220104 - Numerical and Quantitative Methods

**Coordinating unit:** 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering

**Teaching unit:**
- 732 - OE - Department of Management
- 749 - MAT - Department of Mathematics

**Academic year:** 2018

**Degree:** BACHELOR’S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)

**ECTS credits:** 7,5

**Teaching languages:** Catalan

**Degree competences to which the subject contributes**

**Specific:**
1. An adequate understanding of business concepts and the institutional and legal framework of companies. An understanding of business organisation and management
2. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation

**Transversal:**
1. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

**Teaching methodology**

The course is divided into three parts:
- Lecture sessions.
- Practical sessions (exercises and problems).
- Self-study and doing exercises and activities.

In the content of the sessions, teachers will introduce the theoretical foundations of the subject, concepts, methods and illustrate with examples appropriate to facilitate understanding.

In practical sessions in the classroom, teachers guide students in applying theoretical concepts to problem solving, based on critical thinking at all times. The exercises will be proposed that students solve exercises in the classroom and outside the classroom, to promote contact and use the basic tools needed to solve problems.

Students, autonomously, should work the material provided by the teacher and the result of the work sessions, to assimilate concepts. Teachers will provide a study plan and monitoring activities (ATENEA).

**Learning objectives of the subject**

Provide students with the basic tools and methods of computation and mathematical programming to study how to implement other subjects for the degree.
### Study load

<table>
<thead>
<tr>
<th>Total learning time: 187h 30m</th>
<th>Hours large group: 61h 32.53%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h 0.00%</td>
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<td>Hours small group: 14h 7.47%</td>
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<td>Self study: 112h 30m 60.00%</td>
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### Content

#### Module 1: Numerical Methods.

**Learning time:** 150h
- Theory classes: 46h
- Laboratory classes: 14h
- Self study: 90h

#### Module 2: Quantitative Methods.

**Learning time:** 37h 30m
- Theory classes: 15h
- Self study: 22h 30m
## Planning of activities

| ACTIVITY 1: LARGE GROUP SESSIONS / THEORY | Hours: 112h 15m  
Theory classes: 56h  
Self study: 56h 15m |
|------------------------------------------|---------------------------------------------------------------------|
| ACTIVITY 2: SMALL GROUP SESSIONS / PRACTICES | Hours: 36h 55m  
Laboratory classes: 14h  
Self study: 22h 55m |
| ACTIVITY 3: MIDTERM EXAM | Hours: 2h  
Theory classes: 2h |
| ACTIVITY 4: FINAL EXAM | Hours: 3h  
Theory classes: 3h |
| ACTIVITY 5: PRACTICES | Hours: 33h 20m  
Self study: 33h 20m |

## Qualification system

The final grade depends on the following evaluative acts:
- Final Exam Module 2: 20%
- Partial Exam Module 1: 25%
- Final exam Module 1: 45%
- Activities Module 1: 10%

The course will provide for procedures to recover unsatisfactory results obtained in the first evaluation.

## Bibliography

**Basic:**