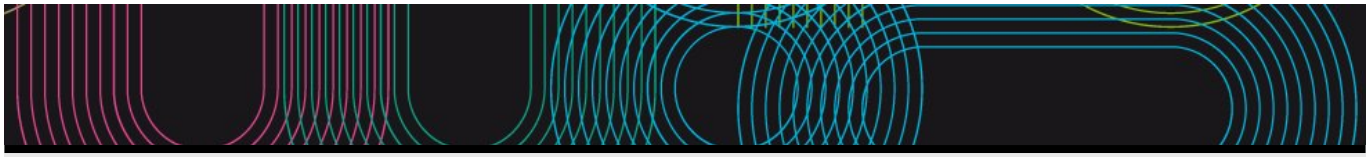

IDENTIFYING DATA				
Electronic Equipments Implementation and Exploitation				
Subject	Electronic Equipments Implementation and Exploitation			
Code	V05M145V01332			
Study programme	Telecommunication Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	5	Optional	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	Marcos Acevedo, Jorge			
Lecturers	Marcos Acevedo, Jorge Sánchez Real, Francisco Javier			
E-mail	acevedo@uvigo.es			
Web	http://faitic.uvigo.es/			
General description	This subject includes concepts related with dependability analysis of complex electronic systems as well as their models. Also includes metodologies for electronic systems design for safety applications and EMC analysis. Finally it includes asset management and human resources.			

Competencies	
Code	
B3	CG3 Ability to lead, plan and monitor multidisciplinary teams.
B7	CG7 Capacity for implementation and management of manufacturing processes of electronic and telecommunications equipment; guaranteeing safety for persons and property, the final quality of the products, and their homologation.
C30	CE30/SE3 Capacity planning, evaluation and decision-making in new environments relating to the packaging of networks, services and applications in the electromagnetic field, with knowledge of reliability and life cycle costing

Learning outcomes	
Expected results from this subject	Training and Learning Results
Ability to make an analysis of electromagnetic compatibility of an electronic system according the standards	B7
Ability to design electronic equipment that includes specifications of maintainability and availability	B7 C30
Ability to specify the stocks level required for a given equipment maintainability	B7
Ability to determine the life cycle cost of a product	C30
Capacity to implement and manage the operation of electronic equipment	B7
Ability to the assets management of an organization, related to the subject	B3
Ability to understand the impact of risks, human reliability and knowledge management, in an organization	B3

Contents	
Topic	
Item 1: Dependability analysis of electronic systems	Reliability allocation and optimization. Maintainability and availability analysis. Product life cycle.
Item 2: Modeling of electronic systems for dependability applications	Markov models and Petri Nets.
Item 3: Failure analysis	Failure modes of electronic components. Analysis of failure mechanisms and causes of the failure modes. Standards.
Item 4: Fail-safe systems	Fault-safe systems specification. Design methodologies. Validation. Practical examples.

Item 5: Production and assembly of equipment electronic	Materials and manufacturing processes. Mounting technologies. Lifetime assays. Installation cautions.
Item 6: Electromagnetic compatibility	Analysis of EMC in circuits, systems and electronic equipments. Circuits and systems in living areas. Circuits and equipment systems of information technologies. Circuits and systems in automotive systems. Applications.
Item 7: Asset Management	Asset management types. Management of physical assets: The Standard. Competence frames.
Item 8: The intellectual capital in organizations	Intangible assets: Management. Human capital. Decision making.

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	18	0	18
Laboratory practises	10	15	25
Troubleshooting and / or exercises	0	10	10
Tutored works	0	40	40
Short answer tests	2	0	2

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

Methodologies

	Description
Master Session	It will develop in the schedules fixed by the direction of the engineering school. It consist of a presentation by the teacher, of the contents of the subject. Also proceed to solving examples and/or problems that illustrate the problems to be solved adequately. The student may submit all doubts and questions deemed appropriate, during the session. We will promote the more active participation of the student possible. Competencias CG7, CG3 and CE30/SE3 are used
Laboratory practises	Students will perform practical examples of dependability analysis of electronic control systems, according to standards. The analysis will performed with specific software application. Competencies CG7 and CG3 are used
Troubleshooting and / or exercises	In this educational activity we will propose problems and/or exercises subject related. They are also used to highlight the doubts and also for feedback to teachers on this aspect. Competencias CG7, CG3 and CE30/SE3 are used
Tutored works	It consists in carrying out specific tasks that are elated to the subject and in collaboration with xternal entities, provided that this is possible. Competencias CG7, CG3 and CE30/SE3 are used

