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>Total learning time: 75h</th>
<th>Hours large group: 30h</th>
<th>40.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study: 45h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>

**Content**

### 1. Module 1: Real time algorithms design and implementation

**Learning time:** 53h
- Theory classes: 23h
- Self study: 30h

**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.

### 2. Module 2: Introduction to database system

**Learning time:** 22h
- Theory classes: 7h
- Self study: 15h

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

**Qualification 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.

**Regulations for carrying out activities**

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**Bibliography**

**Basic:**


**Complementary:**
