Universidad Zaragoza

Academic Year/course: 2023/24

30376 - Guided transmission media

Syllabus Information

Academic year: 2023/24
Subject: 30376 - Guided transmission media
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: Second semester
Subject type: Compulsory
Module:

1. General information

The purpose of the Guided Transmission Media subject is to introduce the student to the aspects related to the guided wave transmission media associated with communications systems. This general objective can be divided:

- To know the mechanisms of propagation and transmission of electromagnetic and acoustic waves in different guided media.
- To know how to operate and know how to use transmitting and receiving devices related to guided electromagnetic waves.
- To know the basic operation of an optical communications system.
- Know how to identify the block diagrams and the characteristic parameters of a communications system.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the 2030 Agenda of United Nations (https://www.un.org/sustainabledevelopment/es/), specifically, the learning activities planned in this subject will contribute to the achievement of target 8.2 of goal 8, and targets 9.5 and 9.c of goal 9.

2. Learning results

- To know the mechanisms of electromagnetic wave transmission in various types of guided media.
- Know how to analyze transmission line circuits and apply that knowledge to impedance matching.
- Know how to analyze a waveguide and calculate the existing electromagnetic wave propagation modes.
- To know the basic operation of an optical communications system and its main components, both passive and active.
- Correctly pose a problem from the proposed statement and identify the options for its resolution. Apply the appropriate solving method and identify the correctness of the solution.
- To know and correctly use the tools, instruments and software applications available in the laboratories and to correctly carry out the analysis of the data collected.

3. Syllabus

Topic 0. Introduction to Guided Telecommunication Systems

Topic 1. Transmission Lines

1.1 Transmission Line Propagation

1.2 Transient analysis in transmission lines

1.3 Smith diagram. Circuits with transmission lines. Impedance matching

1.4 S-parameters

Topic 2. Waveguides

2.1 Waveguide propagation

2.2 Rectangular waveguides

2.3 Cylindrical wave guides

Topic 3. Optical fibers.

3.1 Total reflection. Optical waveguide

3.2 Commercial optical fibers

3.3 Propagation in optical fibers

Topic 4. Introduction to optical communications systems

4.1 Introduction

4.2 Components of a fiber optic link

4.3 Examples of optical networks

4. Academic activities

- Participatory lectures 38 hours
- Problem solving and case studies: 10 hours
- Laboratory practices: 12 hours in 6 two-hour sessions, in small groups
- Study and personal work: 87 hours
- Assessment tests. 3 hours

5. Assessment system

The student will have a global test in each of the exams established throughout the term. Dates and schedules will be determined by the School. The grade for this test will be obtained as follows:

- An exam consisting of two parts, one composed of theoretical-practical questions and the other consisting of a set of problems or practical assumptions. This exam will have a weight of 70% of the overall grade.
- A set of practices whose weight on the overall grade will be 30%. Those students who have not been able to complete the practices and/or work during the term will have the possibility of passing them by means of an exam in the corresponding call

In order to pass the subject it will be necessary to obtain a minimum of 4.5 out of 10 in each of the three parts that make up the assessment (exam, practicals and assignments).