

Course guide 230020 - AST - Network Applications and Services

 Last modified: 11/06/2024

 Unit in charge:
 Barcelona School of Telecommunications Engineering

 Teaching unit:
 Barcelona School of Telecommunications Engineering.

 Degree:
 BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Compulsory subject).

 Academic year: 2024
 ECTS Credits: 6.0
 Languages: Catalan, Spanish

LECTURER		
Coordinating lecturer:	JOSEP COTRINA NAVAU	
Others:	Primer quadrimestre: JOSEP COTRINA NAVAU - 11, 12, 13, 14, 41 MARCEL FERNANDEZ MUÑOZ - 11, 12, 13, 14, 41 ALFONSO ROJAS ESPINOSA - 11, 12	
	Segon quadrimestre: JOSEP COTRINA NAVAU - 13, 41, 42, 44 MARCEL FERNANDEZ MUÑOZ - 12, 41, 42, 43, 44 JORDI FORGA ALBERICH - 11, 43 JUAN LUIS GORRICHO MORENO - 11, 12, 13, 14	

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Generical:

12 CPE N2. They will be able to identify, formulate and solve engineering problems in the ICC field and will know how to develop a method for analysing and solving problems that is systematic, critical and creative.

TEACHING METHODOLOGY

Lectures Laboratory sessions Group work (non-classroom) Individual work (non-classroom) Homework exercises Conventional tests (Control) Conventional tests (Final exam)

LEARNING OBJECTIVES OF THE SUBJECT

To acquire a global perspective of the basic concepts involving Telematic applications and services. To identify the main concepts for the design of Telematic applications, basically those related to the programming of multithread systems for the nodes participating on the designed approach, and the programming of the communication among those threads executing on the distant nodes. To identify the features of the communication channel at the transport layer. To understand the control mechanisms for the transmitted data among the participating nodes assuring a given quality of service.



STUDY LOAD

Туре	Hours	Percentage
Hours large group	39,0	26.00
Hours small group	26,0	17.33
Self study	85,0	56.67

Total learning time: 150 h

CONTENTS

tools review from Java for the programming of the transport and application layers

Description:

In this unit we will complete a review and consolidation for the programming in Java and the use of several native packages for the support to the design and programming of the transport and application layers of the OSI (Open System Interconnection) protocols stack.

Full-or-part-time: 24h

Theory classes: 6h Laboratory classes: 4h Self study : 14h

introduction to the multi-thread and concurrent programming for the design of the transport and application layers

Description:

In this unit the student will learn the use of basic tools for the programming of multi-thread systems and to solve the derived concurrency issues, necessary tools for the design of the transport and application layers of the OSI protocols stack.

Full-or-part-time: 48h

Theory classes: 12h Laboratory classes: 8h Self study : 28h

design and implementation of the transport layer

Description:

In this unit the student learns the design and implementation of fundamental mechanisms for the deployment of the transport layer, in particular, the fragmentation and embedding of data to be transmitted, the mechanism for the multiplex/demultiplex of connections, the flow control mechanism to avoid the receiver congestion, the congestion control mechanism of the network and the mechanism to manage the error and lost of packets in the network.

Full-or-part-time: 60h Theory classes: 15h Laboratory classes: 10h Self study : 35h



introduction to the tools for the design of the application layer

Description:

In this unit the student learns the basic tools of programming with Sockets to implement the RPC (Remote Procedure Call) paradigm for the design of the application layer of telematic services.

Full-or-part-time: 18h Theory classes: 6h Laboratory classes: 4h Self study : 8h

ACTIVITIES

Lab. session 1

Description:

Programming practice for the consolidation of programming in Java and its native packages useful for the course.

Full-or-part-time: 4h

Laboratory classes: 4h

Lab. session 2

Description:

Programming practice of multi-thread systems and its concurrency

Full-or-part-time: 4h

Laboratory classes: 4h

Lab. session 3

Description: Programming practice for data fragmentation and embedding in segments

Full-or-part-time: 2h

Laboratory classes: 2h

Lab. session 4

Description: Programming practice to multiplex/demultiplex connections.

Full-or-part-time: 2h Laboratory classes: 2h



extended response test (half-term test)

Description:

Assessment test of the first-half of the term of the lab. sessions and of the first two units of the course.

Full-or-part-time: 2h

Theory classes: 2h

Lab. session 5

Description:

Programming practice of the mechanisms for the flow control and the error and lost of segment control in the network

Full-or-part-time: 4h

Laboratory classes: 4h

Lab. session 6

Description:

Programming practice of the congestion control mechanism for a variable size window

Full-or-part-time: 2h

Laboratory classes: 2h

Lab. session 7

Description:

Programming practice of the mechanisms to set-up and tear-down a connection

Full-or-part-time: 4h Laboratory classes: 4h

extended response test (Final exam)

Description:

Final exam assessment of the second-half of the term of the lab. sessions and of the last two units of the course.

Full-or-part-time: 3h Theory classes: 3h

GRADING SYSTEM

Half-term test: 40% (assessment of the first half of lab. sessions: 20% + assessment of the first two units of the course: 20%) Final test: 60% (assessment of the second half of lab. sessions: 20% + assessment of the last two units of the course: 40%)

Reassessment:

100% of the course can be re-assessed.



BIBLIOGRAPHY

Basic:

- Kurose, J.F.; Ross, K.W. Computer networking: a top-down approach. 8th ed., global ed. Harlow, United Kingdom: Pearson Education Limited, 2022. ISBN 9781292405469.

- Comer, D.E. Internetworking with TCP/I P : vol.1 : principles, protocols and architecture. 6th ed. Upper Saddle River: Prentice-Hall International, 2014. ISBN 9780136085300.

- Coulouris, G.F. Distributed systems: concepts and design. 5th ed., int.ed. Harlow: Addison-Wesley/Pearson Education, 2012. ISBN 9780273760597.

Complementary:

- Andrews, G. R. Foundations of multithreaded, parallel, and distributed programming. Reading, Mass. [etc.], USA: Addison-Wesley, 2000. ISBN 0201357526.