

Academic Year: (2024 / 2025)

Review date: 28-04-2024

Department assigned to the subject: Telematic Engineering Department

Coordinating teacher: CUEVAS RUMIN, RUBEN

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 1

OBJECTIVES

The learning outcomes that students achieve in this subject are the following:

- Ability to design configurations for connecting networks, using the BGP protocol, according to the business model of the Internet
- Ability to design and dimension transport, diffusion and distribution networks for data, including multimedia contents
- Evaluate the main risks faced by communication protocols and its solutions

The course Design and Operation of Communication Networks (DORC) is coordinated with the subject of Advanced Multimedia Services as follows: DORC addresses the provision and servicing of multimedia content primarily at link and network layers, from the perspective of the organization deploying the networks. On the other hand, in the course of Advanced Multimedia Services aspects of transport level and application-related multimedia service, with an emphasis on end-to-end communication, are covered from the perspective of the user and the developer of multimedia software.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Review of IP
2. Intradomain routing, BGP
 - 2.1 Internet business model
 - 2.2 Attributes and route selection in BGP
 - 2.3 IBGP
 - 2.4 Traffic engineering in BGP
 - 2.5 BGP services, BGP VPN
3. Design of network architectures, redundancy, scalability, residential communication infrastructures
 - 3.1 MPLS
 - 3.2 Intra-AS traffic engineering
4. Security in communication protocols
 - 4.1 Introduction to security in communication networks
 - 4.2 Vulnerability analysis in communication protocols
5. Introduction to network management

LEARNING ACTIVITIES AND METHODOLOGY

- Master classes oriented to obtain the expected competences and skills
- Case studies that include different technologies, their integration and inter-networking in order to understand the different architectures and services.
- Group or personal works, exercises and laboratories if necessary. Set of activities to help in the learning of the necessary competences but making emphasis on team work, oral and written skills as well as self-scheduling and complex problems simplification in smaller parts.
- Personal training and own work designed to obtain self-organizing and self-planning skills in relation with student's personal work and learning process.

ASSESSMENT SYSTEM

% end-of-term-examination:	30
% of continuous assessment (assignments, laboratory, practicals...):	70

The evaluation assesses the degree of compliance of the learning objectives from student work. Continuous assessment of their activities will be performed by:

- 1 partial examination, laboratory exam, 15%
- 2 Partial examination, 30%
- 3 Partial examination, 25%
- Regular final exam will count 30%

In the extraordinary evaluation period, student's grade will be the score on the extraordinary evaluation period exam.

BASIC BIBLIOGRAPHY

- Beijnum, Iljitsch van "BGP", O'Reilly, 2010
- Minei, Ina; Lucek, Julian "MPLS-Enabled Applications: Emerging Developments and New Technologies", John Wiley & Sons, 2011
- Uhlig, Steve "From the Traffic Properties to Traffic Engineering in the Internet", VDM Verlag, 2008
- White, Russ "Practical BGP", Addison-Wesley, 2005

ADDITIONAL BIBLIOGRAPHY

- Davie, Bruce S. "MPLS : technology and applications", Morgan Kaufmann.
- De Ghein, Luc "MPLS Fundamentals", Cisco Press.
- Kurose, James F. "Computer networking : a top-down approach featuring the Internet", Addison Wesley.