SUBJECT TEACHING GUIDE

G675 - Embedded Systems

Degree in Computer Systems Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Optional. Year 4
Faculty	Faculty of Sciences				
Discipline	Subject Area: Computer Engineering Mention in computer Engingeering				
Course unit title and code	G675 - Embedded Systems				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA
Name of lecturer	EUGENIO VILLAR BONET
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Other lecturers	HECTOR POSADAS COBO FRANCISCO JOSE ALCALA GALAN

3.1 LEARNING OUTCOMES
- To know the embedded system market and applications
- To know about the fundamental embedded system architectures and performance
- To use hardware description languages in logic synthesis
- To be able to simulate HW/SW embedded systems
- To be able to generate the embedded system verification plan with required quality

4. OBJECTIVES
To know the architecture of embedded systems
To understand platform-based design
To know embedded system design with hardware description languages
Capability for FPGA prototyping , HW design and the realization of hardware Interfaces
Knowledge about Embedded SW development
Capability for the creation of simulation models and frameworks and design debugging

6. SUBJECT PROGRAM	
CONTENTS	
1	Basic Concepts: Embedded Systems Architecture Platform-Based Design
2	Development of Embedded HW: Design with Hardware Description Languages Structural, Data-Flow and Behavioral descriptions Model, Environment and Simulation mechanism Combinational and Sequential Synthesis: Re-timing Partitioning and Hierarchy HW Architecture
3	Embedded SW Development: Cross-Compilation Embedded SW integration Embedded Operating Systems Drivers and Interrupt mechanisms Embedded SW Debugging
4	HW / SW integration: HW Interfaces FPGA Prototyping Final project

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Classroom Exercises (30%)	Work	No	Yes	30,00
Laboratory Exercises (30%)	Laboratory evaluation	No	No	30,00
Final Project (40%)	Work	No	Yes	40,00
TOTAL				100,00

Observations

To overcome the subject in Continuous Evaluation, two parts must be separately overcome:
Class Exercises and Laboratory Practices.
The Laboratory Practices will consist of a set of partial practices and a final practical project.
The final mark will be the weighted average mark of the Class Exercises (30%), Laboratory Practices (30%) and the Final Practice (40%).
If the student fails the Continuous Assessment, he/she can surpass the subject with a Written Exam. The final note in that case will be calculated from the rate of the continuous assesment (40%) and the final exam (60%).
Exercises in class
Different exercises on specific aspects of the subject and in any case at the end of each thematic block , will be offered to the students
Lab practices
Each practice will be evaluated in its aspects of systemic thinking and problem solving.

The Final Practice will be evaluated in the quality aspects of the proposed solution

Observations for part-time students

Students who can only attend part-time will be given a schedule of participation in the continueous evaluation to enable them to perform the Recovery Exam under the best conditions.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

D. Gajski, S. Abdi, A. Gerstlauer G. Schirner: "Embedded System Design: Modeling, Synthesis and Verification", Springer, 2009

LL. Terés, Y. Torroja, S. Olcóz y E. Villar: "VHDL: Lenguaje estándar de diseño electrónico", McGraw-Hill, 1997

R. Kamal: "Embedded Systems: Arquitecture, Programming and Desin", McGraw-Hill, 2nd Edition, 2008