

**COURSE DATA****Data Subject**

<b>Code</b>	43857
<b>Name</b>	Network planning and management
<b>Cycle</b>	Master's degree
<b>ECTS Credits</b>	4.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. Period</b>
2174 - M.U. en Ingeniería de Telecomunicación 13-V.2	School of Engineering	1 First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
2174 - M.U. en Ingeniería de Telecomunicación 13-V.2	11 - Network planning and management	Obligatory

**Coordination**

<b>Name</b>	<b>Department</b>
ORDUÑA HUERTAS, JUAN MANUEL	240 - Computer Science

**SUMMARY**

This course presents methods to aid the design, planning and dimensioning of communication networks, identifying user needs and creating technically viable solutions to meet those needs, and the associated analysis of the corresponding cost. Introducing the quality parameters of the service offered, with the aim of having a merit figures which allow to guide the planning process, and also input the measurement procedures of these parameters.

Also presented planning systems and network dimensioning for existing networks both in reality and for networks that are in the design phase. For the former we also show the network management systems, covering management functions, different management protocols, the structuring of information management, and the various modern management platforms



## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

### Other requirements

Recommended architecture knowledge of ISO / OSI networking protocols as well as the knowledge of the TCP / IP architecture. Also recommended knowledge of Windows and Linux operating systems, at least at the user level

## OUTCOMES

### 2174 - M.U. en Ingeniería de Telecomunicación 13-V.2

- To have critical thinking capabilities to investigate independently and self-critically, and to search and utilize information for documenting ideas.
- To have the ability of standing up for fair criteria with rigor and arguments, reporting them publicly in a clear way and in a multilingual environment.
- To have the ability to participate in diffusion forums, journals, conferences, etc. and to work cooperatively and effectively in transnational teams.
- To have the capability to identify and solve the critical points to conduct an effective technology transfer, transforming theoretical results into products and services that are useful for the society.
- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Be able to access to information tools in other areas of knowledge and use them properly.
- To be able to assess the need to complete the scientific, historical, language, informatics, literature, ethics, social and human background in general, attending conferences, courses or doing complementary activities, self-assessing the contribution of these activities towards a comprehensive development.
- Ability to model, design, implement, manage and maintain networks, services and contents.
- Ability to plan, take decisions and design networks, services and applications considering quality of service, direct costs, implantation plans, supervision, security protocols, scaling and maintenance, as well as managing and assuring the required quality in the development process.



- Ability to understand the organization of the Internet, applying new-generation technologies and protocols, component models, intermediate software and services.

## LEARNING OUTCOMES

Following the completion of this course, students will achieve the learning outcomes that achieve general and specific skills described in section 4 of this document

## DESCRIPTION OF CONTENTS

### 1. Performance Evaluation

Introduction to evaluation of performance in interconnection networks.

Measures network performance: general basic measures. Basic measures interconnection network simulators. Performance measures in existing networks.

Network simulation

Tools for performance evaluation of existing networks. Detecting bottlenecks

### 2. Network Management

Network management techniques and services.

Using tools and packet analysis.

Installing, configuring and using SNMP.

Internet Management, Network Management OSI. Tools, protocols and procedures. MRTG.

### 3. Network Modeling

Introduction. Basics. Random variables: Probability distributions and densities.

Queuing theory: basic concepts. Performance measures. Basic and advanced models.

Queuing networks: operational laws. Bottleneck Analysis. Open Network Operational Analysis. Mean Value Analysis.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	18,00	100
Laboratory practices	8,00	100
Classroom practices	8,00	100
Tutorials	6,00	100
Development of group work	14,00	0
Study and independent work	15,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	8,00	0
Preparation of practical classes and problem	8,00	0
<b>TOTAL</b>	<b>100,00</b>	

**TEACHING METHODOLOGY**

The training activities are developed according to the following distribution:

MD1.- Theoretical activities.

(AF1) Description: In the lectures will develop the issues by providing a comprehensive and integrative, analyzing in detail the key issues and more complex, promote, at all times, the student's participation.

MD2.- Practical activities.

(AF2) Description: Complement theoretical activities in order to apply the basic concepts and expand the knowledge and experience they acquire during the course of the work proposed. They include the following types of classroom activities:

- Types of problems and issues in classroom
- Sessions for discussion and resolution of problems and exercises previously studied by students.
- Lab

(AF5) - Tutorials programmed (individually or in groups). The objective of these will be to guide and resolve such doubts appear. To do this, students should be raised, thus allowing revise their work process.

(AF3) personal Work of the student. Description: Accomplishment out of the classroom of questions and problems, as well as the preparation of classes and examinations (I) (study). This task will be realized in an individual way and it tries to promote the autonomous work.

- (AF4) Evaluation. Description: Accomplishment of individual questionnaires of evaluation in the classroom with the presence of the teacher.



- (AF2) Am employed at small groups. Description: Accomplishment, on the part of small groups of students (2-4) of a work of the subject. This task complements the individual work and promotes the capacity of integration in workgroups.

We will be used the platform of e- learning (Aula Virtual) as support of communication with the students.

## EVALUATION

This course will be assessed taking into account the following weights:

### Criteria 1st Call

SE1.- Written examination at the end of the semester 65%

SE2.- Project report and presentation 30%

SE2/SE3 Exploitation of laboratory assignments 5%

Total 100%

### 2nd Call

SE1.- Written examination at the end of the semester 70% (\*)

SE2 Presentation and project report 30% (\*)

Laboratory sessions 0%

Total 100%

To pass the course, students must obtain a higher than 4 out of 10 on the written exam at the end of the term, in both calls. Otherwise, it will not mean the rest of the notes, and his score in the minutes shall be obtained in the examination.

If a student can not attend class regularly, and therefore can not benefit from the model of continuous assessment should inform the beginning of the course, and then the method corresponding to the 2nd call assessment will be applied.

(\*) If the student has submitted project first call. Otherwise, the written exam will be 100% of the mark.

In any case, the system of evaluation will be ruled by the established in the Regulation of Evaluation and Qualification of the University of Valencia for Degrees and Masters. (

[http://www.uv.es/graus/normatives/2017\\_108\\_Reglament\\_avaluacio\\_qualificacio.pdf](http://www.uv.es/graus/normatives/2017_108_Reglament_avaluacio_qualificacio.pdf) ).

## REFERENCES



### Basic

- Raj Jain, The Art of Computer Systems Performance Analysis, Ed. Wiley & Sons, 1991.
- Burgess, M., Network and System Administration. J. Wiley, 2nd. Ed., 2004. ISBN: 978-0-470-86807-2
- Dally, W. And Towles, B., Principles and Practices of Interconnection Networks. Morgan & Kaufmann Publishers, 2004. ISBN: 978-0-12-200751-4

### Additional

- Tanenbaum, Andrew S.: Redes de Computadoras, Prentice-Hall.
- Stallings, William: Comunicaciones y Redes de Computadores, Prentice-Hall
- Kurose, James F.: Redes de Computadores: un enfoque descendente, Prentice Hall