

Interfaces and System Integration

Area description

Graduates who have specialised in this area have in-depth knowledge of interfaces between computer systems and between systems and their users.

Professionals who have specialised in this area have been trained to design and develop mechanisms for interaction between computer systems and users. They are also able to design and implement complex systems that interact with their environments and are controlled by computer systems, such as automated production control and management systems.

Optional subjects in the area of specialisation

- Artificial Intelligence Applications
- Data and Image Compression
- Numerical Computation
- Structure and Design of Operating Systems
- Physics of Realistic Modelling and Animation
- Physical Fundamentals of Computer Technologies
- Computational Geometry
- Digital Systems and Microcontrollers
- Natural Language Processing
- Robotics
- Public Data Services
- Simulation
- Interactive Graphics Systems
- Information Technology Systems for Automation
- Business Management Techniques and Procedures
- Computer Vision
- Advanced Visualisation

Advanced Programming Techniques

Area description

Graduates who have specialised in this area have a solid grounding in techniques for solving complex programming problems and programming techniques for specific fields.

Professionals who have specialised in this area are trained to solve complex programming problems efficiently and rapidly. They know how to choose the most suitable programming languages and paradigms in designing solutions to specific problems. They know how to design the most efficient solutions in terms of time and memory, taking into account the environments in which the programs must be run, which might be parallel or distributed environments or specific architectures. They are also familiar with programming techniques developed for specific areas of computing, such as artificial intelligence, numerical and scientific computation and computer security.

Optional subjects in the area of specialisation

- Algorithmics
- Artificial Intelligence Applications
- Machine Learning
- Complexity
- Data and Image Compression
- Numerical Computation
- Cryptography
- Physics of Realistic Modelling and Animation
- Programming Languages
- Logic in Information Technology
- Multiprocessors
- Concurrent and Distributed Programming
- Awareness of Architecture in Programming
- Information Retrieval
- Interactive Graphics Systems

Telematic Networks and Operating Systems

Area description

Graduates who have specialised in this area are trained to design, scale, install, manage, maintain and assess telematic networks and operating systems.

They are professionals trained to build computer systems based on uniprocessors and multiprocessors and design their interconnections and basic software. They are able to select the most appropriate interface according to the requirements of each application and architecture. They are also experts in the different types of telematic networks and network applications. They are able to design remote network systems at all levels and develop distributed Internet applications, taking into account features related to security and data protection in computer systems.

Optional subjects in the area of specialisation

- Operating Systems Administration
- Cutting-Edge Computer Architectures
- Data and Image Compression
- System Performance Evaluation
- Cryptography
- Design of Web-Based Systems
- Structure and Design of Operating Systems
- Operations Research Models for Systems Analysis
- Multiprocessors
- Concurrent and Distributed Programming
- Computer Networks and Operating Systems Project
- Internet and Multimedia Application Protocols
- Security in Information Technology Systems
- Public Data Services
- Distributed and Networked Operating Systems
- Information and Coding Theory

Master's Degree in Information Technology

Barcelona School of Informatics



FIB

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Syllabus

1st semester	Computer Architecture (7.2 ECTS)	Software Engineering I (6.0 ECTS)	Artificial Intelligence (7.2 ECTS)	Programming Project (4.8 ECTS)	Operating Systems Project (6.0 ECTS)
2nd semester	Compilers (7.2 ECTS)	Software Engineering II (7.2 ECTS)	Computer Networks (7.2 ECTS)	Software Engineering and Databases Project (6.0 ECTS)	Information resources in Information Technologies (1.2 ECTS)
3rd semester	5 Elective courses of the chosen area of specialization (30 ECTS)				
4th semester	Master project on the chosen area of specialization (30 ECTS)				

MTI will have a **yearly periodicity**. Assistance to the courses is **mandatory** and the total student's workload is **120 ECTS**, which should be accomplished in four whole-time semesters. It is due to start in September 2006.

Master's Degree in Information Technology (MTI)

The MTI is an academically oriented master's degree which provides graduates with a professional specialization. It has been designed on the basis of the Barcelona School of Informatics (FIB) academic and administrative structure, with the collaboration of all the departments that have teaching responsibilities at FIB. The MTI aims to provide students with a general training in informatics and also with additional in-depth knowledge in some areas of computer science. Then, students will specialize in one of the following **professional areas**:

- High Performance Computer Architectures
- Software Engineering and Information Systems
- Fundamentals of Computation
- Information Management and Use
- Interfaces and System Integration
- Advanced Programming Techniques
- Telematic Networks and Operating Systems

The MTI has a remarkable European and international vocation which means more than just adjusting learning processes to match the European Higher Education area trends. Specifically, the MTI will encourage the mobility of both students and instructors, taking advantage of the international agreements already existing between the FIB and a large number of foreign universities. In consequence, knowledge of the English language will be required for the MTI students.

