Universida_{de}Vigo

IDENTIFYING DATA

Telecommunication Engineering in the Information Society

Subject	Telecommunication Engineering in the Information Society
Code	V05M145V01101
Study programme	Telecommunication Engineering

Descriptors	ECTS Credits	Choose	Year	Quadmester
	5	Mandatory	1st	1st

Teaching language	Spanish Galician
Department	
Coordinator	Fernández Iglesias, Manuel José
Lecturers	Caeiro Rodríguez, Manuel Cuiñas Gómez, Íñigo Fernández Iglesias, Manuel José Mariño Espiñeira, Perfecto
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General description	This subject looks for motivating the students to practical usage of the most technical concepts of Telecommunication Engineering for solving problems and offer services to the society in which they live: it pretends that they realise that the activity of the engineer is not an isolated fact but it transforms the World (at small and at large scale). This leads to two fundamental ideas: 1) Society, people that conform it, have problems that can be resolved by the engineers: the function of the Engineering is to resolve or mitigate problems of the society in which it frames, not to create them. Knowing how it has resolved situations in the past can help to face problems in the future (this leads to history oriented to future action, no to the contemplation of the past). 2) Engineering activities have direct influence in the own society, in how people live or in how they relate. In fact, the large changes of the last decades have been based directly on contributions of the field of the Engineering of Telecommunication. This influence has to go accompanied of being aware of the ethical responsibility.

Competencies

Code	
A3	CB3 Students must integrate knowledge and handle complexity of formulating judgments based on information that was incomplete or limited, including reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.
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.
B9	CG9 Ability to understand the responsibility and professional ethics in the activity of the profession of Telecommunications Engineering.
B13	CG13 Knowledge, understanding and ability to implement the necessary legislation in the exercise of the profession of Telecommunication Engineering.
C15	CE15/GT1 Ability to integrate technologies and systems of Telecommunication Engineering, with general character, and at broader and multidisciplinary contexts such as bioengineering, photovoltaic conversion, nanotechnology, telemedicine.
D3	CT3 Understanding Engineering in a framework for sustainable development.
D4	CT4 Awareness of the need for training and continuous quality improvement, developing values of the dynamics of scientific thought, showing a flexible, open and ethical attitude in front of different opinions or situations, particularly on non-discrimination based on sex, race or religion, respect for fundamental rights, accessibility, etc.

Learning outcomes

Expected results from this subject	Training and Learning Results

Knowledge of what the profession of Telecommunicationis Engineering is and what represents.	B7 B13 D4
Being aware of the social responsibility, ethical and environmental of Telecommunication Engineering.	A3 B9 D3 D4
Contact with other disciplines in which the technologies of Telecommunication integrate for the development of the society (i.e. bioengineering, solar energy, nanotechnologies, tele-medicine, teleasistance, teleeducation).	C15

Contents

Topic	
Seminar on the Engineering in the Society	1. Professional activity and ethic implications. Description of the professional activity of Engineers (preferably with the collaboration of alumni from the School), the ethic implications of their works, and other aspects of professional development. The students interact with speakers. 2. Social implication, by means of Design Thinking. We look for getting familiar with a methodology that moves future engineers to look towards society and try to find solutions or solve problems that directly affect to actual users. Related competencies: CE15, CT4, CB3 and CG9
Professional attributions and their history	Historically, there are eight professional attributions assigned to Telecommunication Engineering within Spanish regulations. Along this item, we will focus on the historical development of systems or applications related with them, as well as on the National and European legislation that applies: * Television * Wire communications (including the small local history: Vigo was the base of German and British cableships) * Radioelectric spectrum (description and management, taking into account National and International legislation) * Internet and its influence in Society * Mobile telephony (including effects on health) * Experts official reports. Related competencies: CG13 and CT3
In a multidisciplinary society	The proposal for the work in groups C is centered in the resolution of problems or situations of the society in which we live, no strictly related with the Telecommunication Engineering, so that the students comprise its implication in multiple fields of the society and how they can influence in giving solutions based on their competencies and engineering skills. Related competencies: CG7, CE15, CT3 and CT4

Planning

	Class hours	Hours outside the classroom	Total hours
Seminars	14	15	29
Project based learning	5	70	75
Lecturing	9	10	19
Essay questions exam	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

