

## 340608 - SETR-R2O07 - Embedded and Real Time Systems

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering  
Teaching unit: 707 - ESAII - Department of Automatic Control  
Academic year: 2016  
Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012).  
(Teaching unit Compulsory)  
ECTS credits: 5 Teaching languages: Catalan

### Teaching staff

Coordinator: Francesc Xavier Parra Llanas

### Learning objectives of the subject

### Study load

Total learning time: 125h	Hours large group:	15h	12.00%
	Hours medium group:	0h	0.00%
	Hours small group:	30h	24.00%
	Guided activities:	0h	0.00%
	Self study:	80h	64.00%

## 340608 - SETR-R2O07 - Embedded and Real Time Systems

### Content

#### Theory

Degree competences to which the content contributes:

Description:

Objectives

The objective of the subject is to obtain that the student understands the problematic individual of the realtime systems, and the characteristics differentiate that them from other computer science systems. The most important methods that they are used to develop realtime systems with a high degree of reliability, especially those that talk about in accordance with the time, the planning of the use of the resources, the prevention and the tolerance to failures, and the organization of software and her application will be learned. The control applications of processes will be contemplated of special form. Several techniques will consider to develop these applications and the mechanisms necessary will settle down to evaluate their benefits.

Will be some tools (programming languages and operating systems) adapted for the accomplishment of realtime systems and the theoretical concepts will study necessary to approach the accomplishment of computer science systems with a determinist temporary behavior.

Contents

1. Introduction to the computer science systems of real time.
  - 1.1 Definition of realtime system.
  - 1.2 Examples of realtime systems.
  - 1.3 Characteristics of the realtime systems.
  - 1.4 Type of realtime systems
  - 1.5 Programming of the realtime systems: Smalltalks.
2. Multiprogrammed operating systems
  - 2.1 Introduction.
  - 2.2 RTOS. Idea of deadline.
  - 2.3 Memory.
  - 2.4 Input/output.
  - 2.5 Processes, concurrence and communication.
  - 2.6 Languages and realtime operating systems.
3. Cyclical systems.
  - 3.1 Concepts and methodology
  - 3.2 Cyclical planning
  - 3.3 Segmentation of tasks
  - 3.4 Construction of the cyclical plan of execution
  - 3.5 Programming of the cyclical executive
4. Management of the time
  - 4.1 Reference systems of time
  - 4.2 Temporary clocks, retardations and limits
  - 4.3 Temporary requirements
  - 4.4 Tolerance to failures
5. Planning of tasks
  - 5.1 Concepts and methodology
  - 5.2 Planning with fixed priorities
  - 5.3 Interaction between tasks
  - 5.4 Planning with dynamic priorities
  - 5.5 Model of tasks generalized
6. Multiprogramming
  - 6.1 Management of processes and memory
  - 6.2 Synchronization and communication between processes



## 340608 - SETR-R2O07 - Embedded and Real Time Systems

### Qualification system

The qualification of the subject considers all the work carried out throughout the course.

The final qualification is obtained to apply the following formula:

$$NF = 0,35 Q1 + 0,35 Q2 + 0,3 Q3$$

where:

Q1=mark of the first partial test.

Q2=mark of the second partial test.

Q3=mark of the laboratory practicals.

Final NF=mark of the subject.

### Bibliography