

## 30322 - Network and Service Programming

### Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	438 - Bachelor's Degree in Telecommunications Technology and Services Engineering 330 - Complementos de formación Máster/Doctorado
ECTS	6.0
Year	XX
Semester	Second semester
Subject Type	ENG/Complementos de Formación, Compulsory
Module	---

### **1.General information**

#### **1.1.Introduction**

#### **1.2.Recommendations to take this course**

#### **1.3.Context and importance of this course in the degree**

#### **1.4.Activities and key dates**

### **2.Learning goals**

#### **2.1.Learning goals**

#### **2.2.Importance of learning goals**

### **3.Aims of the course and competences**

#### **3.1.Aims of the course**

#### **3.2.Competences**

### **4.Assessment (1st and 2nd call)**

#### **4.1.Assessment tasks (description of tasks, marking system and assessment criteria)**

### **5.Methodology, learning tasks, syllabus and resources**

#### **5.1.Methodological overview**

It should be highlighted that the course was designed with both theoretical and practical approaches. Hence, the learning process essentially requires the students to attend the lectures and the practical laboratory lessons, to develop and implement computer programs of growing complexity, and to study individually.

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### 5.2.Learning tasks

1. Instructors will introduce the contents of the course by means of lectures (25 teaching hours).
2. The resolution of practical problems in the classroom (5 teaching hours)
3. The development of practical exercises in the laboratory, with the guidance of instructors and implementing theoretical concepts studied in the lectures. (24 hours: 12 sessions of 2 hours each).
4. The design, elaboration, and implementation of practical assignments in groups, led by instructors.
5. The personal work by students.
6. The customized student support during office hours with the objective of revising and discussing materials and concepts introduced during the course.
7. The elaboration of written exams, based on theoretical and practical concepts and the submission of theoretical and practical assignments and reports. All of them will be used for the assessment of the students' progress. More details can be found in the Evaluation section.

### 5.3.Syllabus

- **Programación Concurrente**

&#10061; Introduction to Concurrency

&#10061; Motivation

&#10061; Mutual Exclusion and Synchronisation Concepts

&#10061; Properties of Concurrent Programs: safety, liveness, and priority

&#10061; Concepts of Process & Thread

&#10061; Inter-process Synchronisation Mechanisms

&#10061; Mutual Exclusion Algorithms

&#10061; Semaphores

&#10061; Monitors

&#10061; Mutual and Partial Exclusion Problems

- **Distributed Systems**

&#10061; Introduction to Distributed Systems

&#10061; Software Architectures

&#10061; Communication Networks: TCP/IP Architecture

&#10061; Process to Process Communication: Interface Socket TCP & UDP

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&#10061; Channels and Asynchronous and Synchronous Message-Passing

&#10061; Client-Server Applications: Stateful and stateless server

&#10061; Introduction to Middleware Technologies

### 5.4.Course planning and calendar

The scheduling of the course is defined by the School every academic year.

### 5.5.Bibliography and recommended resources

- Downey, Allen B . The Little Book of SEMAPHORES : The Ins and Outs of Concurrency Control and Common Mistakes / Allen B. Downey. 2nd ed. CreateSpace Independent Publishing Platform, 2009
- Ben-Ari, M.. Principles of concurrent and distributed programming / M. Ben-Ari. - 2nd ed. Harlow (England): Pearson Education, 2006
- Varela, Carlos. Programming Distributed Computing Systems: Foundational Approach / Carlos Varela The Mit Press, 2013
- Calvert, K.L . TPC/IP Sockets in Java: Practical Guide for Programmers / K. L. Calvert, M. J. Donahoo. - 2nd ed. Morgan Kaufmann Publishers, 2008
- Raynal, Michel. Distributed Algorithms for Message-Passing Systems / Michel Raynal Springer, 2013
- Tanenbaum, Andrew Stuart. Distributed systems : principles and paradigms / Andrew S. Tanenbaum, Maarten Van Steen . - 2nd ed. Upper Saddle River, NJ: Pearson Educación, cop. 2007

**Slides, practical problems descriptions, case studies and practical assignments.**

They can all be found at <http://add.unizar.es>