

## 30374 - Radiation and propaging

### Syllabus Information

**Academic Year:** 2020/21

**Subject:** 30374 - Radiation and propaging

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 581 - Bachelor's Degree in Telecommunications Technology and Services Engineering

**ECTS:** 6.0

**Year:** 3

**Semester:** First semester

**Subject Type:** Compulsory

**Module:** ---

### 1.General information

#### 1.1.Aims of the course

#### 1.2.Context and importance of this course in the degree

#### 1.3.Recommendations to take this course

### 2.Learning goals

#### 2.1.Competences

#### 2.2.Learning goals

#### 2.3.Importance of learning goals

### 3.Assessment (1st and 2nd call)

#### 3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

### 4.Methodology, learning tasks, syllabus and resources

#### 4.1.Methodological overview

Methodology:

1. Lectures (40 hours) laying the theoretical foundations of the course. This task will be classroom-based and will rely on material previously delivered to the student (or available online).
2. Problems and case studies (10 hours). Problems and cases appointed by the instructor, to be solved by the students or the teacher himself, based on the programmed lectures. This activity will be classroom-based.
3. Lab Sessions (10 hours). 5 laboratory assignments of 2 hours each, to be performed in laboratories L.3.06 (Laboratorio de Alta Frecuencia) and/ or L.2.0.2 at the Ada Byron building whenever possible, under the actual circumstances. Small groups of students will carry out simulations and experimental measurements using test equipment related to radio and acoustic wave radiation and propagation, in order to support the

knowledge acquired during the lectures. This activity will require presence at the laboratory.

4. Group assignment (16 hours). A course project, under instructor supervision, will be assigned to each group. The course project should deal with the electromagnetic or acoustic modelling of some application focused on the Telecommunication field.
5. Personal attention through academic tutoring.

#### **4.2.Learning tasks**

##### **Classroom-based learning:**

Lectures and cases according to the detailed syllabus on section 4.3 will be preliminary focused on the following topics:

##### **Laboratory:**

1. Basic Antenna Parameters.
2. Radiowave Propagation on Earth-like environments.
3. Basic radiating elements.
4. Antenna and sensor arrays.
5. Radio Link budgets: atmospheric refraction and obstacle diffraction modelling

##### **Seminars**

Transducer Physical and Mathematical Model development.

#### **4.3.Syllabus**

**Unit 1. Introduction: radio transmitters and receivers.**

**Unit 2. Transmission line Foundations.**

**Unit 3. Basic Antenna modelling in Radio-communications.**

**Unit 4. Electromagnetic and acoustic analysis of radiating elements.**

**Unit 5. Radiowave Propagation.**

#### **4.4.Course planning and calendar**

Distribution of activities:

- Lectures and problems: four hours a week during the semester
- 5 laboratory sessions of 2 hours each, in reduced groups
- 2 seminars of 2 hours each dedicated to Transducer Analysis and design.

Lecture and laboratory session schedules together with evaluation dates will be provided by the university before the beginning of the semester.

#### **4.5.Bibliography and recommended resources**

[http://biblos.unizar.es/br/br\\_citas.php?codigo=30374&year=2020](http://biblos.unizar.es/br/br_citas.php?codigo=30374&year=2020)