Seminars	Teaching in seminar format, in which the student participates very actively in the evolution of the classes deepening in a specific subject, expanding it and relating it with contents oriented to the professional practice; including the participation in scientific and/or informative events , organised or not in the own School; the organisation of debates that allow sharing ideas and proposals, guided by lecturers; and the study of cases/analysis of situations (analysis of a problem or real case, with the purpose to knowing it, interpreting it, resolving it, generating hypothesis, diagnosing it and going deep in alternative procedures of solution, to see the application of the theoretical concepts in the real World). These activities can have related a load of autonomous work of the student. The subject "Seminar on Engineering and Society", and related debates, are taught following this methodology. Competencies worked: with this methodology we work the competencies CB3, CG7, CG9, CG13 and CT4
Project based learning	Realisation of works for the resolution of a case or a specific project, as well as the presentation of the results by writing and/or by means of a presentation that may follow different formats: oral, poster, multimedia. They include the integrated Methodologies: problem-based learning, resolution of design problems proposed by lecturers, and project-based learning (PBL) education. Teams of students will be defined, according to the outcomes of a personality test that the students make in the first session. The aim is to attain heterogeneous groups selected externally, as in a real company. The projects in which groups will work are related among them and are focused in a specific field of study familiar tot he students. For this academic course, we are in conversations with AENA so that the study environment could be the Airport of Vigo. The students, in groups, work towards providing a solution to a clear-cut problem according to the Design Thinking methodology, identifying situations of the daily life that a priori may not relate to the Telecommunication. Design Thinking develops through the following phases: discover, interpret, ideate, experience and evolve. The solution achieved will have to consider no only technical questions, but also legal, environmental, social and related with sustainability. By applying the Design Thinking methodology, a specific challenge will be dentified within the field of study, and all the information available relagted to that challenge will be gathered. The students will pose imaginative solutions and will treat to build a proposal that is reasonable, although it may not be still implementable given the current technological development. The aim is not to manufacture or program a solution, but to look for a proposal that is feasible, now or in the future when technology is more developed, and that it is acceptable socially. The groups will begin for locating all relevant information. From that information, they will try to identify the people involved and will try of empathice with them, to identify the actual problem that they feel. From the problem identified, groups will try to produce technological or procedural solutions. They will have to look for technical and scientific information and, finally, elaborate a prototype, a report and a presentation. The result of this activity may be documented through an online service, forum or wiki. Also it will produce a final document and a presentation and/or video that was used in the defence of the work developed in front of the class. Both results will according to the criteria collected in evaluation rubricsm which will be presented to the students at the beginning of the course and will be available at the University's e-learning platform. The interaction with lecturers will be carried out in five 1-hour sessions, and through forums during the research of information, and by email for the exchange of ideas. The groups will have to send to the lecturer in charge the "point of view" before the third session, and three ideas to resolve the challenge before the fourth session. The subject "In a Multidisciplinary Society" corresponds with this educational methodology. Competences worked: CB3, CE15/*GT1, CG9 and CT4.
Lecturing	Explanation of the contents of the subject; it includes explanation of concepts; introduction of practices and exercises; and resolution of problems and/or exercises. The subject "Professional attributions and its history" fits with this methodology. Competencies worked: with this methodology work the competencies CG7, CG9 and CT3

Personalized assistance

Methodologies	Description

Lecturing	Time that group-A lecturers use to meet their students and to solve his/her doubts		
Seminars	Time that group-A lecturers use to meet their students and to solve his/her doubts		
Project based learning	Time that group-C lecturers use to help their students during their projects development, added to the schedulled meetings		
Tests	**Description**		
Essay questions exam	Time that lecturers use to help the students to understand the contents of assessment exercises and to review with them, individually, those exercises once corrected.		

Assessment

	Description	Qualification	Training and Learning Results		
Seminars	Short answer tests: In the seminars we will value the participation in the debates (with the speakers of the seminar Engineering in the Society). It will be able to support the evaluation in proofs of short answer. With these short answer tests and the observations we will evaluate the competencies CB3, CG7, CG9, CG13 and CT4	20	A3 B7 B9 B13		D4
Project based learning	Practical proofs: The realisation of the works in groups will be evaluated in two parts: the own dynamics of the works and the presentations. 25% of the mark is related to the own work; given by the lecturer that directs the work and by the group of lecturers of the matter. Related to the presentation, the mark will represent another 25%, given by his/her mates (evaluation by pairs) according to a rubric that will be approved before the beginning of the works. The mark will be the same for all the group members. With these works we will evaluate the competencies CB3, CE15/GT1, CG9 and CT4	50	A3 B9	C15	D4
Lecturing	Long answer tests: there will be 2 proofs, of 30 minutes length, that will liberate contents of the previous subjects. In these long proofs we will evaluate the competencies CG7, CG9 and CT3	30	B7 B9		D3
Essay questions exam	The single evaluation exam, in case it would be needed, will consist of questions of development, in which the student will have to show the purchased knowledge, initiative to propose solutions to problems no necessarily of telecommunication, and he/she will also have to expose his opinion on conflicts of professional ethics, showing his capacity to provide opinions on situations that involve to the society.	0	A3 B7 B9 B13	C15	D3 D4

