Electromagnetic Fields

Academic Year: (2022 / 2023) **Review date: 07-06-2021**

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: RAJO IGLESIAS, EVA

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Calculus I and II
Linear Algebra
Physics

OBJECTIVES

To establish and analyse the basic concepts that constitutes the core of the model of electromagnetic radiation and propagation, both in a free and a confined medium.
To introduce the most commonly used numerical procedures to be applied to the model being studied.

DESCRIPTION OF CONTENTS: PROGRAMME

This is a classical course of applied electromagnetics where starting from Maxwell equations the student will carefully analyze some of its particular solutions: plane waves, guided waves and an introduction to radiated waves. The characterization of wave propagation in the different cases will be one of the main aspects of the course.

The course is divided in 4 units:

1: The electromagnetic model: Maxwell equations
2: Electromagnetic propagation in an free medium: plane waves
3: Propagation in confined media: guided waves
4: Introduction to electromagnetic radiation

LEARNING ACTIVITIES AND METHODOLOGY

The following activities will be combined as described in the detailed program of the course:

1- Theory lectures in the blackboard and with slides. Resolution of small exercises
2- Problems
3- Labs (two labs in computer room)
4- Office hours
5- Proposed exercises with solutions will be published in each chapter for self-studying.

ASSESSMENT SYSTEM

Global exam at the end of the semester (60% of the final grade (6 points)).
Theory exam (without books or notes): test and/or short questions together with problems.

The last 40% will be obtained by the continuous evaluation (4 points). Two midterm exams (15% each) and four labs (10% in total) evaluated with a test after the lab.

A minimum of 4 points in the final exam is required to overcome the subject.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- C.A.Balanis Advanced engineering electromagnetics, John Wiley & Sons.

- D. Fleisch A Student¿s Guide to Maxwell¿s Equations, Cambridge University Press, 2008

- D. K. Cheng Fundamentals of Engineering Electromagnetics, Addison Wesley.

- Luis E. García-Castillo Electromagnetic Model: Maxwell's Equations, xxx, 2013

- RAMO, S., J. R. WHINNERY and T. VAN DUZER Fields and Waves in Communication Electronics, John Wiley & Sons.

ADDITIONAL BIBLIOGRAPHY

- C. A. Balanis Advanced Engineering Electromagnetics, John Wiley & Sons.

- D. Pozar Microwave Engineering, John Wiley & Sons.

- J. D. Kraus Electromagnetismo, McGraw-Hill, 1986