

SUBJECT TEACHING GUIDE

G673 - Real Time Systems

Degree in Computer Systems Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Optional. Year 3
Faculty	Faculty of Sciences				
Discipline	Subject Area: Computer Engineering Mention in computer Engineering				
Course unit title and code	G673 - Real Time Systems				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA				
Name of lecturer	HECTOR PEREZ TIJERO				
E-mail	hector.perez@unican.es				
Office	Facultad de Ciencias. Planta: + 3. DESPACHO DE PROFESORES (3053)				
Other lecturers	JOSE CARLOS PALENCIA GUTIERREZ				

3.1 LEARNING OUTCOMES

- Identification of the different temporal properties associated with software applications .
- Usage of different schedulability analysis techniques to meet the temporal requirements of real -time applications
- Experience with programming languages designed for implementing real-time systems
- The modeling of software systems from the real-time perspective
- Be able to choose the right schedulability analysis technique for each particular case study

4. OBJECTIVES

The objective of the course is to provide the student with the resources to design and analyse real-time systems, in which the temporal properties are essential for the correctness of the system.

6. SUBJECT PROGRAM

CONTENTS

1	Theory
1.1	Introduction: Hard and soft real-time systems. Dynamic and static scheduling policies. Schedulability analysis of periodic systems.
1.2	Extensions to the Periodic Model
1.3	Shared resources and synchronization protocols
1.4	Aperiodic events. Schedulability analysis of real-time systems with periodic and aperiodic tasks
1.5	Support in Operating Systems and in the Ada programming language
1.6	Advanced Topics
1.7	EDF
1.8	Case study
2	Real-time lab
2.1	Ada programming language
2.2	MAST: Modeling and Analysis Suite for Real-Time Applications
2.3	Scheduling and analysis of periodic tasks

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Problems and exercises	Work	No	Yes	10,00
Final exam	Written exam	Yes	Yes	50,00
Real-time lab.	Laboratory evaluation	No	Yes	40,00
TOTAL				100,00

Observations

To pass the course, the final grade must be higher than 5.0. Additionally, a minimum grade of 4.0 is required for both lab. and written evaluations.

To attend the final exams is necessary to submit all the lab assignments within the deadline .

Observations for part-time students

Part-time students can pass the course by attending the evaluations in the ordinary and/or extraordinary periods. In this case, the grade will comprise a written exam with questions and problems (60%), and a second exam in the lab (40%).

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

M.H. Klein, T. Ralya, B. Pollak, R. Obenza, and M. González Harbour. "A practitioner's Handbook for Real-Time Analysis". Kluwer Academic Pub., 1993.

