COURSE PROGRAM

Academic Year: 2024/2025

Identification and characteristics of the course				
Code	401086		ECTS Credits	6
Course name (English)	Master's Thesis			
Course name (Spanish)	Proyecto fin de Máster			
Degree programs	Master Degrees in Telecommunications Engineering, Computer Science and ICT Management			
Faculty/School				
Semester	Undefined	Type of course	Mandatory	
Module	Final Project			
Matter	Final Project			
Lecturer/s				
Name		Office	E-mail	Web page
Director of the TFM [Co-director of the TFM]				
Subject Area	All with teaching in the degree			
Department	All with teaching in the degree			
Coordinating Lecturer (If more than one)	Director of the TFM			

Competencies*

BASIC SKILLS

CB6 - Get and understand knowledge that provides a basis or opportunity to be original in new ideas development or application, often in a research context.

CB7 – To know how to apply both knowledge gained by students and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.

CB8 – To be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.

CB9 – To know how to pass on their conclusions and knowledge, and those underlying reasons that sustain them, to specialized and non-specialized audiences in a clear and unambiguous way.

* The sections concerning competencies, course outline, educational activities, teaching methodologies, learning outcomes and assessment systems must conform to that included in the ANECA verified document of the degree program.

CB10 - Gain the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.

GENERAL COMPETENCES

CG1 - Ability to project, calculate and design products, processes and implementations in all areas of Computer Engineering.

CG2 - Ability to manage works and installations of computer systems, complying with current regulations and ensuring the quality of service involved.

CG3 - Ability to lead, plan and manage multidisciplinary teams.

CG4 - Ability for mathematical modeling, calculation and simulation in technology centers and business engineering, particularly in research, development and innovation tasks in all areas related to Computer Engineering.

CG5 - Ability for the development, strategic planning, management, coordination and technical and financial management of projects, in all areas of Computer Engineering, following quality and environmental criteria.

CG6 - Ability for the general, technical and research, development and innovation management of projects, in companies and technological centers, in the field of Computer Engineering.

CG7 - Ability for setting up, leadership and management of processes for computer equipment manufacturing, with safety assurance for people and goods, and the quality of the final products and their approval.

CG8 - Ability to apply knowledge acquired and solve problems in new or unfamiliar environments within broader and multidisciplinary contexts, being able to integrate such knowledge.

CG9 - Ability to understand and apply ethical responsibility, legislation and professional deontology of the profession of Computer Engineering.

CG10 - Ability to apply the economy principles and human resources and projects management, as well as the legislation, regulation and standardization of Information Technology.

TRANSVERSAL COMPETENCES

CT1 - Innovative and entrepreneurial spirit.

CT2 - Ability to manage teams and organizations.

CT3 - Leadership capacity.

CT4 - Ability to communicate conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialized audiences, orally and in writing, in Spanish and English.

CT5 - Ability for teamwork.

CT6 - Interpersonal relationship skills.

CT7 - Ability for critical reasoning and creativity, as means to have the opportunity to be original in the generation, development or application of ideas within a research or professional context.

CT8 - Responsibility and ethical commitment in the performance of the professional and research activity.

CT9 - Respect for and promotion of human rights, democratic principles, principles of equality between women and men, solidarity, universal accessibility and design for all, prevention of occupational risks, protection of the environment and promotion of culture of peace.

CT10 - Orientation towards quality and continuous improvement. CT11 - Autonomous learning capacity.

CT12 - Ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts.

CT13 - Ability to integrate knowledge and face the complexity of making judgments based on incomplete information.

SPECIFIC COMPETENCES

CEDG1 - Ability to integrate technologies, applications, services and systems of Computer Engineering, with a generalist character, in broader and multidisciplinary contexts.
CEDG2 - Capacity for strategic planning, preparation, management, coordination, and technical and economic management in the areas of Computer Engineering related, among others, with: systems, applications, services, networks, infrastructures or computer facilities and centers or factories of software development, respecting the adequate fulfillment of quality and environmental criteria and in multidisciplinary work environments.
CEDG3 - Ability to manage research, development and innovation projects in companies and centers.
CETI1 - Ability to model, design, define architecture, implement, manage, operate, manage and maintain applications, networks, systems, services and computer content.
CETI2 - Ability to understand and know how to apply the operation and organization of the Internet, the technologies and protocols of new generation networks, component models, intermediary software and services.
CETI3 - Ability to ensure, manage, audit and certify the quality of developments, processes, systems, services, applications and computer products.
CETI4 - Ability to design, develop, manage and evaluate mechanisms for certification and guarantee of security in the treatment and access to information in a local or distributed processing system.
CETI5 - Ability to analyze the information needs that arise in an environment and carry out in all its stages the process of construction of an information system.
CETI6 - Ability to design and evaluate operating systems and servers, and applications and systems based on distributed computing.
CETI7 - Ability to understand and be able to apply advanced knowledge of high performance computing and numerical or computational methods to engineering problems.
CETI8 - Ability to design and develop computer systems, applications and services in embedded and ubiquitous systems.
CETI9 - Ability to apply mathematical, statistical and artificial intelligence methods to model, design and develop applications, services, intelligent systems and systems based on knowledge.
CETI10 - Ability to use and develop methodologies, methods, techniques, programs of specific use, norms and standards of graphic computing.
CETI11 - Ability to conceptualize, design, develop and evaluate the human-computer interaction of products, systems, applications and computer services.
CETI12 - Ability to create and exploit virtual environments, and for the creation, management and distribution of multimedia content.

Contents

Course outline*

The Master's Thesis (TFM) for the Master's Degree in Computer Engineering is defined as an individual, predominantly practical project in which the student applies the knowledge acquired during their academic training in an integrative and synthetic manner. Its primary objective is to evaluate the academic maturity, professional readiness, and overall formation of the graduate upon completing their studies.

The TFMs, as a cross-disciplinary subject associated with various fields, will consist of engineering projects and other professional works related to the degree. These can include theoretical, experimental, numerical, computational projects, or any other type that demonstrates the acquisition of competencies associated with the corresponding program of the degree. The TFMs can be carried out either within the Polytechnic School itself or in external centers.

The TFM proposals can be:

1. Generic: The TFM will be conducted as a seminar with in-person teaching in student groups led by the supervising professors.
2. Specific: In this case, the TFM will be carried out by one student or, exceptionally, by more than one student, with a unique title proposed for the project.

Course syllabus

1. Tutorials on the objectives of the Master's Thesis (TFM), instrumentation, software, analysis techniques, bibliography, development, structure, and scope of the project, as well as progress monitoring.
2. Development of the TFM. Depending on the modality: literature review, data collection and analysis, software development, modeling, simulation, and validation. Preparation of the report, layout, and instructions for the presentation and defense of the TFM.
3. Defense of the TFM before a panel.

Educational activities *

Student workload in hours by lesson		Lectures	Practical activities				Monitoring activity	Homework
Lesson	**Total**	**L**	**HI**	**LAB**	**COM**	**SEM**	**SGT**	**PS**
1	13						13	0
2	135						0	135
3	2						2	0
TOTAL	**150**						**2**	**135**

L: Lectures (85 students)
HI: Hospital internships (7 students)
LAB: Laboratory or field practices (15 students)
COM: Computer room or language laboratory practices (20 students)
SEM: Problem classes or seminars or case studies (40 students)
SGT: Scheduled group tutorials (educational monitoring, ECTS type tutorials)
PS: Personal study, individual or group work and reading of bibliography

Teaching Methodologies*

Scheduled tutoring, individual or in small groups to carry out a more individualized follow-up of the student, with training and orientation activities. Mainly, they will be used to track the work.

Completion of activities, work and study by the student, autonomously.

The activities that the student will develop in a non-face-to-face manner will be mainly oriented to the acquisition of basic knowledge in the field of Information Technology and to the development of the projects and work requested, either individually or in groups

Learning outcomes *

The Master's Thesis (TFM) must verify whether the student has achieved the technical and transversal competencies specified in the degree. This is done through the conception and development of an application, service, or computer system of sufficient complexity, integrating hardware, software, or both perspectives, and promoting teamwork in environments close to real-world scenarios.

Attached to this document is the evaluation rubric for the written work and the oral presentation.

Assessment systems *

The defense of the Master's Thesis (TFM) will be public and will consist of the student's presentation of their work before a panel of three members. The presentation should not exceed 30 minutes. Following the presentation, there will be a question-and-answer session not exceeding 30 minutes, during which the student will respond to questions posed by the panel members.

Before the panel's deliberation, the Director or Co-directors of the TFM, or any of the people present at the presentation, may intervene with the authorization of the Chair of the panel.
Once the panel's deliberation is complete, the grade will be assigned according to the UEx evaluation regulations. An evaluation rubric (attached as an annex) will be used to assess each item. If there is no agreement on the final grade, the final score will be the arithmetic mean of the two highest grades.

The student's results will be graded on a numerical scale from 0 to 10, with one decimal place, and the corresponding qualitative grade may be added: 0 - 4.9: Fail (SS), 5.0 – 6.9: Pass (AP), 7.0 - 8.9: Good (NT), 9.0 - 10: Excellent (SB).

The panel may unanimously propose to the institution the award of honors to students who have achieved a grade of 9 or higher. This proposal must be justified with a detailed report, which will be submitted along with the grade report. If the number of honor distinctions proposed exceeds the number that can be awarded, the institution will automatically assign them to the students with the highest average grades in the Master's program.

The evaluation regulations for the Master's Thesis are common to the entire Polytechnic School and can be found on the center's website: (https://www.unex.es/conoce-la-uex/centros/epcc/informacion-academica/tf-estudios)

Bibliography (basic and complementary)

No applicable

Other resources and complementary educational materials

Polytechnic School webpage (https://www.unex.es/conoce-la- uex/centros/epcc/).