



## 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	Cuiñas Gómez, Íñigo			
Lecturers	Caeiro Rodríguez, Manuel Cuiñas Gómez, Íñigo Fernández Iglesias, Manuel José Mariño Espiñeira, Perfecto			
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Web	<a href="http://fatic.uvigo.es">http://fatic.uvigo.es</a>			
General description	<p>This subject looks for proposing 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 take consciousness 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:</p> <p>1) The 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 (history oriented to future action, no to the contemplation of the past).</p> <p>2) The engineering activities have direct influence in the own society, in how people live or in how they relate. In fact, the big changes of the last decades have been starred directly by contributions of the field of the Engineering of Telecommunication. This influence has to go accompanied of taking of consciousness of the ethical responsibility.</p>			

## 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
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Knowledge of what the profession of Telecommunicationis Engineering is and what represents.	B7 B13 D4
Taking of consciousness 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: bioengineering, solar energy, nanotechnologies, tele-medicine, teleasistance, teleeducation.	C15

## Contents

Topic	
Seminar on the Engineering in the Society	<p>1. Professional activity and ethic implications. Description of the professional activity of Engineers (to be possible former students at the School), the thic implications of their works, and other aspects of professional development (EuroPass, professional association, activity ambits). The students interact with speakers.</p> <p>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.</p> <p>Related competencies: CE15, CT4, CB3 and CG9</p>
Professional attributions and their history	<p>Historically, there are eight historical professional attributions assigned to Telecommunication Engineering. Along this item, we will center on the historical development of systems or applications related with tem, as well as on the National and European legislation that applies:</p> <ul style="list-style-type: none"> <li>* Television</li> <li>* Wire communications (including the small local history: Vigo was the base of German and British cables)</li> <li>* Radioelectric spectrum (description and management, taking into account National and International legislation)</li> <li>* Internet and its influence in Society</li> <li>* Mobile telephony (including effects on health)</li> <li>* Experts official reports.</li> </ul> <p>Related competencies: CG13 and CT3</p>
In a multidisciplinary society	<p>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 his implication in multiple fields of the society and how can influence in her with solutions posed from his competencies and engineering skills.</p> <p>Related competencies: CG7, CE15, CT3 and CT4</p>

## Planning

	Class hours	Hours outside the classroom	Total hours
Seminars	14	15	29
Projects	5	70	75
Master Session	9	10	19
Long answer tests and development	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
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**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 events and/or informative, organised or no in the own School; the organisation of debates that allow sharing ideas and proposals, guided by lecturers, both face-to-face or on-line; and the study of cases/analysis of situations (analysis of a problem or real case, with the purpose to know it, interpret it, resolve it, generate hypothesis, diagnose it and going deep in alternative procedures of solution, to see the application of the theoretical concepts in the reality). 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

**Projects** Realisation of works, individual or in group, for the resolution of a case or a concrete project, as well as the presentation of the results by writing and/or by means of a presentation that can follow different formats: oral, poster, multimedia. They include the integrated Methodologies: learning based in problems (LBP), resolution of problems of design proposed by the professor, and education based in projects of learning (PBL).

Teachers will create groups, using as selection criteria the results of a personality test done by the students at first session. The objective is to obtain heterogeneous groups, and externally selected, as at an actual company.

The student, in group, prepares a work providing a solution to a clear-cut problem according to the methodology Design Thinking, identifying situations of the daily life that a priori do not relate with the Telecommunication. Design Thinking methodology develops with the following steps: finding, interpreting, thinking, experimenting, and evolving.  
The solution has to take into account both technical and legal, environmental, social and sustainability aspects.

Following Design Thinking methodology, an area of actuation will be identified and the first step will be searching for news on a subject proposed by each group (for example location of missing aeroplanes in the sea, integration vs. exclusion of communities in risk of vulnerability -elderly, third world, rural-, etc.). Students will pose imaginative solutions and will treat to find a proposal that would be reasonable, although it can not being still implementable given the current technological development.  
The final objective is not to build or program a solution, but it is to look for a proposal that is valid, today or in the future, and would be socially acceptable.

The groups will begin for locating real news related. From them, they will treat to identify people implied in similar situations and they will try to empathy with them, in order to explain the problem they feel (and not the problem that we seem to identify from outside). From this explained problem groups will ideate technological or procedural solutions . They will have to look for technical and scientific information on these and, finally, elaborate a prototype, a report and a presentation. The result of this activity could be documented through a service on line type forum or wiki. Also, a document of presentation or video will produce to be used in the final presentation of the work developed to the class. Both results will be evaluated based on previously known rubrics. The interaction with the lecturers will be face-to-face with five meetings of one hour, and through forums during the research of information, and by email for the exchange of ideas.

The subject "At a Multidisciplinary Society" fits with this methodology.

Competencies worked: with this methodology work the competencies CB3, CE15/GT1, CG9 and CT4

**Master Session** Explanation of the contents of the subject; it includes explanation of concepts; introduction of practices and exercises; and resolution of problems and/or exercises in ordinary classroom.

The subject "Professional attributions and its history" fits with this methodology.

Competencies worked: with this methodology work the competencies CG7, CG9 and CT3

### Personalized attention

Methodologies	Description
Master Session	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

Projects	Time that group-C lecturers use to help their students during their projects development, added to the scheduled meetings
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Tests	Description
Long answer tests and development	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
Projects	Practical proofs: The realisation of the works in groups will be evaluated in two parts: the own dynamics of the works and the presentations. The student will receive 25% of the note by the own work; evaluated to 50% by the lecturer that directs the work and by the group of professors of the matter. Related to the presentation, the student will receive another 25%, evaluated by his/her mates (evaluation by pairs) according to a rubric that will be approved before the beginning of the works.  With these works we will evaluate the competencies CB3, CE15/GT1, CG9 and CT4	50	A3 B9	C15 D4
Master Session	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
Long answer tests and development	The final examination, in case it would be needed, will consist of questions of 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

The students can choose any of the following assessment systems:

1.- The **continuous assessment** 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.- **Final 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 final exam is one that is done in the official dates marked on School Board in the months of December or January (or July in the case of special consideration), and who are obliged to attend 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 resit 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 be considered 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.

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### **Sources of information**

#### **Basic Bibliography**

O. Pérez Sanjuán, **De las señales de humo a la Sociedad del Conocimiento**, COIT-AEIT, VV.AA., **Design Thinking for Educators**, [www.designthinkingforeducators.com/toolkit/](http://www.designthinkingforeducators.com/toolkit/),

#### **Complementary Bibliography**

C. Rico, **Crónicas y testimonios de las Telecomunicaciones españolas**, COIT-AEIT,

O. Pérez Sanjuán, **Detrás de la cámara**, COIT-AEIT,

J. Cabanelas, **Vía Vigo: el Cable Inglés y el Cable Alemán**, Instituto de Estudios Vigueses,

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### **Recommendations**

#### **Subjects that continue the syllabus**

Telecommunication Projects Management/V05M145V01201