Bachelor's Degree

Engineering

Computer Science Engineering

Complutense University of Madrid

Syllabus

A group in English is offered.

Type of subject	ECTS
Core Studies	60
Compulsory	90
Elective	78*
Final Year Project	12
Total	240

* 48 of these credits must be part of one of the eligible itineraries.

Year One	ECTS
Business Management	6
Basics of Electricity and Electronics	6
Mathematical Methods of Engineering	12
Discrete Mathematics and Mathematical Logic	12
Basics of Programming	12
Basics of Computers	12

Year Two	ECTS
Advanced Mathematics	6
Computer Technology and Organisation	6
Probability and Statistics	6
Computer Architecture	6
Software Engineering	9
Data Structure and Algorithms	9
Programming Technologies	12
Databases	6

Year Three	ECTS
Operating Systems	6
Networks	6
Five Itinerary Subjects	30
Two General Electives	12
One Itinerary Elective	6

Year Four	ECTS
Ethics, Legislation and Profession	6
Advanced Operating Systems and Networks	6
Computer Architecture	6
Two Itinerary Electives	12
Three General Electives	18
Final Year Project	12

Year Three Itinerary Subjects	ECTS
Itinerary: Specifics of Computing Technology	
Basics of Computer Languages	6
Concurrent Programming	6
Declarative Programming	6
Algorithmic Methods for Troubleshooting	9
Artificial Intelligence	9
Itinerary: Specifics of Information Technology	
Web Applications	6
Corporate Software	6
Advanced Databases	6
Computer Audits	9
Networks and Security	9

Year Four Itinerary Electives	ECTS
Itinerary: Specifics of Computing Technology	
Language Processors	6
Development of Interactive Systems	6
Itinerary: Specifics of Information Technology	
Evaluation of Computer Systems	6
Development of Interactive Systems	6

Third and Fourth Year General Electives	ECTS
Social Media Analysis	6
Automated Learning and Big Data	6
Internal Architecture of Linux and Android	6
NoSQL Databases	6
Calculability and Complexity	6
Cloud and Big Data	6
Cryptography and Coding Theory	6
Creating a Company	6
Developing Web-Based Video Games	6
Automated System Design	6
Information Management in the Web	6
Computer Tools for Gambling	6
Computer Graphics	6
Web Engineering	6
User Interfaces	6
Operational Research	6
Emerging Science and Technology Scenarios and Defence	6
Data Mining and the Big Data Paradigm	6
Computational Perception	6
Application Programming for Mobile Devices	6
Programming with Restrictions	6
Programming GPUs and Accelerators	6
Parallel Programming for Mobile Phones and Multicore	6
Robotics	6
Smart Systems (only for the Information Technology Itinerary)	6
Network Security (only for the Computing Itinerary)	6
Company Internship I	6
Company Internship II	6

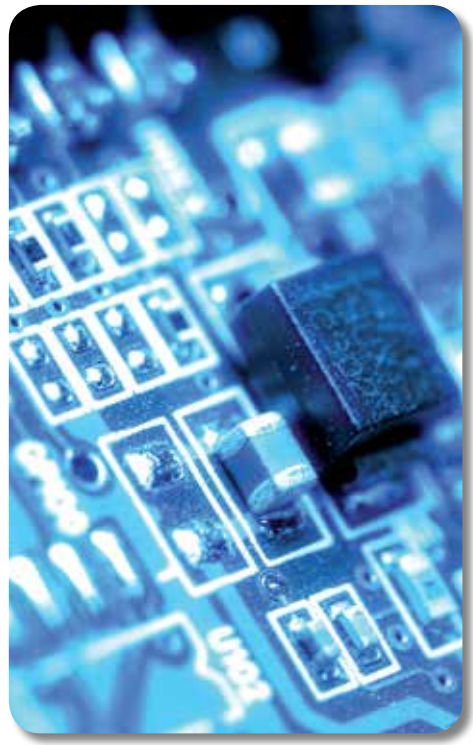
Participation Credits	ECTS
Any course	6

Knowledge acquired

- Theoretical fundamentals of programming languages and related lexical, syntactic and semantic processing techniques.
- Ability to evaluate computational complexity of a problem and understand which algorithmic strategies may lead to its resolution.
- Fundamentals, paradigms and techniques specific to smart systems.
- Ability to develop and evaluate interactive systems and to present complex information.
- Techniques for computational learning and automatic data mining based on large volumes of data.
- Ability to understand organisation environments and their information and communication technology needs.
- Computer system security.
- Management of computer projects, services and systems in all areas, leading their implementation and continuous improvement while assessing their financial and social impact.
- Preparation of technical specifications for computer installations in compliance with applicable standards and regulations.
- Administration and maintenance of computer systems, services and applications.
- Basic algorithmic procedures of computer technologies to design solutions to problems, analysing appropriateness and complexity of algorithms proposed.
- Most appropriate data types and structures to resolve problems.
- Robust, secure and efficient design of applications, choosing the best paradigm and programming language.
- Operating systems.
- Design of web-based applications.
- Design, analysis and implementation of database applications.
- Information systems, including those that are web-based.
- Parallel, concurrent, distributed and real-time programming.
- Principles, methodologies and life cycles of software engineering.
- Person-computer interfaces that guarantee accessibility and usability of computer systems, services and applications.
- Fundamentals and basic techniques of smart systems and their practical applications.

Professional opportunities

- System engineer.
- Project engineer.
- Software and application developer.
- Software design architect.
- Person-computer interface designer.
- Information system developer.
- System or solution architect and designer.
- Integration, implementation and testing specialist.



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COMPLUTENSE
MADRID

Grados UCM

Faculty of Computer Science

Campus Moncloa
http://informatica.ucm.es

For further information: www.ucm.es/estudios/grado-ingenieriainformatica

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