SUBJECT TEACHING GUIDE

G816 - Communications Networks

Degree in Telecommunication Technologies Engineering

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Networks and Data Communication Module in Common with the Telecommunications Branch				
Course unit title and code	G816 - Communications Networks				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web	http://www.tlmat.unican.es				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES
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Other lecturers	ROBERTO SANZ GIL LUIS FRANCISCO DIEZ FERNANDEZ

3.1 LEARNING OUTCOMES
- Knowledge of some basic concepts on communication networks: multiplexing, switching and routing.
- Algorithm design; applicability on network routing.
- Modeling of network dimensioning problems by means of teletraffic concepts
- Knowledge of basic network planning techniques

4. OBJECTIVES

The main goal of this course is to adquire the basic knowledge about telecommunication systems, in particular the following ones: switching, multiplexing. Introduction to routing in communication networks. Routing algorithms and protocols. Teletraffic. Queuing Theory and mathematical modeling. Loss systems. System dimensioning. Introduction to cellular networks. Cellular system dimensioning.

6. COURSE ORGANIZATION

CONTENTS	
1	Part 1 - Introduction Network concept. Telephone network: (1) the road to the digital network; (2) Last-mile. Multiplexing: (1) Static resorce sharing: FDMA, TDMA, CDMA. Network hierarchies: PDH, SDH. Switching: (1) circuit; (2) packet (datagram and virtual circuit)
2	Part 2 - Network algorithms Routing: minimum cost: Dijkstra, Bellman-Ford, Floyd-Warshall. Additional algorithms: (1) Minimum Spanning Tree: Prim, Kruksal; (2) Maximum Flow: Ford-Fulkerson.
3	Part 3.1 - Introduction to teletraffic Introduction to teletraffic and queuing theory. Poisson model. Little's law.
4	Part 3.2 - Teletraffic: application to system dimensioning. Birth and death processes. Pure loss systems: ErlangB. Non-loss systems: ErlangC. Network dimensioning.
5	Part 4 - Cellular Mobile Networks Introduction to the mobile telephone systems. Evolution to cellular networks. Cellular planning and interference. Cellular systems.
6	Ordinary final exam

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Three individual (per lesson) evaluation per term.	Written exam	No	No	30,00
Lab assignment evaluation.	Laboratory evaluation	No	No	20,00
Ordinary final exam.	Written exam	Yes	Yes	50,00
TOTAL				100,00

Observations

Lab assignments are compulsary.
The final qualification is obtained by means of the following expression, in which TEOR is the one corresponding to the theory part of the course and PRAC corresponds to lab assigments.
NOTA = TEOR*0.8 + PRAC*0.2

The theory qualification is obtained from the individual (per lesson) exams (EC) and the final ordinary exam (EF).
Furthermore, the EC does not jeopardize the final qualification, and therefore:
TEOR = max{ 0.6 * EF + 0.4 * EC ; EF}

In any case, a minimum mark of 4.0 is required in the final exam; otherwise the final course qualification would be that of that exam (IF EF < 4, NOTA = EF), keeping the rest of qualifications only until the extraordinary September exam.

Observations for part-time students

The participation in lab assignments is compulsary. Several groups are established to favor the attendance of all students.
The individual (per-lesson) evaluation is optional; the qualification of the theoretical part of the course (TEOR) would that of the final exam for those students not taking the individual tests.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Flood, John E. "Telecommunications switching, traffic and networks". Prentice Hall.
Schwartz, Mischa. "Telecommunication networks: protocols, modeling, and analysis". Prentice Hall.
Tanenbaum, Andrew S. "Computer Networks". Pearson.