Last update: 06-05-2019

230703 - AMPLAB - Laboratory of Antennas, Microwaves and Photonics for Communications Systems

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

Teaching unit: 739 - TSC - Department of Signal Theory and Communications

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: Mallorqui Franquet, Jordi Joan

Others: Aguasca Sole, Alberto
Blanch Boris, Sebastian
Broquetas Ibars, Antoni
Comeron Tejero, Adolfo
Dios Otin, Victor Federico
Mallorqui Franquet, Jordi Joan
O'Callaghan Castella, Juan Manuel
Pradell Cara, Lluis
Santos Blanco, María Concepción
Romeu Robert, Jordi

Prior skills

Previous knowledge of Antennas, Microwaves and Optics.

Degree competences to which the subject contributes

Specific:

CE2. Ability to develop radio-communication systems: antennas design, equipment and subsystems, channel modeling, link dimensioning and planning.
CE11. Knowledge of hardware description languages for high-complex circuits.

CE13. Ability to apply advanced knowledge in photonics, optoelectronics and high-frequency electronic

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

Transversal:

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.
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.

Last update: 06-05-2019

230703 - AMPLAB - Laboratory of Antennas, Microwaves and Photonics for Communications Systems

Teaching methodology

Being a laboratory course there are not formal lectures and learning is acquired through practice. Initially the assignments are guided and at the end more freedom of action are allowed to the students.

Learning objectives of the subject

The student will learn how to design, characterize and measure the different devices that constitute a system that uses antennae, microwave circuits and optical devices. From these knowledge, the student would face the integration of the different elements conforming the system as well as its characterization, validation and practical application.

Study load

Total learning time: 125h	Hours large group:	0h	0.00%
	Hours medium group:	0h	0.00%
	Hours small group:	39h	31.20%
	Guided activities:	0h	0.00%
	Self study:	86h	68.80%

Last update: 06-05-2019

230703 - AMPLAB - Laboratory of Antennas, Microwaves and Photonics for Communications Systems

Content

Microwave Circuitry Dessing and Simulation (I)

Learning time: 3h
Guided activities: 3h

Description:
Design and simulation of passive circuits (mixers and filters) with ADS and Momentum linked with the systems to implement at the end of the course.

Microwave Circuitry Desing and Simulation (II)

Learning time: 3h
Guided activities: 3h

Description:
Design and simulation of passive circuits (mixers and filters) with ADS and Momentum linked with the systems to implement at the end of the course.

Antenna Design and Simulation

Learning time: 3h
Guided activities: 3h

Description:
Design and simulation of antennas linked with the systems to implement at the end of the course.

Antenna Measurement

Learning time: 3h
Guided activities: 3h

Description:
Measurement antenna techniques. First the students will use the anechoic chamber located at building D3 to charcaterize and antenna. The data will be later processed using the transformation near to far-field in order to determine its radiation pattern and gain.

Advanced use of Vector Network Analyzers (VNA)

Learning time: 3h
Guided activities: 3h

Description:
Advanced measurement techniques with VNA.

230703 - AMPLAB - Laboratory of Antennas, Microwaves and Photonics for Communications Systems

Advanced use of Spectrum Analyzers (SA)	Learning time: 3h Guided activities: 3h

Description:
Advanced measurement techniques with Spectrum Analyzers (SA).

Advanced use of Optical Spectrum Analyzers (OSA)	Learning time: 3h Theory classes: 3h

Description:
.

Systems implementation	Learning time: 12h Theory classes: 12h

Description:
Building, assembling, testing and validation of systems.
The different groups would select one system among this list: radar systems and processing, radio over fiber, phase arrays with optical shifters, optical telemeter and distributed antenna systems.
Due to the obvious time constrains most of the devices will be comercial or already mounted. Only few of them will be mounted by the students. Most of the work will concéntrate on the modules integration and system testing and performance evaluation.

Final report presentations	Learning time: 3h Laboratory classes: 3h

Description:
Presentation of the final report with the system implementes by each group of students.

Photonics Systems Design	Learning time: 3h Guided activities: 3h

Description:
.

Last update: 06-05-2019

230703 - AMPLAB - Laboratory of Antennas, Microwaves and Photonics for Communications Systems

Bibliography