

62246 - Evaluation and control of production systems

Syllabus Information

Academic year: 2024/25

Subject: 62246 - Evaluation and control of production systems

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 534 - Master's Degree in Informatics Engineering

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Optional

Module:

1. General information

The general objective of this subject is to provide students with knowledge on modeling, analysis and control of discrete concurrent systems, whether distributed or not, with primary application to production systems. The production systems will be understood to have a general purpose, and their applications will be studied in four areas: manufacturing, logistics systems, workflow systems, and planning and control systems of mobile robot groups. Formal methods will be used, based primarily on the Petri net paradigm.

2. Learning results

1. To model general-purpose production systems using formalisms of discrete event concurrent systems. The student will be trained in the modeling of the following types of production systems modeled with Petri nets: manufacturing systems, logistics systems, workflow systems and planning and control systems of mobile robots.
2. To apply formal analysis techniques to the study of the properties (structural and behavioral) of a qualitative (logical) and quantitative (timed) type, using computer modeling, simulation and analysis tools.
3. To apply control techniques (supervisor) for discrete event systems, both timed and not.
4. To prepare documentation related to discrete event systems and present it publicly in written and oral form.

3. Syllabus

1. Presentation
2. Deterministic finite automata
3. Untimed (autonomous) Petri nets
4. Elements of linear programming and convex geometry
5. Discrete time production models
6. Analysis of untimed (autonomous) Petri nets
7. Stochastic networks and Markov chains
8. Performance evaluation: bounds
9. Performance Evaluation: approximations

4. Academic activities

Theoretical classes; practical classes; personal work and study; tests or assessment activities. More information on this issue will be provided on the first day of class.

5. Assessment system

According to the regulations of the University of Zaragoza, the evaluation of this subject is established as "Progressive". The final grade will be based on the following assessments:

- Evaluation of laboratory practices: carried out throughout the term (in each practical session), based on prior study, work development, preparation of reports or issue solving (30% of the final grade).
- Completion of a written assignment (supervised by one of the teachers) on a topic related to the subject in order to show the creativity and ability to apply the concepts and techniques presented in the subject (30% of the final grade).
- Presentation and oral exposition of one or more articles that define the state of the art in any of the topics covered in the subject (40% of the final grade).

In the event that a student has not carried out any of the evaluable activities mentioned above, each official call for exams will include an individual written test composed of theoretical-practical questions and problems.

6. Sustainable Development Goals

- 7 - Affordable and Clean Energy
- 8 - Decent Work and Economic Growth
- 9 - Industry, Innovation and Infrastructure