Course guide
230053 - ANTENES - Antennas

Last modified: 14/06/2024

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications.

Degree: BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: SEBASTIAN BLANCH BORIS - JUAN-MANUEL RIUS CASALS

Others: Primer quadrimestre:
SEBASTIAN BLANCH BORIS - 41
JUAN-MANUEL RIUS CASALS - 41

Segon quadrimestre:
JUAN-MANUEL RIUS CASALS - 11

PRIOR SKILLS

Electromagnetic Waves and Transmission Lines knowledge

REQUIREMENTS

ELECTROMAGNETICS WAVES - Precorequisite
RADIATION AND PROPAGATION - Precorequisite

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Generical:
12 CPE N3. They will be able to identify, formulate and solve engineering problems in the ICC field and will know how to develop a method for analysing and solving problems that is systematic, critical and creative.

TEACHING METHODOLOGY

Application classes
Lecture classes
Laboratory classes
Group work (non-classroom)
Individual work (non classroom)
Other activities
Long answer tests (midterm exam)
Long answer tests (final exam)
Laboratory practices

LEARNING OBJECTIVES OF THE SUBJECT

Analyse radiating structures by obtaining the parameters that characterise them, establishing the paradigms of their operation.

Learning outcome:

Knows how to select antennas, equipment and systems for transmission, propagation of unguided radio frequency electromagnetic waves.

Analyses components and their specifications for unguided communication systems.

STUDY LOAD

Type	Hours	Percentage
Hours large group	52,0	34.67
Hours small group	13,0	8.67
Self study	85,0	56.67

Total learning time: 150 h

CONTENTS

(ENG) Tema 0. Course presentation

Description:
Course introduction

Full-or-part-time: 1h
Theory classes: 1h

(ENG) Tema 1. Radiation fundamentals.

Description:
Introduction. Maxwell equations. General expressions of the fields. Approaches to large distances. The vector of radiation. Fresnel and Fraunhofer zones.

Full-or-part-time: 15h 20m
Theory classes: 5h
Laboratory classes: 2h
Self study : 8h 20m

(ENG) Tema 2.Analysis of basic antennas.

Description:
Introduction. Elementary antennas (dipoles and loops). Cylindrical antennas. Monopoles. Reciprocity theorem and applications. Selfimpedance and mutual impedance. Baluns.

Full-or-part-time: 49h
Theory classes: 18h
Laboratory classes: 1h
Self study : 30h

(ENG) Tema 3. Antenna arrays.

Description:
Introducction. Array factor. Array analysis. Planar arrays. Array synthesis.

Full-or-part-time: 40h 20m
Theory classes: 14h
Laboratory classes: 3h
Self study : 23h 20m

(ENG) Tema 4. Aperture antennas

Description:
Introduction. Equivalence theorem. Planar apertures. Horns. Slots. Parabolic reflectors.

Full-or-part-time: 39h 20m
Theory classes: 14h
Laboratory classes: 2h
Self study : 23h 20m

ACTIVITIES

(ENG) Pràctica de laboratori

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(ENG) Pràctica de laboratori

GRADING SYSTEM

The evaluation is done using a midterm exam with a 30% weight, 10% of practices and a final exam with a 60% weight

This course will assess generic skills:
- Ability to identify, formulate and solve engineering problems (Middle Level)
- Knowledge of and experimentation? Instruments and tools (Middle Level)The evaluation is done using two controls with a 15% weight each, 10% of practices and a final exam with a 60% weight

This course will assess generic skills:
- Ability to identify, formulate and solve engineering problems (Middle Level)
- Knowledge of and experimentation instruments and tools (Middle Level)

BIBLIOGRAPHY

Basic:
- Cardama, Á. [et al.]. Antenas [on line]. 2a ed. Barcelona: Edicions UPC, 2002 [Consultation: 09/02/2015]. Available on: http://hdl.handle.net/2099.3/36797. ISBN 8483016257.