Last update: 06-05-2019

230700 - RES1 - Introduction to Research 1

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering

Teaching unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering

Academic year: 2019

Degree: MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Teaching unit Optional)
MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Teaching unit Optional)

ECTS credits: 5 Teaching languages: English

Teaching staff

Coordinator: Cap d'estudis de màsters / Jefe de estudios de másteres / Head of master studies

Others: Responsables de grups de recerca / Responsables de grupos de investigación / Heads of research groups

Requirements

The procedure for enrolling this course is as follows:

1- The ETSETB will publish the places of research projects that research groups from universities, research institutes and companies offer. There will be a description of the project, the tasks to be performed and the name of research tutor.

2- The student will contact the research tutor and, if they reach an agreement to do the project, the two of them will make a project proposal with a work plan dimensioned for 5, 10 or 15 ECTS.

3- This project proposal will be submitted by the student to the head of master studies and then the student will be allowed to enrol the number of subjects of introduction to research for which the project is dimensioned.

Degree competences to which the subject contributes

Specific:

CE1. Ability to apply information theory methods, adaptive modulation and channel coding, as well as advanced techniques of digital signal processing to communication and audiovisual systems.

CE2. Ability to develop radio-communication systems: antennas design, equipment and subsystems, channel modeling, link dimensioning and planning.

CE3. Ability to implement wired/wireless systems, in both fix and mobile communication environments.

CE4. Ability to design and dimension transport, broadcast and distribution networks for multimedia signals

CE5. Ability to design radio-navigation and location systems, as well as radar systems.

CE6. Ability to model, design, implement, manage, operate, administrate and maintain networks, services and contents

CE7. Ability to plan networks and decision-making about services and applications taking into account: quality of service, operational and direct costs, implementation plan, supervision, security processes, scalability and maintenance. Ability to manage and assure the quality during the development process

CE8. Ability to understand and to know how to apply the functioning and organization of the Internet, new generation Internet technologies and protocols, component models, middleware and services

CE9. Ability to deal with the convergence, interoperability and design of heterogeneous networks with local, access and core networks, as well as with service integration (telephony, data, television and interactive services).

CE10. Ability to design and manufacture integrated circuits

230700 - RES1 - Introduction to Research 1

CE11. Knowledge of hardware description languages for high-complex circuits.

CE12. Ability to use programmable logical devices, as well as to design analog and digital advanced electronics systems. Ability to design communication devices, such as routers, switches, hubs, transmitters and receivers in different bands.
CE13. Ability to apply advanced knowledge in photonics, optoelectronics and high-frequency electronic

CE14. Ability to develop electronic instrumentation, as well as transducers, actuators and sensors.

CE15. Ability to integrate Telecommunication Engineering technologies and systems, as a generalist, and in broader and multidisciplinary contexts, such as bioengineering, photovoltaic conversion, nanotechnology and telemedicine.
CE16. Ability to develop, direct, coordinate, and technical and financial management of projects in the field of: telecommunication systems, networks, infrastructures and services, including the supervision and coordination of other's subprojects; common telecommunications infrastructures in buildings or residential areas, including digital home projects; telecommunication infrastructures in transport and environment; with corresponding energy supply facilities and assessment of electromagnetic emissions and electromagnetic compatibility.

Transversal:

CT1a. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding how companies are organised and the principles that govern their activity, and being able to understand employment regulations and the relationships between planning, industrial and commercial strategies, quality and profit.
CT2. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.
CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Teaching methodology

The aim of this course is to introduce the student to the research methodology, making stays in research groups located at universities, research centres or companies.

The subjects introduction to research 1, introduction to research 2 and introduction to research 3 may be enrolled in the same semester or in different ones, and the student may enrol one, two or three, depending on the load and temporal distribution of the research project.

Each subject represents between 125 and 150 hours of academic load, which distributed between the number of weeks of a semester, it means an approximate dedication of 10 hours/week.

Learning objectives of the subject

The learning results of this subject are:
- Ability to conduct research into new techniques, methodologies, architectures, services or systems in the area of telecommunications engineering.
- Ability to analyse the state of the art on a particular research topic.
- Ability to form hypotheses, propose models and perform experimental validations.
- Ability to plan, organize, develop and present a research topic.

Last update: 06-05-2019

230700 - RES1 - Introduction to Research 1

- Ability to adequately disseminate the results of an investigation.

Study load

Total learning time: 125h	Hours small group:	39h	31.20%
	Self study:	86h	68.80%

Content

Project development	Learning time: 125h Guided activities: 125h

Description:
It depends on the contents of the chosen project.

Qualification system

Evaluation Method:

- The student will have a research tutor pertaining to the research group that hosts him. If the tutor is not a professor of the UPC, another who is will be assigned.
- By the last day of the examination period, the student will deliver a final report using a research paper format of no more than 6 pages in length. In case that the report is submitted to a conference or to a journal, the student can deliver this paper even if exceeds 6 pages in length.
- If the tutor is not a UPC professor, this tutor will fill a student activity report that will be considered by the UPC professor.
- The tutor who is a UPC professor will propose a grade for the student in the subject, taking into consideration the activity report of the tutor not professor of UPC if there is one.
- If the student enrolls several introduction to research subjects in the same semester, the assessment can be combined, with a single final report and a single student activity report. In this case, the grade will be the same for all introduction to research subjects enrolled in the same semester.

Bibliography