There is a remarkable parallelism between the MTI and the second cycle of the current degree in Informatics Engineering, but substantial differences should be pointed out. Specialization, which is compulsory in the second year of the master's degree, and the significant international vocation are some of the MTI distinguishing trends.

The MTI promotes social and environmental values related to the computer science discipline. Moreover, MTI courses intend to develop abilities particularly oriented to the professional practice. Working in group, leading working groups, oral and written communication skills will also be promoted. MTI graduates will be prepared and encouraged to learn throughout their professional lives.

The FIB offers **100 vacancies** that will be distributed between the MTI and the second cycle of the degree in Informatics Engineering. Taking into account the preferences declared by the applicants, and according to the legal requirements, the FIB will take a final decision on the student's admission.

High Performance Computer Architectures

Area description

Graduates who have chosen this area have specialised in computer architectures, the technologies required to design them and architecture-aware software.

Professionals who have specialised in this area have the skills needed to design computers and develop applications in keeping with the computer architecture on which they will be executed, taking full advantage of the resources available and attaining high performance. They are proficient in the assessment of computers, concurrent programming, operating system tools, internal structure and code generation and optimisation. They are well acquainted with multiprocessing systems, supercomputers and other advanced architectures. They are able to make the most of the features of systems with specialised architectures and tools for designing microprocessors and other integrated circuits.

Optional subjects in the area of specialisation

- Cutting-Edge Computer Architectures
- System Performance Evaluation
- Microprocessor Design
- Structure and Design of Operating Systems
- Physical Fundamentals of Computer Technologies
- Logic in Information Technology
- Digital Systems and Microcontrollers
- Operations Research Models for Decision Making
- Multiprocessors
- Concurrent and Distributed Programming
- Awareness of Architecture in Programming
- Internet and Multimedia Application Protocols
- Simulation

Software Engineering and Information Systems

Area description

Graduates who have specialised in this area have in-depth knowledge of software engineering and information systems.

Professionals who have specialised in this area have all the skills expected of project managers who develop software for the management of organisations. This entails providing customer service, supervising technical aspects and managing human and material resources. They are able to analyse an organisation's information system requirements, as well as drawing up specifications for, designing and implementing high-quality software systems at a low cost. They have a broad knowledge of databases. They are able to design them, monitor them, assess their performance and manage them. They also know how to use the very latest technologies for the development of distributed applications.

Optional subjects in the area of specialisation

- Design of Web-Based Systems
- Design and Administration of Databases
- Engineering of Requirements
- Logic in Information Technology
- Operations Research Models for Decision Making
- Planning and Management of Information Technology Projects and Systems
- Decision Making and Project Management in Business
- Concurrent and Distributed Programming
- Security in Information Technology Systems
- Public Data Services
- Simulation
- Information Systems for Organisations
- Database and Object Management Systems
- Distributed and Networked Operating Systems
- Business Management Techniques and Procedures
- Viability of Business Projects

Fundamentals of Computation

Area description

Graduates who have specialised in this area have an in-depth understanding of computer science.

Professionals who have specialised in this area are able to tackle problems that require in-depth knowledge of the foundations of computer science and a system-wide view of all the levels in a computer system. They are able to assess the difficulty of a computing problem and recommend the most suitable machines, languages and programming paradigms for designing a solution.

Optional subjects in the area of specialisation

- Algorithmics
- Artificial Intelligence Applications
- Machine Learning
- Cutting-Edge Computer Architectures
- Complexity
- Data and Image Compression
- Numerical Computation
- Cryptography
- Structure and Design of Operating Systems
- Physical Fundamentals of Computer Technologies
- Computational Geometry
- Programming Languages
- Logic in Information Technology
- Multiprocessors
- Concurrent and Distributed Programming
- Awareness of Architecture in Programming
- Internet and Multimedia Application Protocols
- Security in Information Technology Systems
- Distributed and Networked Operating Systems
- Information Retrieval
- Information and Coding Theory

Information Management and Use

Area description

Graduates who have specialised in this area are experts in managing and using information in organisations.

Professionals who have specialised in this area are able to organise, maintain, explore and present the information available within an organisation. They know how to use a wide range of computing techniques to analyse this information and acquire new knowledge. Based on this knowledge, they know how to help organisations take strategic decisions and how to plan processes and actions, in addition to anticipating and assessing the results of these actions.

Optional subjects in the area of specialisation

- Artificial Intelligence Applications
- Machine Learning
- Design and Administration of Databases
- Engineering of Requirements
- Data Mining
- Operations Research Models for Decision Making
- Planning and Management of Information Technology Projects and Systems
- Decision Making and Project Management in Business
- Natural Language Processing
- Information Exploitation Project
- Information Retrieval
- Security in Information Technology Systems
- Simulation
- Information Systems for Organisations
- Database and Object Management Systems
- Business Management Techniques and Procedures
- Viability of Business Projects