Other comments on the Evaluation

Thestudents can chose any of the following assessment systems:

1.- The **continuous evaluation** tests allow students to obtain a final grade based solely on their path along the course, and consist of:

1.1. Two long-answer tests, with 15% of the total grade each, totaling 30%.

1.2. Short-answer tests in the seminars, which account for 20%.

1.3. Practical proofs for the evaluation of supervised work (25%) and the presentation of them (25%).

Continuous assessment tasks are not recoverable, and they are only valid for the current year.

A student is assumed to have opted for continuous assessment when he/she has been made one of the long-answer tests and has participated in two debate activities. A student who chooses to continuous assessment is deemed to have been presented to the subject, whether they are present or not to the final exam.

If a student, having submitted to continuous assessment, chooses the final exam, the final grade for the

course will be the average of the two.

2.- **Single evaluation exam**. Under the regulations of the University of Vigo, the student who wishes may choose 100% of the final grade by a single final exam. The single evaluation exam is one that is done in the official dates marked on School Board in the months of December or January in first call (or July in the case of second call), and it is mandatory to attend to those students who have not opted for continuous assessment and want to pass the subject.

The final exam will consist of a development test, as described in the evaluation section. All material given in the lectures, lab classes and project presentations is subject to questioning.

The second call exam will have a similar structure to the final exam.

Ethical code

Final exams and quizzes must be worked out on everyone□s own. Any infraction will beconsidered a serious breach of ethics and reported to the academic authorities.

Lecturers may decide to fail a student if he has committed a serious ethical breach.

Sources of information
Basic Bibliography
O. Pérez Sanjuán, **De las señales de humo a la Sociedad del Conocimiento**, http://bit.ly/2Rxf9cI, COIT-AEIT,
VV.AA., **Design Thinking Innovation and Research**, https://desire.webs.uvigo.gal, Universidade de Vigo,
VV.AA., **Design Thinking for Educators**, www.designthinkingforeducators.com/toolkit/,
Complementary Bibliography
C. Rico, **Crónicas y testimonios de las Telecomunicaciones españolas**, http://bit.ly/31V3NnF, COIT-AEIT,
O. Pérez Sanjuán, **Detrás de la Cámara. Historia de la televisión y de sus cincuenta años en España**, http://bit.ly/2X0iyBA, COIT-AEIT,
J. Cabanelas, **Vía Vigo: el Cable Inglés □ el Cable Alemán**, Instituto de Estudios Vigueses,

Recommendations
Subjects that continue the syllabus
Telecommunication Projects Management/V05M145V01201

Contingency plan

Description

In the event that teaching is carried out exclusively online, lectures will be delivered through Campus Remoto, and FaiTIC will serve as a supporting platform to guarantee the accessibility to teaching materials to all students. In case of online tuition, the course planning will be as follows:

A Sessions (Classroom lectures)

Lectures on the topic "Professional powers and their history" will delivered through Campus Remoto. Additionally, the associated presentations will be published in FaiTIC, duly recorded, so that the students can access the explanations of each topic at the most appropriate time, beyond the synchronous sessions.

The conferences of seminar "Engineering in society" will be delivered by videoconference through Campus Remoto. These videoconferences will be recorded and will be made available to the students, in accordance with the precepts of data protection regulations. The speakers will also be asked to provide any material in digital format that they consider appropriate to complement their talks. This material will also be made available to students at FaiTIC.

The means enabled for the resolution of the doubts raised by the students will include: (i) online consultation forums in FaiTIC to give greater visibility to the answers of the teaching staff in relation to the questions asked by each student, and (ii) mentoring sessions in lecturers□ virtual offices at Campus Remoto, making an appointment in advance.

C Sessions (Lab sessions)

The scheduled meetings will be held by videoconference through Campus Remoto. Questions related to the practical part

will be addressed through online consultation forums and virtual mentoring sessions.

Evaluation

Online assessment will be carried out according to the same provisions as face-to-face assessment, as described in the teaching guide, including the same number of tests with the same weight. Assessment will be organized as follows:

Classroom lectures: Continuous assessment exams and the final exam will be carried out virtually on the scheduled dates using the tools provided by the University.

Lab Sessions: each lab group must deliver a final project report. The content of this report and its organization will be announced at the beginning of the course, as well as the delivery deadline, in case virtual tuition modality is activate