

Course guide

330232 - PCTR - Concurrent and Real-Time 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: ANTONI ESCOBET CANAL

Others: SEBASTIAN VILA MARTA

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. The ability to analyze, design and maintain computer applications as well as knowledge of the principles and tools of software engineering and its application.
2. Knowledge and ability to use existing tools and instrumentation for the analysis, design, development and verification of electronic, computer and communications systems.
3. The ability to perform the typical activities of the degree, taking into account the corresponding standards, rules and regulations.
4. Knowledge of and the ability to use existing tools and instrumentation for the analysis, design, development and verification of electronic, computer and communication system
5. The ability to analyze, design and implement, select and use real-time data processing, control and automation systems, especially in embedded systems.
6. The ability to perform the typical activities of the degree, taking into account the corresponding standards, rules and regulations.

Transversal:

7. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.
8. 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.
9. 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.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

STUDY LOAD

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

Total learning time: 150 h



CONTENTS

(ENG) TEMA 1: Introducció a la Concurrencia

(ENG) TEMA 2: Programació concurrent

(ENG) TEMA 3: Sistemes en Temps real

(ENG) TEMA 4: Disseny i Implementació de Sistemes en Temps Real

(ENG) TEMA 5: Planificació de processos de Temps Real

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: 14h

Theory classes: 14h

(ENG) ACTIVITAT 4: CLASSE DE PROBLEMES

Full-or-part-time: 14h

Theory classes: 14h

(ENG) ACTIVITAT 5: TREBALL DE LABORATORI

Full-or-part-time: 65h

Laboratory classes: 30h

Self study: 35h

(ENG) ACTIVITAT 6: RESOLUCIÓ DE PROBLEMES**Full-or-part-time:** 30h

Self study: 30h

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:**

- Brooke, P. J.; Paige, R. F. Practical distributed processing [on line]. London: Springer, 2008 [Consultation: 07/10/2022]. Available on : <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=6310529>. ISBN 9781846288401.
- Cesarini, F.; Thomson, S. Erlang programming [on line]. Farnham: O'Reilly, 2009 [Consultation: 27/05/2022]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=443218>. ISBN 9780596518189.
- Kopetz, H. Real-time systems: design principles for distributed embedded applications [on line]. 2n ed. Nova York: Springer, 2011 [Consultation: 10/06/2022]. Available on: <https://link-springer-com.recursos.biblioteca.upc.edu/book/10.1007/b116085>. ISBN 9781441982360.
- Buttazzo, Giorgio. Hard real-time computing systems: predictable scheduling algorithms and applications [on line]. 3rd ed. New York: Springer, 2011 [Consultation: 27/05/2022]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=3067230>. ISBN 9781461406754.
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