory
<b>FOURTH SEMESTER</b>			
Business and Economic Environment		6	Compulsory
Computer Architecture		6	Compulsory
Computer Networks		6	Compulsory
Introduction to Software Engineering		6	Compulsory
Programming Projects		6	Compulsory
<b>Major in Computer Engineering</b>	Business and Economic Environment	6	Compulsory
	Computer Architecture	6	Compulsory
	Computer Networks	6	Compulsory
	Introduction to Software Engineering	6	Compulsory
	Programming Projects	6	Compulsory
<b>Major in Computing</b>	Business and Economic Environment	6	Compulsory
	Computer Architecture	6	Compulsory
	Computer Networks	6	Compulsory
	Introduction to Software Engineering	6	Compulsory
	Programming Projects	6	Compulsory
<b>Major in Information Systems</b>	Business and Economic Environment	6	Compulsory
	Computer Architecture	6	Compulsory
	Computer Networks	6	Compulsory
	Introduction to Software Engineering	6	Compulsory
	Programming Projects	6	Compulsory
<b>Major in Information Technologies</b>	Business and Economic Environment	6	Compulsory
	Computer Architecture	6	Compulsory
	Computer Networks	6	Compulsory
	Introduction to Software Engineering	6	Compulsory
	Programming Projects	6	Compulsory

Subjects		ECTS credits	Type
<b>Major in Software Engineering</b>	Business and Economic Environment	6	Compulsory
	Computer Architecture	6	Compulsory
	Computer Networks	6	Compulsory
	Introduction to Software Engineering	6	Compulsory
	Programming Projects	6	Compulsory
<b>FIFTH SEMESTER</b>			
PC Architecture		6	Optional
Academic and Professional Speaking Skills		6	Optional
Academic Skills for Developing a Project		6	Optional
Applied Engineering Project		6	Optional
Computational Geometry		6	Optional
Computer Science Summer School 1		1	Optional
Computer Science Summer School 2		2	Optional
Computer Vision		6	Optional
Cryptography		6	Optional
Curve and Surface Design		6	Optional
Cybersecurity Management		6	Optional
Data and Image Compression		6	Optional
Data Mining		6	Optional
Free Software and Social Development		6	Optional
Graphic Cards and Accelerators		6	Optional
Interaction and Interface Design		6	Compulsory
Parallelism		6	Compulsory
Physics of Memory Devices		6	Optional
Physics of Realistic Modelling and Animation		6	Optional
Quantum Computing and Cryptography		6	Optional
Robotics		6	Optional
Social and Environmental Issues of Information Technologies		6	Optional
Videogames		6	Optional
Writing Skills for Engineering		6	Optional

Subjects		ECTS credits	Type
<b>Major in Computer Engineering</b>	Architecture-Aware Programming	6	Optional
	Computer Architecture II	6	Compulsory
	Computer Networks II	6	Compulsory
	Data Processing Centers	6	Optional
	Design of Microcomputer-Based Systems	6	Compulsory
	Digital Signal Processing	6	Optional
	Operating Systems II	6	Compulsory
	PC Architecture	6	Optional
	Academic and Professional Speaking Skills	6	Optional
	Academic Skills for Developing a Project	6	Optional
	Applied Engineering Project	6	Optional
	Computational Geometry	6	Optional
	Computer Science Summer School 1	1	Optional
	Computer Science Summer School 2	2	Optional
	Computer Vision	6	Optional
	Cryptography	6	Optional
	Curve and Surface Design	6	Optional
	Cybersecurity Management	6	Optional
	Data and Image Compression	6	Optional
	Data Mining	6	Optional
	Free Software and Social Development	6	Optional
	Graphic Cards and Accelerators	6	Optional
	Interaction and Interface Design	6	Compulsory
	Parallelism	6	Compulsory
	Physics of Memory Devices	6	Optional
	Physics of Realistic Modelling and Animation	6	Optional
	Quantum Computing and Cryptography	6	Optional
	Robotics	6	Optional
	Social and Environmental Issues Od Information Technologies	6	Optional
	Videogames	6	Optional
Writing Skills for Engineering	6	Optional	

