Course guides
230090 - ONELE - Electromagnetics Waves

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). (Compulsory subject).

Academic year: 2020 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Michaël Sicard
Others: Federico Dios, David Artigas, Adolfo Comeron

REQUIREMENTS

It is advisable to have studied: Fundamentals of Physics, Mathematics of telecommunication, Vector Calculation and Electromagnetism

DEGREE COMPETENCES TO WHICH THE SUBJECT CONtributes

General:
12 CPE N2. 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

Most of lessons will be given on the blackboard, and others with multimedia material.

LEARNING OBJECTIVES OF THE SUBJECT

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STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>52,0</td>
<td>34.67</td>
</tr>
<tr>
<td>Self study</td>
<td>85,0</td>
<td>56.67</td>
</tr>
<tr>
<td>Hours small group</td>
<td>13,0</td>
<td>8.67</td>
</tr>
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Total learning time: 150 h
# CONTENTS

## 1. Electromagnetics waves in free space

**Description:**
Wave equation. Plane and spherical waves. Waves in sinusoidal steady state.

**Related activities:**
Laboratory, P1

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

## 2. Wave polarization

**Description:**
Polarization types. Devices used to control and measure polarization.

**Related activities:**
Laboratory, P2

**Full-or-part-time:** 6h  
**Theory classes:** 6h

## 3. Incidence of plane waves

**Description:**

**Related activities:**
Laboratory, P3 and P4

**Full-or-part-time:** 12h  
**Theory classes:** 12h

## 4. Waveguides. Types and characteristics. Transmission lines

**Description:**

**Related activities:**
Laboratory, P5

**Full-or-part-time:** 16h  
**Theory classes:** 16h
5. Foundations of radiation

Description:
Wave equation with charge and current densities. Electric potential and magnetic vector A. Radiating dipoles. Arrays of dipoles.

Full-or-part-time: 12h
Theory classes: 12h

GRADING SYSTEM

Partial exam: 30%
Laboratory and work summaries: 10%
Final exam: 60%

BIBLIOGRAPHY

Basic: