

220040 - Real-Time Programming and Database Systems

Coordinating unit:	205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	723 - CS - Department of Computer Science
Academic year:	2019
Degree:	BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits:	3
Teaching languages:	English

Teaching staff

Coordinator: Josefina López Herrera

Prior skills

programming experience: c/c++

Teaching methodology

Traditional lectures or distance learning.
Students will have to design in group a real-time control system.
Students will have to design and implement in group a case study.

Learning objectives of the subject

Module 1 - Real time algorithms design and implementation: To be able to design both the software and hardware aspects of real-time systems specific concepts, design method, specific functions and algorithms of real-time operating systems, fault tolerance

Module 2 - Introduction to database systems, the student should be able to:

- Construct an enhanced entity relationship model at a conceptual level
- Map the model into a relational database system
- Implement the given schema on a relational DBMS
- Use a database language for manipulating and querying the data

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Study load

Total learning time: 75h	Hours large group:	30h	40.00%
	Self study:	45h	60.00%

Content

<p>1. Module 1: Real time algorithms design and implementation</p>	<p>Learning time: 53h Theory classes: 23h Self study : 30h</p>
<p>Description:</p> <ul style="list-style-type: none"> 1.1 Introduction to real-time systems (Unified Modeling Language) 1.2 Software design and implementation methods for real-time systems 1.3 Real-time operating systems 1.4 Programming in C on C++ 1.5 Fault tolerance <p>Related activities:</p> <p>Traditional lectures or distance learning. Students will have to design in group a real-time control system.</p>	
<p>2. Module 2: Introduction to database system</p>	<p>Learning time: 22h Theory classes: 7h Self study : 15h</p>
<p>Description:</p> <ul style="list-style-type: none"> 2.1 Introduction 2.2 Database concepts <ul style="list-style-type: none"> 2.2.1 Databases 2.2.2 Specific purpose vs. resource databases 2.2.3 Relational databases <ul style="list-style-type: none"> - One-to-one relationships - One-to-many relationships - Many-to-many relationships - Primary and foreign keys - Data types and definition - Look-up tables - Database applications <p>Related activities:</p> <p>Traditional lectures or distance learning. Students will have to design and implement in group a case study.</p>	

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Qualification system

Activities of practical classes, weight: 20 %
Module 1: evaluation, weight: 30 %
Module2: evaluation, weight: 20 %
Project module 1 and Case Study module2 , weight: 30 %

Unsatisfying results of the final exam could be repeated in an exam to be carried out during the period of the final exams. Students with grades lower than 5 points (unsatisfactory) can retake the exam. The new grade, if it is equal or higher than 5 points, will substitute the original one with a grade of 5.

Regulations for carrying out activities

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Bibliography

Basic:

Burns, A.; Wellings, A.J. Real-time systems and programming languages: Ada, Real-Time Java and C/Real-Time POSIX. 4th ed. Harlow [etc.]: Addison-Wesley, 2009. ISBN 978-0-321-41745-9.

López Herrera, J.. Programación en tiempo real y bases de datos: un enfoque práctico [on line]. Barcelona: Iniciativa Digital Politècnica, 2011 [Consultation: 07/07/2017]. Available on: <<http://hdl.handle.net/2099.3/36650>>. ISBN 9788476536582.

Sifakis, J.; Bouyssounouse, B. Embedded systems design: the ARTIST roadmap for research and development. New York: Springer, 2005. ISBN 9783540251071.

Silberschatz, A.; Korth, H.F.; Sudarshan, S. Database system concepts. 6th ed. New York: McGraw-Hill, 2011. ISBN 9780073523323.

Silberschatz, A.; Gagne, G.; Galvin, P.B. Fundamentos de sistemas operativos. 7a ed. Madrid, (etc.): McGraw-Hill, 2006. ISBN 8448146417.

Complementary:

Levine, W.S.; Hristu-Varsakelis, D. Handbook of networked and embedded control system. Boston [etc.]: Birkhäuser, 2005. ISBN 978-0-8176-3239-7.

Date, C. J. View updating and relational theory: solving the view update problem. Sebastopol: O'Really, 2013. ISBN 9781449357849.