

## Course guide

### 330450 - SCE - Embedded Control Systems

Last modified: 01/06/2023

**Unit in charge:** Manresa School of Engineering  
**Teaching unit:** 750 - EMIT - Department of Mining, Industrial and ICT Engineering.  
**Degree:** BACHELOR'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2017). (Optional subject).  
**Academic year:** 2023    **ECTS Credits:** 6.0    **Languages:** Catalan

#### LECTURER

**Coordinating lecturer:** Vicente Rodrigo, Jesús

**Others:**

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

**Specific:**

1. The ability to specify, analyze, design, evaluate, and document microcomputer-based systems, as well as their implementation alternatives in order to form a built-in control system.
2. The ability to use microcomputer tools and programming languages.
3. The knowledge and ability to use existing tools and instrumentation for the analysis, design, development and verification of electronic, computer and communications systems.

**Transversal:**

7. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
6. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
5. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

#### TEACHING METHODOLOGY

#### LEARNING OBJECTIVES OF THE SUBJECT

#### STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	10.00
Self study	90,0	60.00
Hours large group	45,0	30.00

**Total learning time:** 150 h



## CONTENTS

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### title english

**Description:**

content english

**Full-or-part-time:** 6h

Theory classes: 3h

Self study : 3h

### title english

**Description:**

content english

**Full-or-part-time:** 35h

Theory classes: 12h

Practical classes: 1h

Self study : 22h

### title english

**Description:**

content english

**Full-or-part-time:** 84h

Theory classes: 22h

Practical classes: 12h

Self study : 50h

### title english

**Description:**

content english

**Full-or-part-time:** 25h

Theory classes: 8h

Practical classes: 2h

Self study : 15h

## ACTIVITIES

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### 1. CLASSE EXPOSITIVA I DE PROBLEMES (ENG)

**Full-or-part-time:** 41h

Theory classes: 41h



## 2. CLASSE DE LABORATORI (ENG)

**Full-or-part-time:** 45h  
Laboratory classes: 15h  
Self study: 30h

## 3. TREBALL PERSONAL INDIVIDUAL/ EN GRUP (ENG)

**Full-or-part-time:** 30h  
Self study: 30h

## 4. PROVES (ENG)

**Full-or-part-time:** 34h  
Theory classes: 4h  
Self study: 30h

## GRADING SYSTEM

## BIBLIOGRAPHY

### Basic:

- Noergaard, Tammy. Embedded systems architecture: a comprehensive guide for engineers and programmers [on line]. 2nd ed. Amsterdam: Elsevier/Newnes, 2013 [Consultation: 10/06/2022]. Available on: <https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780750677929/embedded-systems-architecture>. ISBN 9780123821966.
- Grace, Thomas. Programming and interfacing Atmel AVR microcontrollers. Boston: Cengage Learning PTR, 2016. ISBN 9781305509993.
- Toulson, Rob; Wilmschurst, Tim. Fast and effective embedded systems design: applying the ARM mbed [on line]. Boston: Elsevier/Newnes, 2012 [Consultation: 10/06/2022]. Available on: <https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780080977683/fast-and-effective-embedded-systems-design>. ISBN 9780080977683.
- Margush, Timothy S. Some assembly required: assembly language programming with the AVR microcontroller [on line]. Boca Raton: CRC Press, 2012 [Consultation: 10/06/2022]. Available on: <https://www-taylorfrancis-com.recursos.biblioteca.upc.edu/books/mono/10.1201/b11791/assembly-required-timothy-margush>. ISBN 9781439820643.
- Mazidi, Muhammad Ali; Naimi, Sarmad; Naimi, Sepehr. The AVR microcontroller and embedded systems: using Assembly and C [on line]. 2nd ed. Mazidi & Naimi, 2017 [Consultation: 31/05/2022]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=5174828>. ISBN 9780997925968.
- Manuals de referència i Notes d'aplicació del fabricant (en anglès).
- Barrett, Steven F.; Pack, Daniel J. Atmel AVR microcontroller primer: programming and interfacing. San Rafael, California: Morgan & Claypool, 2008. ISBN 9781598295412.