<b>Subjects</b>	<b>ECTS credits</b>	<b>Type</b>
<b>Major in Computing</b>		
Algorithmics	6	Compulsory
Artificial Intelligence	6	Compulsory
Graphics	6	Compulsory
Logics in Information Technology	6	Compulsory
Massive Information Search and Analysis	6	Optional
Numerical Computation	6	Optional
Operations Research	6	Optional
Programming Languages	6	Compulsory
Theory of Computation	6	Compulsory
PC Architecture	6	Optional
Academic and Professional Speaking Skills	6	Optional
Academic Skills for Developing a Project	6	Optional
Applied Engineering Project	6	Optional
Computational Geometry	6	Optional
Computer Science Summer School 1	1	Optional
Computer Science Summer School 2	2	Optional
Computer Vision	6	Optional
Cryptography	6	Optional
Curve and Surface Design	6	Optional
Cybersecurity Management	6	Optional
Data and Image Compression	6	Optional
Data Mining	6	Optional
Free Software and Social Development	6	Optional
Graphic Cards and Accelerators	6	Optional
Interaction and Interface Design	6	Compulsory
Parallelism	6	Compulsory
Physics of Memory Devices	6	Optional
Physics of Realistic Modelling and Animation	6	Optional
Quantum Computing and Cryptography	6	Optional
Robotics	6	Optional
Social and Environmental Issues Od Information Technologies	6	Optional
Videogames	6	Optional
Writing Skills for Engineering	6	Optional



<b>Subjects</b>	<b>ECTS credits</b>	<b>Type</b>	
<b>Major in Information Systems</b>	Data Analysis and Information Exploitation	6	Compulsory
	Information Systems Design	6	Compulsory
	Information Systems for Organisations	6	Compulsory
	Massive Information Search and Analysis	6	Optional
	Operations Research	6	Optional
	Requirements Engineering	6	Compulsory
	Viability of Business Projects	6	Optional
	PC Architecture	6	Optional
	Academic and Professional Speaking Skills	6	Optional
	Academic Skills for Developing a Project	6	Optional
	Applied Engineering Project	6	Optional
	Computational Geometry	6	Optional
	Computer Science Summer School 1	1	Optional
	Computer Science Summer School 2	2	Optional
	Computer Vision	6	Optional
	Cryptography	6	Optional
	Curve and Surface Design	6	Optional
	Cybersecurity Management	6	Optional
	Data and Image Compression	6	Optional
	Data Mining	6	Optional
	Free Software and Social Development	6	Optional
	Graphic Cards and Accelerators	6	Optional
	Interaction and Interface Design	6	Compulsory
	Parallelism	6	Compulsory
	Physics of Memory Devices	6	Optional
	Physics of Realistic Modelling and Animation	6	Optional
	Quantum Computing and Cryptography	6	Optional
	Robotics	6	Optional
	Social and Environmental Issues Od Information Technologies	6	Optional
	Videogames	6	Optional
	Writing Skills for Engineering	6	Optional

Subjects		ECTS credits	Type
<b>Major in Information Technologies</b>	Computer Network Technology	6	Compulsory
	Computer Security	6	Compulsory
	Data Processing Centers	6	Optional
	Distributed Applications	6	Optional
	Information Transmission and Encoding	6	Optional
	Internet Protocols	6	Compulsory
	Wireless and Mobile Communications	6	Optional
	PC Architecture	6	Optional
	Academic and Professional Speaking Skills	6	Optional
	Academic Skills for Developing a Project	6	Optional
	Applied Engineering Project	6	Optional
	Computational Geometry	6	Optional
	Computer Science Summer School 1	1	Optional
	Computer Science Summer School 2	2	Optional
	Computer Vision	6	Optional
	Cryptography	6	Optional
	Curve and Surface Design	6	Optional
	Cybersecurity Management	6	Optional
	Data and Image Compression	6	Optional
	Data Mining	6	Optional
	Free Software and Social Development	6	Optional
	Graphic Cards and Accelerators	6	Optional
	Interaction and Interface Design	6	Compulsory
	Parallelism	6	Compulsory
	Physics of Memory Devices	6	Optional
	Physics of Realistic Modelling and Animation	6	Optional
	Quantum Computing and Cryptography	6	Optional
	Robotics	6	Optional
	Social and Environmental Issues Od Information Technologies	6	Optional
	Videogames	6	Optional
Writing Skills for Engineering	6	Optional	

