



Course Unit Description

PROTOCOL ENGINEERING

Course 2024-25



GRADO EN INGENIERÍA TELEMÁTICA (BOE 20-04-2011)

ETS DE INGENIERÍA DE TELECOMUNICACIÓN

Universidad Politécnica de Cartagena

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1. Subject data

Name	PROTOCOL ENGINEERING
Code	505103007
Type	Compulsory
ECTS	4.5
Length of subject	Per term
Length of subject	3rd Year - Second term
Speciality	
Language	English
Mode of study	In person

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2. Lecturer data

Lecturer data	BURRULL I MESTRES, FRANCESC
Knowledge area	Ingeniería Telemática
Department	Tecnologías de la Información y las Comunicaciones
Telephone	968325365
email	francesc.burrull@upct.es
Office hours and location	
Qualification/Degree	
Academic rank in UPCT	PROFESOR TITULAR DE ESCUELA UNIVERSITARIA
Number of five-year periods	5
Number of six-year periods	0
CV	https://personas.upct.es/perfil/francesc.burrull
Head of groups	G1, G2

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3. Competencies and learning outcomes

3.1. Basic curricular competences related to the subject

3.2. General curricular competences related to the subject

[CG3]. Knowledge of basic subjects and technologies which enables the student to learn new methods and technologies, and gives them great versatility to adapt to new situations

3.3. Specific curricular competences related to the subject

[T3]. Ability to build, operate and manage telematic services using analytical planning, sizing and analysis tools.

[T4]. Ability to describe, program, validate and optimize communication protocols and interfaces at different levels of a network architecture.

[T6]. Ability to design network architectures and telematic services.

[T7]. Ability to program network and distributed telematic services and applications.

Specific topic competences (for elective topics which have them)

3.4. Transversal curricular competences related to the subject

[TR4]. Using information resources responsibly

[TR5]. Putting the acquired knowledge into practice

3.5. Subject learning outcomes

At the end of the training plan, the student must be able to: Address the analysis and synthesis of communication protocols at a theoretical level. Address the use of the CASE tool for the validation and simulation of communication protocols at a practical level.

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4. Contents

4.1 Curricular contents related to the subject

Formal techniques for the description and validation of protocols.

4.2. Theory syllabus

Teaching modules and units

Block I.-

0. Presentation.
1. Introduction.
2. Structure of the protocols

Block II.-

3. Error Control, Review.
4. Flow Control. Review.
5. Protocol Validation Models

Block III.-

6. Correction Requirements (correctness).
7. Protocol Design.
8. Finite State Machines (FSM)

Block IV.-

9. Conformity Test.
10. Synthesis of Protocols.
11. Protocol Validation

4.3. Practice syllabus

Name and description

Demongame. SDL Validation

Introduction to the IBM validator tool Rational SDL suite

Demongame. SDL Simulation

Introduction to the IBM simulator tool Rational SDL suite

Protocol slotted Aloha N nodes. Validation, Simulation and measurements

Editing using the IBM Rational platform SDL suite of the slotted Aloha protocol. Validation, Simulation and obtaining results

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Comments

Labs will be performed on virtual machine. They can be done in an optional way in the laboratory or in the equipment properly configured (Virtualbox) of the students

Risks prevention

Promoting the continuous improvement of working and study conditions of the entire university community is one the basic principles and goals of the Universidad Politécnica de Cartagena. Such commitment to prevention and the responsibilities arising from it concern all realms of the university: governing bodies, management team, teaching and research staff, administrative and service staff and students. The UPCT Service of Occupational Hazards (Servicio de Prevención de Riesgos Laborales de la UPCT) has published a "Risk Prevention Manual for new students" (Manual de acogida al estudiante en materia de prevención de riesgos), which may be downloaded from the e-learning platform ("Aula Virtual"), with instructions and recommendations on how to act properly, from the point of view of prevention (safety, ergonomics, etc.), when developing any type of activity at the University. You will also find recommendations on how to proceed in an emergency or if an incident occurs. Particularly when carrying out training practices in laboratories, workshops or field work, you must follow all your teacher's instructions, because he/she is the person responsible for your safety and health during practice performance. Feel free to ask any questions you may have and do not put your safety or that of your classmates at risk.

4.4. Comments

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5. Teaching method

Name	Description	Hours	In-class %
Class in conventional classroom: theory, problems, case studies, seminars, etc	Theory class is a synchronous activity Problem solving and case study class	24	100
Class in laboratory: practical classes / internships	Practical class in laboratory	14	100
Class in the field or open classroom (technical visits, lectures, etc.). In general, activities that require special resources or planning	Practical class in laboratory Presentation of assignments before the professor	4	100
Assessment activities (continuous assessment system)	Performance of evaluation tests (duration of exams and other evaluation tests in the classroom)	3	100
Student work: study or individual or group work	Assignments and exercises require some minimal research on the subject Personal study is the time the student should take to study class material	90	0



6. Assessment method

6.1. Continuous assessment system		
Name	Description and criteria	Percentage %
Practical laboratory assignment	The student is required to perform 2 tutorials in the lab and implementing the Slotted Aloha protocol in SDL	20 %
Written and/or oral exams (assessment of theoretic and/or applied subject contents)	Written and / or oral exams (evaluation of theoretical and / or applied contents of the subject). One in the middle of the semester and one at the end,	60 %
Deliverables of exercises and/or laboratory practices	Deliverables of exercises and / or laboratory practices, Deliverable from the slotted Aloha lab: Codes, validation, simulation and results of the execution. Comparison with the theoretical model. There will be an individual interview to each student. The clarity and correctness of the solution proposed will be evaluated.	20 %

6.2. Final assesment system		
Name	Description and criteria	Percentage %
Practical laboratory assignment	The student is required to perform 2 tutorials in the lab and implementing the Slotted Aloha protocol in SDL	20 %
Written and/or oral exams (assessment of theoretic and/or applied subject contents)	Written and / or oral exams (evaluation of theoretical and / or applied contents of the subject). One in the middle of the semester and one at the end, A student who has passed the assessment in the continuous evaluation system, you want appear in the final evaluation system must renounce the grade obtained in the continuous evaluation system (Article 8.3 of the Evaluation Regulation for Official Bachelor's and Master's degree from the UPCT approved by the Governing Council on April 30 2021).	60 %
Deliverables of exercises and/or laboratory practices	Deliverables of exercises and / or laboratory practices, Deliverable from the slotted Aloha lab: Codes, validation, simulation and results of the execution. Comparison with the theoretical model.	20 %

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6.2. Final assesment system

Name	Description and criteria	Percentage %
	There will be an individual interview to each student. The clarity and correctness of the solution proposed will be evaluated.	

6.3. Formative assesment

Description

Information

Comments



7. Bibliography and resources

7.1. Basic bibliography

Gburynski, Pawel Protocol design for local and metropolitan area networks. Prentice Hall. 1996. 0135542707

Holzmann, Gerard J. Design and validation of computer protocols. Prentice Hall. 1991. 0135399254

Gouda, Mohamed G. Elements of network protocol design. John Wiley & Sons. 1998. 0471197440

7.2. Supplementary bibliography

7.3. On-line resources and others


ITU (Intl. Telecommunications Union) Recommendations:

Z.100 11/99: "Specification and Description Language" SDL (Inglés)

Z.120 11/99: "Message Sequence Chart" MSC (Inglés)

Z.141 07/01: "The Tree and Tabular Combined Notation version 3¿ TTCN-3 (Inglés)

Local copy available at "Aula Virtual"

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