39828 - Concurrent and distributed systems programming

Syllabus Information

Academic year: 2023/24
Subject: 39828 - Concurrent and distributed systems programming
Faculty / School: 326 - Escuela Universitaria Politécnica de Teruel
Degree: 634 - Joint Programme in Computer Engineering - Business Administration
ECTS: 6.0
Year: 3
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The student will learn to develop programs in which a set of processes must be synchronized, either through shared memory mechanisms or through communication networks, being able to reason about the correctness of the proposed solution. A methodological approach will be followed in which problem patterns and appropriatesolution schemes will be studied using the different common technologies.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement (goals 7 and 9).

2. Learning results

- The student will end up with a deep understanding of what are the specific characteristics of concurrent and distributed systems.
- Know the problems generated by concurrent access to data and resources, as well as the conceptual and technological solutions that have been given to them.
- Learn about the characteristics of distributed systems, the challenges they pose and the solutions that have been provided for them.
- Learn tools for the design and programming of programs with concurrent and/or distributed features.
- Acquire notions of what are real time systems, and event based systems.

3. Syllabus

The program of the subject consists of the following topics:
- Unit 1: Introduction to concurrent programming
- Unit 2: Modeling and analysis of concurrent systems
- Unit 3: The problem of the critical section
- Unit 4: Traffic light synchronization
- Unit 5: Synchronization via monitors
- Unit 6: Introduction to distributed programming
- Unit 7: Coordination based on tuple spaces
- Unit 8: Distributed algorithms
- Unit 9: Introduction to real-time systems
- Unit 10: Introduction to event-driven systems

4. Academic activities

- 45 hours of theoretical-practical activities and 15 hours of problem sessions.
- 15 hours of laboratory sessions.
- 24 hours of group work.
- 60 hours of work and effective individual study.
- 6 hours dedicated to different assessment tests.

5. Assessment system

- Group work. 10%. Concurrent programming will have to be solved. In the final exam there will be a part of recovery of this activity.
- Practical sessions. 20%. In the final exam there will be a recovery part of this activity.
- Theory and exercises. 70% of the final grade. Assessed in the final exam.

The final grade of the subject will be obtained as the weighted average of the three parts, being necessary to reach at least 4 points out of 10 in the practicals and 4 points out of 10 in the written test. In case of not reaching this minimum in any of these parts, the overall grade of the course will be the minimum between 4.0 and the result of weighting with thepercentages of each part.

As forthe second call, the final grade will be the grade of the extraordinary exam, taking into account that the exam will have a practical part that will be worth 30% of the total grade. Those who have passed the practical part in the ordinary exam will keep the grade and will not have to take the practical part in the extraordinary exam. In the extraordinary call, the grade of the work is not maintained.