<b>Subjects</b>		<b>ECTS credits</b>	<b>Type</b>
<b>Major in Software Engineering</b>	Advanced Programming Concepts	6	Optional
	Database Design	6	Compulsory
	Information Systems Concepts	6	Optional
	Operating Systems for Distributed Applications	6	Optional
	Requirements Engineering	6	Compulsory
	Simulation	6	Optional
	Software Architecture	6	Compulsory
	Software Project Management	6	Compulsory
	PC Architecture	6	Optional
	Academic and Professional Speaking Skills	6	Optional
	Academic Skills for Developing a Project	6	Optional
	Applied Engineering Project	6	Optional
	Computational Geometry	6	Optional
	Computer Science Summer School 1	1	Optional
	Computer Science Summer School 2	2	Optional
	Computer Vision	6	Optional
	Cryptography	6	Optional
	Curve and Surface Design	6	Optional
	Cybersecurity Management	6	Optional
	Data and Image Compression	6	Optional
	Data Mining	6	Optional
	Free Software and Social Development	6	Optional
	Graphic Cards and Accelerators	6	Optional
	Interaction and Interface Design	6	Compulsory
	Parallelism	6	Compulsory
	Physics of Memory Devices	6	Optional
	Physics of Realistic Modelling and Animation	6	Optional
	Quantum Computing and Cryptography	6	Optional
	Robotics	6	Optional
	Social and Environmental Issues Od Information Technologies	6	Optional
Videogames	6	Optional	
Writing Skills for Engineering	6	Optional	

## **SIXTH SEMESTER**

Subjects		ECTS credits	Type
<b>Major in Computer Engineering</b>	Advanced Concepts on Operating Systems	6	Optional
	Computer Engineering Project	6	Compulsory
	Multiprocessors	6	Compulsory
	Parallel Programming and Architectures	6	Optional
	Real-Time Systems	6	Optional
	VLSI	6	Optional
<b>Major in Computing</b>	Advanced Algorithmics	6	Optional
	Compilers	6	Optional
	Distributed Intelligent Systems	6	Optional
	Machine Learning	6	Optional
<b>Major in Information Systems</b>	Database Administration	6	Optional
	Digital Strategy for Organisations	6	Optional
	E-Business	6	Compulsory
	Information Systems Project	6	Compulsory
	Marketing on Internet	6	Optional
<b>Major in Information Technologies</b>	Advanced Concepts on Operating Systems	6	Optional
	Advanced Operating Systems	6	Compulsory
	Distributed Network Systems	6	Optional
	Information Technology Project	6	Compulsory
	Operating Systems Administration	6	Compulsory
<b>Major in Software Engineering</b>	Concepts for Specialised Databases	6	Optional
	Knowledge Engineering and Distributed Intelligent Systems	6	Optional
	Software Engineering Project	6	Compulsory
	Web Applications and Services	6	Compulsory
<b>SEVENTH SEMESTER</b>			
	Design of Online Communities	6	Optional
	Summer Computing School	4	Optional
<b>Major in Computer Engineering</b>	Design of Online Communities	6	Optional
	Summer Computing School	4	Optional
<b>Major in Computing</b>	Design of Online Communities	6	Optional
	Summer Computing School	4	Optional
<b>Major in Information Systems</b>	Design of Online Communities	6	Optional
	Summer Computing School	4	Optional
<b>Major in Information Technologies</b>	Design of Online Communities	6	Optional
	Summer Computing School	4	Optional
<b>Major in Software Engineering</b>	Design of Online Communities	6	Optional
	Summer Computing School	4	Optional
<b>EIGHTH SEMESTER</b>			

Subjects		ECTS credits	Type
<b>Major in Computer Engineering</b>	Bachelor's Thesis	18	Compulsory
<b>Major in Computing</b>	Bachelor's Thesis	18	Compulsory
<b>Major in Information Systems</b>	Bachelor's Thesis	18	Compulsory
<b>Major in Information Technologies</b>	Bachelor's Thesis	18	Compulsory
<b>Major in Software Engineering</b>	Bachelor's Thesis	18	Compulsory