IDENTIFYING DATA

Systems engineering and ICT project management

Subject	Systems engineering and ICT project management			
Code	P52M182V01201			
Study programme	Master Universitario en Dirección TIC para la defensa			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	4	Mandatory	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Fernández Gavilanes, Milagros			
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General description	The subject of Systems Engineering and ICT Project Management has two aspects. The first focuses on systems engineering and the other on project management, which are interrelated since the development or modification of a new or existing system is a project in itself. In both parts, a theoretical introduction and the analysis of practical cases will be developed.			

Skills

Code	
A6	CB6 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.
A7	CB7 - That students know how to apply the acquired knowledge and their ability to solve problems in new or poorly understood environments within broader (or multidisciplinary) contexts related to their area of study.
A8	CB8 - That students are able to integrate knowledge and face the complexity of formulating 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.
A9	CB9 - That students know how to communicate their conclusions and the knowledge and ultimate reasons that support them to a specialized and unspecialized public in a clear and unambiguous way.
A10	CB10 - That students possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
B2	CG2 - Integrate and apply the knowledge acquired, and possess the ability to solve problems in new or imprecisely defined environments, including multidisciplinary contexts related to their field of study.
B4	CG4 - Being a professional committed to quality, deadlines and the adequacy of solutions, not only in the exercise of the profession but also in the social field, including a commitment to economic, ethical and environmental sustainability.
B5	CG5 - Critically evaluate the structure and validity of reasoning, analyzing, interpreting, and questioning the foundations of ideas, actions, and judgments of oneself or others, before accepting them as valid.
C4	CE4 - Strategically plan, direct, coordinate and technically and economically manage projects in the field of ICTs and information security, applying the current normative and regulatory framework in the technical-economic-legal fields.
D3	CT3 - Incorporate criteria of sustainability and environmental commitment into professional practice. Acquire skills in the equitable, responsible and efficient use of resources.
D4	CT4 - Oral and written communication skills.
D5	CT5 - Autonomous learning and work.

Learning outcomes

Expected results from this subject	Training and Learning Results

LO1: Understand the basic concepts of systems engineering and its structure. Ability to apply them to practical examples and cases.	A6 A7 B2 C4 D5
LO2: Basic knowledge of the main processes, activities and documents of project/programme management.	A6 C4
LO3: Knowledge of the main standards and methodologies for project management, in particular PMBOK and PRINCE2. Introductory knowledge of AGILE methods and practices.	A6 C4
LO4: Basic and introductory knowledge of the most commonly used IT tools in project management.	A6 C4 D5
LO5: Theoretical and practical knowledge of the fundamentals of project planning, execution and control.	A6 A10 B4 C4 D5
LO6: Ability to undertake the planning, programming, monitoring and control of a project in the field of CIS, ICT and SEGINFO.	A7 A8 B2 B4 C4 D3 D4
LO7: Knowledge of the fundamentals of risk management and risk analysis in the framework of a project.	A6 A8 B2 C4 D5
LO8: Ability to develop actions and make decisions that allow a satisfactory response to project risks.	A7 A8 A9 B2 B5 C4 D4

Contents

Topic	
Topic 1: Systems Engineering	- Introduction - Life Cycle / Models - Validation versus Verification - Structure / Processes: specification, design, development, testing, operation - Integral Life Cycle. Case Study
Topic 2: Project Management / Programme	- Introduction - Life Cycle Project / Product - Concepts, elements and actors of project management - Key processes and activities - Projects versus Programmes - Basic financial concepts
Topic 3: Methodologies and Standards related to Project Management	- PMBOK versus PRINCE2 - AGILE practices and methodologies. Scrum
Topic 4: Project planning, monitoring and control	- Key processes of project management - Case studies and exercises
Topic 5: Project Management Tools	- Classic techniques and tools - Computer tools. Introduction to Microsoft Project - Case studies
Topic 6: Risk Management	- Introduction - Plan Risk Management - Identify Risks - Risk Analysis - Plan Risk Responses - Implement Risk Responses - Monitor Risks - Exercises and case studies

Planning

	Class hours	Hours outside the classroom	Total hours
Autonomous problem solving	0	12	12
Previous studies	0	48	48
Lecturing	8	8	16
Problem solving	2	2	4
Practices through ICT	6	0	6
Presentation	3	0	3
Seminars	2	0	2
Discussion Forum	0	4	4
Self-assessment	0	4	4
Objective questions exam	1	0	1

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Autonomous problem solving	Activity in which students analyse and solve problems and/or exercises related to the subject in an autonomous way.
Previous studies	Research, reading, documentation work and/or autonomously carrying out any other activity that the student considers necessary to enable him/her to acquire knowledge and skills related to the subject. This is usually carried out prior to the classes, laboratory practices and/or assessment tests.
Lecturing	Lecturer's presentation of the contents of the subject being studied, theoretical bases and/or guidelines for a project or exercise to be carried out by the student.
Problem solving	Activity in which problems and/or exercises related to the subject are formulated. The student must develop the appropriate and correct solutions through the exercise of routines, application of formulas or algorithms, application of transformation procedures of the available information and interpretation of the results.
Practices through ICT	Activities for applying knowledge in a given context and acquiring basic and procedural skills in relation to the subject, through the use of ICT.
Presentation	Presentation by the students, individually or in groups, of a topic related to the contents of the subject or of the results of a work, exercise, project, etc.
Seminars	Activity focused on working on a specific topic, which allows to deepen or complement the contents of the subject.
Discussion Forum	An activity carried out in a virtual environment in which a variety of current topics related to the academic and/or professional sphere are debated.

