An overview of digital telecomunications

Academic Year: (2022 / 2023) **Review date: 10-06-2021**

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: LOPEZ BENITO, FRANCISCO JAVIER

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

No requirements.

OBJECTIVES

The integration of information and communications technologies is an increasing trend in many areas; some examples are the content storage and the provision of services in the "Cloud", communications network function virtualization , software defined networks or servers virtualization. In the course "Panorámica de las Comunicaciones Digitales" the students acquire a general vision of interrelationship between computers and telecommunication. Students understand and experience the usefulness of the knowledge of communications in the future work environment. Also, they acquire a coherent overview of electrical communications and, more specifically, about Digital Communications. (CEIC1, CEIC8)
The student acquires the ability to cooperatively work in groups with the goal of elaborating on a given topic related to contemporary digital communication systems. (CG7)
The student acquires an ability to communicate effectively by oral and written means, an actual topic related to Telecommunications. (CG7)
The student acquires an ability to autonomously search and elaborate information, extracting his/her own conclusions. (CG7)

DESCRIPTION OF CONTENTS: PROGRAMME

The course is organized into the following topics:

T1 - IT Services and CIT Technologies
1. IT Services and Systems: Residential and business areas.
2. Identification of "communications" in each type of system: Concept of Telecommunication. Information. Quality and Access
3. Telecommunication services
4. Telecommunication networks. Switching. Multiplex Access.
5. Transmission media: cable and radio.
6. Frequency and Modulation.
7. Digital communications and its advantages. Channel coding. Digitization of Information
8. Transmission process.

T2 - Communication Systems
9. Telephony: signals and services.
10. Messaging Services and Social Networks
12. Subscriber access.
13. Terrestrial wireless communications.
14. Satellite Communications
15. Television: signals and services.
16. Radiodetermination.

T3 - ICT and Society
17. Sectorial communications.
18. Regulation and standards.
19. New technology trends in telecommunication services.
20. Telecommunications and the information and knowledge Society.

T4 - Practical work
Teamwork: The theme of the work are defined each course according to the trends.

LEARNING ACTIVITIES AND METHODOLOGY

Various types of training activities are used: lectures, interactive activities and teamwork. Include the work to be carried out by the student either personally or in groups, as well as the preparation of summaries of the subjects presented by the students.

THEORY LECTURES AND INTERACTIVE ACTIVITIES (4ECTS)
Theory lectures are taught using the blackboard or other audiovisual media in order to illustrate some concepts related to Telecommunications. It is complemented by interactive activities and practices adapted to the content of each subject.
With these sessions the student will acquire the Basic contents of the subject. It is important to highlight that these sessions will require the initiative and participation from the student (some concepts will have to be studied personally with some indications, particular cases will have to be developed, ...). (CEIC1, CEIC8)

WORK IN GROUPS (2ECTS)
The students will work in groups to elaborate, acquire and broaden some of the concepts exposed in the lectures. They will have to search for information about a specific and actual topic in the context of digital telecommunication systems and elaborate a written summary with emphasis on the introduction, their vision of the importance/interest of the topic and their own conclusions.
Afterwards they will present their work using slides to the rest of the students. This presentation will include a debate and will contribute to strengthen the knowledge and develop the capacity to analyze and communicate relevant information. Besides the debate will favor the exchange of critical opinions with the professor and between the students. (CG7, CEIC1, CEIC8)

ASSESSMENT SYSTEM

Assessment includes:

Continuous assessment (50% of the final grade):
- Participation and proposed activities in class (CG7, CEIC1, CEIC8)
- Testing training (CEIC1, CEIC8),
- Elaboration and presentation of the teamwork with discussion. (CG7, CEIC1, CEIC8),

Final exam with general questions about the subject. (CEIC1, CEIC8) (50% of the final grade)
All students that get a score of 5 or plus in both testing trining and get also a 5 or plus in the continuous asseessment can choose that weight of conyinuous assesment be a 100% of the final score
Students can get up to 0.5 additional points over final score through participations in activities in class

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

BASIC BIBLIOGRAPHY

- J.M. Huidobro Todo sobre Comunicaciones, Paraninfo; , 2º Edición, 2001
- J.R. Pierce, A.M. Noll Señales. La Ciencia de las Telecomunicaciones, Reverté; 1995..
- S. Olivé Roig Primeros Pasos de la Telecomunicación, Fundación Airtel Móvil; 1999..

ADDITIONAL BIBLIOGRAPHY

- A. R. Figueiras et. al. Una Panoramica de las Telecomunicaciones, Prentice Hall; 2001.
- E.B. Carne Telecommunications Primer: Signals Building Blocks and Networks, Prentice-Hall PTR; 1995..
- R. L. Freeman Fundamentals of Telecommunications. (2nd Ed.; L/D 621.39 FRE), John Wiley & Sons, Inc., 2005
- W. Stallings Communications and computer networks. Ed.8ª. , Prentice Hall, 2007