Design of telematic systems

Academic Year: (2023 / 2024)   **Review date: 19-04-2023**

Department assigned to the subject: Telematic Engineering Department

Coordinating teacher: ESTEVEZ AYRES, IRIA MANUELA

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming
Algorithms and data structures

OBJECTIVES

The main aim of this subject is the acquisition of the basic fundamentals related to the field of concurrency and parallelism, as well as the familiarization of the student with the basic concepts of communications in distributed systems.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to distributed systems, telematics and robotics.
2. Threads and concurrency.
3. Processes and interprocess communication (IPC).
4. Sockets. Transmission control protocol/Internet protocol (TCP/IP) and user datagram protocol/Internet protocol (UDP/IP) interfaces.
5. Communication models: multicasting and broadcast communication, client-server communication, peer-to-peer communication,hybrid interaction models.
6. Design of a distributed system with scripting languages: basic data structures, algorithms, coding protocols and communication.

LEARNING ACTIVITIES AND METHODOLOGY

THEORETICAL CLASSES.
Presentation by the teaching staff of the main concepts in the form of a summary. This type of session encourages both interaction and discussion of the explained concepts.

PRACTICAL CLASSES.

Sessions in which problems are posed and students are allowed to analyse them and propose possible solutions.

PROGRAMMING LABORATORIES.

A functionality is described based on the theoretical concepts covered in both the lecture and problem sessions and, under the supervision of the teaching staff, it is implemented. These sessions involve additional work by the students over a period of several days in which they have the possibility, through various channels, to consult their conceptual doubts with the teaching staff.

TUTORING SESSIONS

Individual or group assistance to students by the teacher.

ASSESSMENT SYSTEM

FINAL EXAM (40%)
- In which the knowledge, skills and abilities acquired throughout the course will be assessed globally.
- A minimum mark of 3.5 out of 10 in the final exam is required to pass the course.

CONTINUOUS EVALUATION (60%)
- Individual assessment will consist of two written mid-term exams and a laboratory exam.
- The evaluation of the collaborative work carried out will be assessed with two practical/project

submissions.

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY
 - David M. Beazley, Brian K Jones Python cookbook, O'Reilly Media Inc. , 2013

 - Eric Chou Mastering Python Networking : Utilize Python Packages and Frameworks for Network Automation, Monitoring, Cloud, and Management., Packt Publishing, 2023
 - Sam Washington, M. O. Faruque Sarker Learning Python Network Programming, Packt Publishing, 2015

ADDITIONAL BIBLIOGRAPHY
 - Alex Martelli, Anna Ravenscroft, Steve Holden Python in a Nutshell: A Desktop Quick Reference, O'Reilly Media, Incorporated, 2017
 - Elliot Forbes Learning concurrency in Python: speed up your Python code with clean, readable, and advanced concurrency techniques, PACKT Publishing , 2017
 - Quan Nguyen Mastering Concurrency in Python: Create Faster Programs Using Concurrency, Asynchronous, Multithreading, and Parallel Programming, Packt Publishing, Limited, 2018