Personalized assistance

Methodologies	Description
Discussion Forum	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the teacher in forums or by e-mail. They will also be able to arrange individual tutorials with the lecturer, which will take place via videoconference.
Autonomous problem solving	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the lecturer in forums or by e-mail. They will also be able to arrange individual tutorials with the teacher, which will take place via videoconference.
Lecturing	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the teacher in forums or by e-mail. They will also be able to arrange individual tutorials with the lecturer, which will take place via videoconference. While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.
Problem solving	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the lecturer in forums or by e-mail. They will also be able to arrange individual tutorials with the teacher, which will take place via videoconference. While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.
Practices through ICT	While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.
Presentation	While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.
Seminars	While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.

Assessment

	Description	Qualification	Training and Learning Results			
Practices through ICT	Activities involving the application of knowledge in a given context and the acquisition of basic and procedural skills in relation to the subject, through the use of ICT. They make it possible to assess the student's knowledge and skills. They will be assessed by means of deliverables.	20	A6 A7	B2 B4	C4	D3 D5
Presentation	Presentation by the students, individually or in groups, of a topic related to the contents of the subject or of the results of a work, exercise, project, etc. Knowledge, skills and attitudes can be assessed by means the presentation.	30	A9 A10	B4	C4	D4 D5
Discussion Forum	An activity carried out in a virtual environment in which a variety of current topics related to the academic and/or professional sphere are debated. It assesses the skills, knowledge and, to a lesser extent, attitudes of the student. Participation will be assessed in the forums.	10	A8	B5	C4	D5
Objective questions exam	Test that assesses knowledge and includes closed questions with different answer alternatives (true or false, multiple choice, item matching, etc.).	40	A6	B2	C4	D4 D5

Other comments on the Evaluation

It will be necessary to obtain at least 50% of the grade to pass the subject. If the subject is not passed in the ordinary call, there will be a second opportunity to pass it in the extraordinary call, which will be held in distance mode on the dates established for this purpose by the Master's Academic Committee.

 The evaluation process in this second call would be carried out by means of a single written test for 100% of the grade, being necessary to obtain at least 50% of the grade to pass the subject.

Fraud or attempted fraud on the part of the student in the evaluation process (plagiarism or facilitating it to third parties) will be penalised by giving the student a failing grade (0.0) in the exam session in which it occurs.

In the case of any difference between the Galician/Spanish/English guides related to the evaluation, the Spanish guide will always prevail.

Sources of information

Basic Bibliography

Complementary Bibliography

Project Management Institute, **A Guide to the Project Management Body of Knowledge (PMBOK Guide)**, 5ª Edición, Project Management Institute, 2013

Project Management Institute, **A Guide to the Project Management Body of Knowledge (PMBOK Guide)**, 6ª Edición, Project Management Institute, 2017

Pressman, Roger, **Ingeniería del Software. Un enfoque práctico**, 10ª Edición, McGraw Hill, 2010

INCOSE Systems Engineering Handbook, **A guide for system life cycle processes and activities**, 4ª Edición, INCOSE-International Council on Systems Engineerin, 2015

Reifer, Donald J., **Software War Stories: Case Studies in Software Management**, 1ª Edición, Wiley, 2013

Buchtik, Liliana, **Secretos para dominar la gestión de riesgos en proyectos**, 1ª Edición, Buchtikglobal, 2012

Haimes, Yacov Y., **Risk modeling, assessment, and management**, 4ª Edición, Wiley, 2015

Hopkin, Paul, **Fundamentals of Risk Management: Understanding, Evaluating and Implementing Effective Risk Management**, 3ª Edición, Institute of Risk Management, 2014

Kerzner, Harold, **Project Management: A Systems Approach to Planning, Scheduling, and Controlling**, 12ª Edición, Wiley, 2017

Harris, Paul E., **Planning and Control Using Microsoft Project 2013 or 2016 and PMBOK Guide**, 5ª Edición, Eastwood Harris, 2016

Turley, Frank, **An Introduction to PRINCE2®**, Management Plaza, 2010

Highsmith, Jim, **Agile project management: creating innovative products**, 1ª Edición, Pearson Education, 2009

Sutherland, J., K. Schwaber, **The Scrum Guide: the definitive guide to Scrum**, Ken Schwaber and Jeff Sutherland, 2017

Recommendations