

Course guide

330228 - PBN - Low-Level Programming

Last modified: 25/05/2026

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.

Degree: BACHELOR'S DEGREE IN ICT SYSTEMS ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: SEBASTIAN VILA MARTA

Others: Aguila Lopez, Francisco Del
Bonet Dalmau, Jordi

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. (ENG) El coneixement i la capacitat d'aplicar els procediments algorítmics fonamentals a la resolució de problemes fent ús de llenguatges d'alt i baix nivell.
2. The ability to analyze, design and maintain computer applications as well as knowledge of the principles and tools of software engineering and its application.
3. Knowledge and ability to use existing tools and instrumentation for the analysis, design, development and verification of electronic, computer and communications systems.
4. The ability to perform the typical activities of the degree, taking into account the corresponding standards, rules and regulations.
5. The ability to analyze, design and implement, select and use real-time data processing, control and automation systems, especially in embedded systems.

Transversal:

7. EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.
8. 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.
9. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.
- 05 TEQ N2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT



STUDY LOAD

Type	Hours	Percentage
Hours small group	30,0	20.00
Self study	90,0	60.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

(ENG) TEMA 1: Llenguatge de programació C

(ENG) TEMA 2: El llenguatge C en el context de l'AVR

(ENG) TEMA 3: Python en el context de baix nivell

ACTIVITIES

(ENG) ACTIVITAT 1: EXAMEN

Full-or-part-time: 2h

Theory classes: 2h

(ENG) ACTIVITAT 2: ESTUDI DE CONTINGUTS

Full-or-part-time: 25h

Self study: 25h

(ENG) ACTIVITAT 3: CLASSE EXPOSITIVA

Full-or-part-time: 12h

Theory classes: 12h

(ENG) ACTIVITAT 4: CLASSE DE PROBLEMES

Full-or-part-time: 12h

Theory classes: 12h



(ENG) ACTIVITAT 5: CLASSE DE LABORATORI

Full-or-part-time: 41h

Laboratory classes: 26h

Self study: 15h

(ENG) ACTIVITAT 6: RESOLUCIÓ DE PROBLEMES

Full-or-part-time: 30h

Self study: 30h

(ENG) ACTIVITAT 7: PROJECTE

Full-or-part-time: 28h

Theory classes: 4h

Laboratory classes: 4h

Self study: 20h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the [Action Framework for Academic Integrity in Assessment at the UPC](#).

BIBLIOGRAPHY

Basic:

- Kernighan, Brian W.; Dennis M. Ritchie. The C programming language [on line]. 2nd ed. New Jersey: Prentice Hall, 1988 [Consultation: 20/06/2024]. Available on: https://search-ebscohost-com.recursos.biblioteca.upc.edu/login.aspx?direct=true&AuthType=ip,uid&db=nlebk&AN=1598613&site=ehost-live&ebv=EB&ppid=pp_Cover. ISBN 0131103628.
- Barnett, Richard H.; O'Cull, Larry; Cox, Sarah. Embedded C programming and the Atmel AVR. 2th ed. New York: Delmar, 2007. ISBN 9781418039592.
- Barrett, Steven F. Embedded systems design with the Atmel AVR microcontroller [on line]. San Rafael, Calif.: Morgan & Claypool, 2010 [Consultation: 14/06/2024]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=881375>. ISBN 9781608451272.
- Harbison, Samuel P.; Steele, Guy L. C, a reference manual. 5th ed. Upper Sadle River: Prentice-Hall, 2002. ISBN 013089592X.