Course guide
240712 - 240712 - Calculus I

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 749 - MAT - Department of Mathematics.
Degree: BACHELOR’S DEGREE IN INDUSTRIAL TECHNOLOGIES AND ECONOMIC ANALYSIS (Syllabus 2018).
(Compulsory subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: English

LECTURER

Coordinating lecturer: GEMMA HUGUET CASADES

Others: Delshams I Valdes, Amadeu
        Huguet Casades, Gemma

TEACHING METHODOLOGY

In the lectures we will present the basic theoretical contents in combination with exercises that illustrate the notions and most important results. We will also introduce modeling problems to illustrate the potentialities of calculus in the applied sciences, with special emphasis on economy.

In the workshop sessions, the students will be introduced to the Matlab software to perform effective calculations and show its application for actual problems, including problems in economic sciences.

The collections of exercises will be sufficiently extensive so that the student has enough material to practise. In this way the students will be able to complete their learning in an autonomous way.

LEARNING OBJECTIVES OF THE SUBJECT

The main goal of the course is to provide the basic analytical and numerical tools for the analysis of real functions of a single variable, and alongside to show its use in the modelling of scientific and technical problems, particularly in economics.

This course also aims to serve as an introduction to the study methodology of the degree, as well as a fundamental support for the good understanding of the rest of the courses. To that end, we emphasize its instrumental character.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>56,0</td>
<td>37.33</td>
</tr>
<tr>
<td>Hours small group</td>
<td>4,0</td>
<td>2.67</td>
</tr>
</tbody>
</table>

Total learning time: 150 h
## CONTENTS

### Continuity

**Description:**

**Full-or-part-time:** 21h 30m  
Theory classes: 4h  
Practical classes: 4h  
Self study: 13h 30m

### The Derivative

**Description:**

**Full-or-part-time:** 34h 30m  
Theory classes: 6h  
Practical classes: 6h  
Self study: 22h 30m

### Integration

**Description:**

**Full-or-part-time:** 44h  
Theory classes: 10h  
Practical classes: 10h  
Self study: 24h

### Series

**Description:**

**Full-or-part-time:** 35h  
Theory classes: 7h  
Practical classes: 7h  
Self study: 21h
Matlab Workshop

Description:

Full-or-part-time: 15h
Practical classes: 6h
Self study : 9h

GRADING SYSTEM

During the semester there will be
- One midterm exam (ME), on the date determined by the School.
- Short tests about the Matlab Workshop (WE).
- The final exam (FE), on the date determined by the School.

Exams will contain a mixture of computational and conceptual problems. The final exam is likely to be a mixture of multiple choice and free response problems. Participation in class will be taken into account in the computation of the final grade.

The final mark (FM) will be computed according to this formula:
FM = max(0.6*FE + 0.1*WE + 0.3*ME, 0.9*FE+0.1*WE)

The part corresponding to the Matlab Workshop will not be re-evaluated. Therefore, those students that take the re-evaluation exam (RE), the final mark will be computed according to this formula:
FM = 0.9*RE+0.1*WE

BIBLIOGRAPHY

Basic: