**Course guide**

**220040 - RTP - Real-Time Programming and Database Systems**

<table>
<thead>
<tr>
<th>Unit in charge:</th>
<th>Terrassa School of Industrial, Aerospace and Audiovisual Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching unit:</td>
<td>723 - CS - Department of Computer Science.</td>
</tr>
<tr>
<td>Degree:</td>
<td>BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN INSTRUMENTATION AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).</td>
</tr>
<tr>
<td></td>
<td>BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).</td>
</tr>
</tbody>
</table>

**Academic year:** 2023  **ECTS Credits:** 3.0  **Languages:** English

**LECTURER**

**Coordinating lecturer:** Josefina López Herrera

**Others:**

**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
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>30.0</td>
<td>40.00</td>
</tr>
<tr>
<td>Self study</td>
<td>45.0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 75 h

CONTENTS

1. Module 1: Real time algorithms design and implementation

Description:
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

Related activities:
Traditional lectures or distance learning. Students will have to design in group a real-time control system.

Full-or-part-time: 53h
Theory classes: 23h
Self study : 30h

2. Module 2: Introduction to database system

Description:
2.1 Introduction
2.2 Database concepts
2.2.1 Databases
2.2.2 Specific purpose vs. resource databases
2.2.3 Relational databases
- 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

Related activities:
Traditional lectures or distance learning. Students will have to design and implement in group a case study.

Full-or-part-time: 22h
Theory classes: 7h
Self study : 15h
GRADING SYSTEM

Activities of practical classes, weight: 20 %
Module 1: evaluation, weight: 30 %
Module 2: evaluation, weight: 20 %
Project module 1 and Case Study module 2, 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.

EXAMINATION RULES.

- BIBLIOGRAPHY

Basic:

Complementary: