COURSE PROGRAM

Academic Year: 2024/25

Identification and characteristics of the course				
Code	401078		ECTS Credits	6
Name	Audit, Certification and Quality of Computer Systems			
Degrees	Master Degree in Computer Science Engineering			
Centre	School of Technology			
Semester	Third	Character		Required
Module	Computer Science Technologies			
Material	Advanced Computer Science Technologies			
Lecturers				
Name	Office	e-mail	Web page	
Andrés Caro Lindo	18 (Lab. GIM, Research building)	andresc@unex.es	http://gim.unex.es	
Subject Area	Languages and Computer Systems			
Department	Computer and Telematic Systems Engineering			
David Cortés Polo	2 (Computer Science building)	dcorpol@unex.es		
Subject Area	Telematic Engineering			
Department	Computer and Telematic Systems Engineering			
Coordinating lecturer	Andrés Caro Lindo			

Competencies

Basic competencies

CB6 - Knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context.

CB9 – Skills to communicate conclusions, and the knowledge and rationale underpinning these, to specialized and non-specialized audiences in a clear and unambiguous manner.

CB10 - Learning skills that enable to continue studying in a way that will be largely self-directed or autonomous.

General competencies

CG4 - Capacity for mathematical modeling, calculation and simulation in technological centers and engineering of company, particularly in research, development and innovation tasks in all fields related to Informatics Engineering.

CG8 - Ability to apply acquired knowledge and solve problems in new or little-known environments within broader and multi-disciplinary contexts, being able to integrate this knowledge.

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

Specific competencies

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.

CETI11 - Ability to conceptualize, design, develop and evaluate the human-computer interaction of computer products, systems, applications and services.

Cross-curricular competencies

CT5 - Ability to work as a team member.

Themes and syllabus

Brief description of the syllabus

Computer audit concept. Types of computer audit. Methodologies, standards and techniques of computer audit. Tests and tools in computer audit. Preparation of computer audit reports. Methodologies and certification standards and security management. Procedures and tools for certification and security guarantee. Quality of the software process. Models for the management of the quality of the software processes and software products (ISO 9001, CMMI, ITL). Methods for the inspection, testing, verification and validation of software. Software development process evaluation metrics. Tools for implementation and management of quality models. Management of improvement projects. Software quality certifications.

Course Syllabus

Theme 1: Computer Audit.
Computer audit concepts. Types of computer audit. Standards. COBIT. The computer audit report.

Theme 2: Management and certification of security.
Management of security. Security management standards. Certification of the security of the systems.

Theme 3: Quality. Technic, tools, models and y standards.
Quality. Related concepts. Quality technics and tools. Levels of maturity. Quality models and standards. ISO 9000/9001 standards. Quality models.

Theme 4: Quality of Computer Systems.
Quality of Information Systems. Quality of software products. ISO 25000 standards.

Theme 5: Quality of software process.
Software process modelling. Evaluation and improvement of process. ISO 90003 standard. CMM/CMMI models. Other standards and models.

Educational Activities

Student hours of work per theme		Theorical hours	Classroom				Monitoring activity	Non-classroom
Theme	Total	LG	HP	LAB	COMP	SL	PT	PS
1	41	12		5				24
2	28	8		3				17
3	13	5		1				7
4	20	6		2				12
5	34	10		4				20
Evaluation of the whole	14	4						10
Total	**150**	**45**		**15**				**90**

LG: Large Group (85 students).
HP: Hospital practices (7 students).
LAB: Laboratory/field sessions (15 students).
COMP: Computer or languages laboratory practices (20 students).
SL: Seminar/Laboratory (computer laboratory sessions = 30, problem classes or seminars or case studies = 40).
PT: Programmed Tutorials (educational monitoring, in the form of ECTS tutorials).
PS: Personal study, individual or group tasks, and reading the literature.

Teaching Methodology

Theoretical-practical classes in the classroom, for the development of the fundamental contents of the course; short activities, individual or group, which allow to apply the exposed concepts and to solve problems, allowing the active participation of the students.

Laboratory sessions, practical activities, guided laboratory sessions, problem solving seminars, etc. in groups under the direction of a teacher.

Programmed tutoring, individual or in small groups, that allow a more individualized follow-up of the student, including training and orientation activities. Mainly, they will be used for the follow-up of the proposed works, debate on alternatives and evaluation of the achieved objectives.

Activities, work and study carried out by the student, autonomously, individually or in groups. The activities that the student will develop in a non-face-to-face manner will be mainly oriented to the development of the projects and work requested, either individually or in groups.

Learning outcomes

Knows the concepts related to the computer audit and its types.
Uses methodologies, standards and computer audit techniques.
Knows different types of tests and tools used in computer audit.
Prepares and interprets computer audit reports.
Knows and applies methodologies and standards for certification and security management.
Uses certification tools and procedures, and security assurance.
Knows and apply the models and standards for the management and control of process quality.
Knows different analytical methods to evaluate the situation and capacity of the processes, and to undertake and manage improvement projects.
Knows different methodologies to manage and evaluate the processes of acquisition or provision of ICT services.
Knows the different models for the evaluation and improvement of software quality.
Knows different methods of verification and validation of the quality of software products.

Evaluation systems

Course evaluation will consist of the evaluation of both the theoretical concepts and the practical cases.

There are two evaluation modalities in the course:

1. **Continuous assessment:** Assessment system that consists of several activities, distributed throughout the course's teaching semester. This modality also includes a final test, which will be held on the official examination date.

A) Continuous assessment during the semester

The continuous assessment throughout the semester will be carried out evaluating the proposed activities, which are organized in two blocks: Audit and Certification block (themes 1 and 2) and Certification and Quality of Information Systems block (themes 3, 4, 5). The grade will correspond to the arithmetic mean of the two blocks considered, and it is essential to pass each of the two blocks separately. If any of the two blocks is failed, the grade will be that of the failed block.

Mandatory conditions for continuous assessment throughout the semester:

1. Minimum attendance at 80% of the classes (both theoretical and practical).

2. Resolution of all practical cases perfectly solved and documented.

3. Pass a minimum of 50% of the continuous assessment cases carried out throughout the semester.

If any of the preconditions are not met, it is understood that the student waives the continuous evaluation throughout the semester, and will be examined by the final continuous assessment exam, described in B).

The continuous assessment exams throughout the semester are recoverable. If they are not passed, the student may be evaluated again in the final continuous assessment exam, described in B).

B) Final continuous evaluation exam

A final continuous assessment test is included, which will be held on the official examination date.

This final test will not be necessary for those students who have passed the continuous assessment throughout the semester, according to section A) above. Similarly, those students who have passed any of the continuous evaluations carried out throughout the semester will only have to take those that have not passed.

It is mandatory to solve all the practical cases, prior to take the final test of the subject.

The final test of the course will consist of the evaluation of the theoretical and practical concepts by means of an exam.

C) Final grade of the subject by the continuous assessment system

The final grade for the course in the continuous assessment mode will be the following:

• The mark of the final test of the subject will be the arithmetic mean of the mark relative to themes 1-2 and the mark relative to themes 3-4-5. It is mandatory to pass separately these two parts. If any of the two blocks is failed, the final grade will be that of the failed block.

• The final grade for the practical cases will be the arithmetic mean of the grade obtained in the cases corresponding to themes 1-2 and the grade obtained in the cases corresponding to themes 3-4-5. It is mandatory to pass separately these two parts. If any of the two blocks is failed, the final grade will be that of the failed block.

• The final weighting considers 2/3 of the final grade for the final exam of the subject, and 1/3 of the final grade for practical cases.

• If any of the two parts (final exam / practical cases) is not passed, the final grade for the course will be SUSPENSO-3

• Any type of exam fraud will imply a SUSPENSO-0 in the final grade, in addition to any other academic actions.

• Each of the parts (final test / practical cases) may be passed separately and the grade will be kept throughout the academic year.

2. **Global assessment:** Assessment system that consists of a final assessment.

Selection of global assessment modality implies the waiver of continuous assessment.

The resolution of all practical cases perfectly solved and documented is mandatory, prior to the final test of the subject.

The final test of the course will consist of the evaluation of the theoretical and practical concepts by means of an exam.

The final grade for the course in the global assessment mode will be the following:

• The mark of the final test of the subject will be the arithmetic mean of the mark relative to themes 1-2 and the mark relative to themes 3-4-5. It is mandatory to pass separately these two parts. If any of the two blocks is failed, the final grade will be that of the failed block.

• The final grade for the practical cases will be the arithmetic mean of the grade obtained in the cases corresponding to themes 1-2 and the grade obtained in the cases corresponding to themes 3-4-5. It is mandatory to pass separately these two parts. If any of the two blocks is failed, the final grade will be that of the failed block.

• The final weighting considers 2/3 of the final grade for the final exam of the subject, and 1/3 of the final grade for practical cases.

• If any of the two parts (final exam / practical cases) is not passed, the final grade for the course will be SUSPENSO-3

• Any type of exam fraud will imply a SUSPENSO-0 in the final grade, in addition to any other academic actions.

• Each of the parts (final test / practical cases) may be passed separately and the grade will be kept throughout the academic year.

Bibliography (basic and complementary)

- "Auditoría de tecnologías y sistemas de información". Mario G. Piattini, Emilio Del Peso, Mar Del Peso. Ed. Ra-Ma, 2008.
- "Modelo para el gobierno de las TIC basado en las normas ISO". Carlos M. Fernández y Mario Piattini. Ed. AENOR Ediciones, 2012.
- "Seguridad de la Información". Javier Areitio. Ed. Paraninfo, 2008.
- "Calidad de Sistemas Informáticos". Mario G. Piattini, Félix O. García, Ismael Caballero. Ed. Ra-Ma, 2006.
- "Calidad, Calidad del Producto y Proceso Software". Coral Calero, Mª Ángeles Moraga, Mario G. Piattini. Ed. Ra-Ma, 2010.
- "CMMI" (Segunda Edición). Mary Beth, Mike Konrad, Sandy Shrum. Ed. Prentice Hall, 2009.

Other resources

Resources: Virtual space of the course, available in the Virtual Campus of the University of Extremadura.