

Academic Year: ( 2023 / 2024 )

Review date: 07-04-2023

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: GIL JIMENEZ, VICTOR PEDRO

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

- Digital Communications: 3th year, 1st Semester
- Communications theory: 2nd year, 2nd Semester

**OBJECTIVES**

The student will acquire knowledge about the principles of contemporary telecommunication systems. With an integrating and systemic character, the student acquires the ability to analyze and design complete telecommunication systems according to the fundamental quality parameters and requirements. He/She will also be able to evaluate the pros and cons of different technological alternatives.

Also, the student will be capable of communicating efficiently in written and oral form, the procedure followed to solve problems of design of mobile communication systems.

**DESCRIPTION OF CONTENTS: PROGRAMME**

Introduction to Telecommunications systems: Systems, networks and services; core and Access networks; regulation

- Main parameters: coverage, transmission, multiple access, traffic, quality of service
- Broadband communications: IDSN, xDSL, SDH, (D)WDM
- Terrestrial Mobile Communications systems: Coverage, design, 2G, 2.5G, 3G, 3.5G, 4G, 5G
- Satellite Systems: fixed and mobile
- Broadcast Systems:

**LEARNING ACTIVITIES AND METHODOLOGY**

Two learning activities are proposed, namely, theoretical classes and study cases.

Theoretical Classes (4 ECTS):

Theoretical classes using the blackboard, slides or video presentations where all the concepts are explained. In these lectures, the student will acquire the main concepts about mobile communications systems and their design and performance. Also practical exercises are included here.

Study Cases and Practical Classes (2 ECTS):

In order to acquire a more integrate view on the systems, several study cases have to be solved by the students either individual or in groups.

In the lab, link budget satellite simulators will be used for the reinforcement of the concepts learned in class.

**ASSESSMENT SYSTEM**

**% end-of-term-examination:** 60

**% of continuous assessment (assignments, laboratory, practicals...):** 40

The final mark is obtained as a weighted sum of the marks of the continuous assesment (40%) and the final exam (60%).

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

#### BASIC BIBLIOGRAPHY

- Roger L. Freeman Telecommunication System Engineering. 4th Edition, Wiley, 2004

#### ADDITIONAL BIBLIOGRAPHY

- Gerard Maral, Michel Bousquet, Zhili Sun Satellite communications systems: systems, techniques and technology, Wiley, 2009
- Harri Holma, Antti Toskala LTE for UMTS: Evolution to LTE-Advanced, 2nd Edition, Wiley, 2011
- Klaus Grobe, Michael Eiselt Wavelength Division multiplexing: a practical engineering guide, Wiley, 2013
- Roger L. Freeman Telecommunication Transmission Handbook. 4th Edition, Wiley, 1998