Personalized attention

Methodologies	Description
Master Session	The teacher will personally attend doubts and queries of students, on the study of theoretical, laboratory or projects. Students will have opportunity to attend individual tutorials or in groups in the teacher's office on schedule to be established for this purpose at the beginning of the course and to be published on the page of the subject.
Laboratory practises	The teacher will personally attend doubts and queries of students, on the study of theoretical, laboratory or projects. Students will have opportunity to attend individual tutorials or in groups in the teacher's office on schedule to be established for this purpose at the beginning of the course and to be published on the page of the subject.
Troubleshooting and / or exercises	The teacher will personally attend doubts and queries of students, on the study of theoretical, laboratory or projects. Students will have opportunity to attend individual tutorials or in groups in the teacher's office on schedule to be established for this purpose at the beginning of the course and to be published on the page of the subject.
Tutored works	The teacher will personally attend doubts and queries of students, on the study of theoretical, laboratory or projects. Students will have opportunity to attend individual tutorials or in groups in the teacher's office on schedule to be established for this purpose at the beginning of the course and to be published on the page of the subject.

Assessment

	Description	Qualification	Training and Learning Results

Troubleshooting and / or exercises	Deliverables, problems and exercises will be assess.	40	B3 B7	C30
Tutored works	They will evaluate the contents (methodology of development, conclusions obtained, exhibition of results and capacity of work in team) For works in team the indivual note will be the same for all members of the team	50	B3 B7	C30
Short answer tests	It will realise a proof with 10 questions of theory or exercises on the matter.	10	B3 B7	C30

Other comments on the Evaluation

The deliverables of the troubles and exercises are provide for guidance, for weeks 2, 4, 6 and 8.

Following the own guidelines of the degree and the agreements of the academic commission, offers to the students the option of continuous evaluation or do the final examination in the date established by the centre.

The students that choose continuous evaluation will have to communicate it to the professor during the first week of class. The continuous evaluation supposes:

a) The students realise the problems and exercises proposed by the professor and deliver them in time and form. Maximum assessment 4 points (40% of the final note). Will have to obtain a minimum note of 2 points. These tasks will not be recoverable later.

b) The students realise a supervised work, in group. This work will procure , whenever it was possible, that realise with a company or external institution to the University. In this case the students will go to the company when it was necessary, for the realisation of the work. Maximum assessment 5 points (50% of the final note). Will have to obtain a minimum note of 2,5 points.

c) The students realise a examf of 10 short questions. Maximum assessment 1 point (10%).

Students do not exceed any of the two minimum requirements, the rating will be the lower of the average grade of the two scores and 4.5 points.

Students working in groups will have the same grade.

The final exam assessment by the end of the semester or in the extraordinary (June-July), involves:

a) That the students perform and deliver on exam day, the exercises and problems posed in the subject, which is referred to in paragraph a) above. Maximum rating 4 points (40% of the final mark). The students must obtain a minimum of 2 points.

b)That the students to take an exam with questions and problems 2h corresponding to both the theoretical and laboratory. Maximum rating 6 points (60% of the final grade). The students must obtain a minimum of 3 points.

Students in the final examination do not exceed any of the two minimum requirements, the rating will be the lower of the average grade of the two scores and 4.5 points.

It demands an ethical behaviour by part of the students. In case of plagiarism detection in any of the works/test realised the final qualification of the matter will be "suspense (0)" and the professors will communicate to the school direction the problem so that it take the measures that consider timely.

Sources of information

Basic Bibliography

David J. Smith, **Reliability, Maintainability and Risk**, 8ª, Butterworth Heinemann, 2011

López Veraguas, Joan Pere, **Compatibilidad electromagnética y seguridad funcional en sistemas electrónicos**, Marcombo, 2010

I. Fernández, A. Camacho, C. Gasco, A.M. Macías, M.A. Martín, G. Reyes, J. Rivas, **Seguridad Funcional en Instalaciones de Proceso: Sistemas Instrumentados de Seguridad y Análisis SIL**, ISA, 2012

M. Goble, H. Cheddie, **Safety Instrumented Systems Verification**, ISA, 2005

M. Goble, **Control Systems Safety Evaluation and Reliability**, 3ª, ISA, 2010

Complementary Bibliography

T.I. Bajenescu, M.I. Bâzu, **Reliability of Electronic Components**, Springer-Verlag, 1999

P. Kales, **Reliability**, Prentice-Hall, 1998

B. R. Mehta Y. J. Reddy, **Industrial Process Automation Systems Design and Implementation**, Elsevier, 2015

ISO, **UNE-ISO 55000:2015: Gestión de activos. Aspectos generales, principios y terminología**, AENOR, 2015

Recommendations

Subjects that are recommended to be taken simultaneously

Signal Conditioners/V05M145V01331
Photovoltaic Power Electronics/V05M145V01330

Subjects that it is recommended to have taken before

Digital and Analog Mixed Circuits/V05M145V01213
Hardware/Software Design of Embedded Systems/V05M145V01214
Integrated Circuits Design and Manufacturing/V05M145V01215