Last update: 06-10-2016

230604 - NPAE - Network Performance Analysis and Evaluation

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering

Teaching unit: 744 - ENTEL - Department of Network Engineering

Academic year: 2016

Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Teaching unit Optional)

ECTS credits: 5 Teaching languages: English

Teaching staff

Coordinator: Cruz Llopis, Luis Javier De La

Others: Demirkol, Ilker Seyfettin
Hesselbach Serra, Xavier
Pallares Segarra, Esteve

Degree competences to which the subject contributes

Specific:

1. Ability to design and dimension transport, broadcast and distribution networks for multimedia signals

2. Ability to model, design, implement, manage, operate, administrate and maintain networks, services and contents

3. Ability to plan networks and decision-making about services and applications taking into account: quality of service, operational and direct costs, implementation plan, supervision, security processes, scalability and maintenance. Ability to manage and assure the quality during the development process

Transversal:

4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Teaching methodology

- Lectures
- Application classes
- Laboratory sessions
- Extended answer test (Mid-Term and Final Exam)

Learning objectives of the subject

Objectives

The finality of the course is to capacitate to the students in methods of design, dimensionment and evaluation of networks of communications. First we consider the parameters of interest for the planification and the tools mathematical of which we dispose.

Results

Hability for to model and evaluate networks of commutation of circuits and paquets
Hability for to model and evaluate networks of access meding diverse techniques
Analysis qualitative and quantitative

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Study load

Total learning time: 125h	Hours large group:	39h	31.20%
	Hours medium group:	0h	0.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	86h	68.80%

Content

1. Introduction

Learning time: 4h

Theory classes: 2h
Self study : 2h

Description:
- Introduction to network analysis and evaluation.

2. Evaluation and modelling of transmission Systems

Learning time: 45h

Theory classes: 13h
Self study : 32h

Description:
- Markovian queuing Systems.
- Markovian systems with losses.
- Markovian systems with finite costumer population.
- Semimarkovian systems.
- Priority systems.

3. Evaluation of network access mechanisms

Learning time: 45h

Theory classes: 13h
Self study : 32h

Description:
- TDMA, FDMA, Polling, Aloha and S-Aloha, CSMA, CSMA/CD, CSMA/CA.

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Planning of activities

LABORATORY SESSION 1. STUDY OF THE PROBABILITY DENSITY FUNTION OF RANDOM VARIABLES WITH MATLAB.	Hours: 6h Laboratory classes: 2h Self study: 4h

Description:
Random variables generation.
Functions and scripts in MATLAB.

Support materials:
MATLAB.

LABORATORY SESSION 2. SIMULATION AND PERFORMANCE EVALUATION OF DELAY SYSTEMS.	Hours: 12h Laboratory classes: 4h Self study: 8h

Description:
Delay systems M/M/1 and M/M/oo and M/M/m are thoroughly studied.

Support materials:
Scalev Lite.
MATLAB.

LABORATORY SESSION 3. SIMULATION AND PERFORMANCE EVALUATION OF LOSS SYSTEMS.	Hours: 6h Laboratory classes: 2h Self study: 4h

Description:
Loss systems M/M/1/K and M/M/m/m are thoroughly studied.

Support materials:
Scalev Lite.
MATLAB.

LABORATORY SESSION 4. SEMIMARKOVIAN AND PRIORITY SYSTEMS.	Hours: 6h Laboratory classes: 2h Self study: 4h

Description:
M/G/1 and priority systems are thoroughly studied.

Support materials:
Scalev Lite.
MATLAB.

LABORATORY CONTROL.	Hours: 1h Laboratory classes: 1h

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Description:
Laboratory control to be done individually by the students.

MIDTERM CONTROL	Hours: 2h Theory classes: 2h

Description:
Theoretical midterm control.

FINAL EXAMINATION	Hours: 3h Theory classes: 3h

Description:
Theoretical final examination.

Qualification system

Final exam: 50%
Mid-Term exam: 25%
Laboratory: 25%

Bibliography

Basic:

Bertsekas, D.P.; Gallager, R.G. Data networks. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall, 1992. ISBN 0132009161.

Kleinrock, L. Queueing systems: vol 1: theory. New York: John Wiley & Sons, 1975. ISBN 0471491101 (V. 1).

Complementary:

Kleinrock, L. Queueing systems: vol 2: computer applications. New York: John Wiley and Sons, 1976. ISBN 047149111X (V.2).