

DEGREE CURRICULUM EMBEDDED AND UBIQUITOUS SYSTEMS

Coordination: GUIRADO FERNANDEZ, FERNANDO

Academic year 2016-17

Subject's general information

Subject name	EMBEDDED AND UBIQUITOUS SYSTEMS					
Code	103056					
Semester	1st Q(SEMESTER) CONTINUED EVALUATION					
Typology	Degree	Course	Туроlоду	Modality		
	Master's Degree in Computer Engineering	1	COMPULSORY	Attendance- based		
	Master's Degree in Informatics Engineering	1	COMPULSORY	Attendance- based		
ECTS credits	4,5					
Groups	1GG					
Theoretical credits	2.5					
Practical credits	2					
Coordination	GUIRADO FERNANDEZ, FERNANDO					
Department	INFORMATICA I ENGINYERIA INDUSTRIAL					
Teaching load distribution between lectures and independent student work	30% lecture 70% autonomous work					
Important information on data processing	Consult <u>this link</u> for more information.					
Language	English					
Distribution of credits	20% theoretical content 30% classroom activities 50% laboratory					
Office and hour of attention	Email to the professor					

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GUIRADO FERNANDEZ, FERNANDO	f.guirado@diei.udl.cat	4,5	Wednesday 18:00 - 20:00

Subject's extra information

The topic is related to the subjects: Intelligent Systems and Computer graphics and multimedia.

The common goal is to develop a videogame.

- The topic "Intelligent Systems" is based on adding artificial intelligence to the game characters .
- The topic "Computer graphics and multimedia" will work the graphic issue.
- And finally the topic "Embedded Systems and Ubiquitous Computing" the user interaction will be the main goal.

By this reason it is recommended to take this three subjects simultaneously, although it is not considered a requirement.

We recommend programming skills in C ++

Most practical course in which the study is based on solving exercises recommended and required. It is essential for individual work skills and acquire the skills set necessary to properly use the tools that work with during the course.

The use of the Virtual Campus is essential to access the resources of the subject notifications about delivery dates exercises, schedule meetings, and finally delivering practical and assessment tests.

Course taught during the 2nd half of the 1st year of the degree.

Subject corresponding to "Computers" in the module "Information Technology"

Learning objectives

University of Lleida strategic competences

- To use office automation tools for the development of technical documents
- Create presentations using office automation tools
- Understand technical documents in English

Degree-specific competences

- Ability to evaluate the hardware and software requirements for the development of embedded and ubiquitous systems
- · Understand the concept of embedded system and ubiquitous
- Know how to design, describe i validate embedded electronic systems with industrial application
- Know and be able to use methods and tools for development and debugging of programs implemented with microcontrollers
- Understand and know the different technological options for developing embedded systems
- Identify control requirements, interaction and security you have to give in an embedded system
- Identify requirements of E / S necessary to develop an embedded system

Degree-transversal competences

- Independent learning ability and adapatación to new situations, able to foster creativity and sensitivity for quality
- Analytical skills, organization or planning in the area of computer and embedded systems

Competences

General Competences

CG1. Capacity to project, calculate and design products, processes and installations in all fields of Computer Engineering.

CG8. Capacity to apply the knowledge acquired for solving problems in new and unfamiliar situations within broader and more multidisciplinary contexts, and to be capable of integrating this knowledge.

Basic Competences

CB2. That the students can apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.

CB3. Students are able to integrate knowledge and handle complexity, and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.

University of Lleida strategic competences

UDL2 - Master a foreign language.

UDL3 - Master Information and Communication Technologies.

Degree-specific competences

CE11 - Capacity to design and develop computer systems, applications and services to built-in and ubiquitous systems

Degree-transversal competences

EPS4 - Capacity to draft, design and implement projects and/or give novel solutions, using engineering-related tool

Subject contents

1. Ubiquitous Computing

- Introduction
- Ubiquitous Computing Characteristics
- Input/Output interaction
- Middleware Architectures

2. Embedded Systems

- Introduction
- Embedded systems characteristics
- Architecture
- Transducers
- Bus and communications
- Real Time Systems

Methodology

The methodology is based on :

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- Theoretical lectures in the classroom.
- Individual exercises.
- Several practical activities

Development plan

Week	Contents	Scheduling	
1	Introduction: Ubiquitous computing and Embedded Systems	6h lecture/9h autonomous work	
2	Development environments and prototiping Development environment – Arduino	6h lecture/9h autonomous work	
3	Biometric parameters - Sensors Definition of the project. BGC (Biometric Game Controller)	6h lecture/9h autonomous work	
4	Proposal definition Biometric Control parameters	6h lecture/9h autonomous work	
5	Prototype development	6h lecture/9h autonomous work	

Evaluation

Activity	% grade	Mínimum grade	Group/Individual	Mandatory
Embedded systems & Society – Being a visionary - Technical Report	10%	No	Individual	Yes
Finding the secret number		No	Individual	Yes
Sensors and interaction (1)		No	Group	Yes
Characterizing the gamer behaviour (Technical Report & Presentation) (2)		No	Group	Yes
Game controller developement (2)		No	Group	Yes

(1) Implies multiple exercises with sensors

(2) Implies an oral presentation

Bibliography

Basic Bibliography

- 1. Ubiquitous Computing Fundamentals: J. Krumm (ed.), CRC Press, 2010
- 2. Smart Sensors to Network the World: D. E. Culler, H. Mulder, Scientific American, Jun 2004.

Suplementary Bibliography

1. Ubiquitous Computing: Smart Devices, Environments and Interactions: S. Poslad, Wiley, 2009