

230607 - SBMIC - Systems Based on Microprocessors

Coordinating unit:	230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit:	710 - EEL - Department of Electronic Engineering
Academic year:	2017
Degree:	MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Teaching unit Optional) MASTER'S DEGREE IN ELECTRONIC ENGINEERING (Syllabus 2013). (Teaching unit Optional)
ECTS credits:	5
Teaching languages:	English

Teaching staff

Coordinator:	JORDI SALAZAR
Others:	MANEL DOMÍNGUEZ, VICENTE JIMÉNEZ

Degree competences to which the subject contributes

Specific:

1. Ability to use programmable logical devices, as well as to design analog and digital advanced electronics systems. Ability to design communication devices, such as routers, switches, hubs, transmitters and receivers in different bands.
2. Ability to develop electronic instrumentation, as well as transducers, actuators and sensors.

Transversal:

3. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
4. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Teaching methodology

- Lectures
- Application classes
- Laboratory classes
- Individual work (distance)
- Exercises
- Other activities
- Short answer test (Control)
- Extended answer test (Final Exam)

Learning objectives of the subject

Learning objectives of the subject:

The aim of this course is to provide students with an understanding of microprocessor-based systems and their use in instrumentation, control and communication systems. Topics covered in the course include, microprocessor architecture and organization, bus architectures, memory and I/O subsystems, timing and interfacing, peripheral controllers and programming in the 'C' language.

Learning results of the subject:

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- To know how microprocessor based systems can be applied.
- To understand the architecture and operation of a microprocessor system.
- To be able to use a microprocessor development system to prepare and run a program.
- To be able to implement microprocessor-based systems, including both hardware and software, using a specific microprocessor or microcontroller

Study load

Total learning time: 125h	Hours large group:	26h	20.80%
	Hours medium group:	0h	0.00%
	Hours small group:	13h	10.40%
	Guided activities:	0h	0.00%
	Self study:	86h	68.80%

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Content

<p>1. Introduction</p>	<p>Learning time: 16h Theory classes: 4h Self study : 12h</p>
<p>Description: Course description. Programmable electronic systems. Architecture of a microprocessor system.</p>	
<p>2. The CPU</p>	<p>Learning time: 20h Theory classes: 4h Laboratory classes: 2h Self study : 14h</p>
<p>Description: ALU, registers, control unit and datapath. Instruction sets: RISC and CISC. Bus cycles</p>	
<p>3. Interfacing memory</p>	<p>Learning time: 29h Theory classes: 6h Laboratory classes: 3h Self study : 20h</p>
<p>Description: Types of memory: ROM and RAM. Interfacing memory to the processor: Address decoding and timing.</p>	
<p>4. The I/O subsystem</p>	<p>Learning time: 22h Theory classes: 4h Laboratory classes: 4h Self study : 14h</p>
<p>Description: I/O interfaces, programmed and interrupt-driven I/O. DMA</p>	
<p>5. Advanced microprocessor systems</p>	<p>Learning time: 16h Theory classes: 4h Self study : 12h</p>
<p>Description: Pipelined and superscalar processors. Memory Hierarchy and Cache</p>	

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6. Software development tools	Learning time: 22h Theory classes: 4h Laboratory classes: 4h Self study : 14h
Description: Development process, Integrated development environment, Testing and debugging tools, RTOS	

Planning of activities

LABORATORY

Description:
Continuous assessment of laboratory exercises to develop along the course.

EXERCISES

Description:
Exercises to strengthen the theoretical knowledge.

SHORT ANSWER TEST (CONTROL)

Description:
Mid term control.

EXTENDED ANSWER TEST (FINAL EXAMINATION)

Description:
Final examination.

Qualification system

Final examination: 60%
Mid-term exam 15%
Laboratory assessments: 25%

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Bibliography

Basic:

Clements, A. Microprocessor systems design: 68000 hardware, software, and interfacing. 3rd ed. Boston: PWS, 1997. ISBN 0534948227.

Complementary:

Laplante, P.A.; Ovaska, S.J. Real-time systems design and analysis : tools for the practitioner. 4th ed. Hoboken, New Jersey: Wiley, 2012. ISBN 978-0-470-76864-8.