Course guide
390231 - MAT - Mathematics

Unit in charge: Barcelona School of Agri-Food and Biosystems Engineering
Teaching unit: 749 - MAT - Department of Mathematics.
Degree: BACHELOR'S DEGREE IN LANDSCAPE ARCHITECTURE (Syllabus 2019). (Compulsory subject).
Academic year: 2022  ECTS Credits: 6.0  Languages: Catalan

LECTURER
Coordinating lecturer: Blanco Abellan, Monica

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES
Specific:
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre: álgebra lineal; geometría; ecuaciones lineales.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT
The course Mathematics addresses general formative purposes. It aims to generate learning skills and to promote the assessment of the power and usefulness of mathematical models and procedures, in order to understand and to make decisions in the techno-scientific area. Mathematics plays a fundamental role in helping to understand the techno-scientific environment and to deal with it in an autonomous and creative way. As in all the areas of mathematics, systematic and constant work, accurate reasoning and interpretation, and abstraction will be enhanced throughout the teaching-learning process. By the end of the course the student will be able to carry out logical reasoning, to develop analytical and critical thinking, to evaluate arguments rigorously and to communicate them effectively. Students will achieve fundamental concepts connected with linear algebra and geometry, and their applications to drawing, graphical expression and projects. Regarding the area of programming and applications students will use worksheets and specific programs to solve complex mathematical problems.

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>40,0</td>
<td>26.67</td>
</tr>
<tr>
<td>Hours small group</td>
<td>20,0</td>
<td>13.33</td>
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</tbody>
</table>

Total learning time: 150 h
**CONTENTS**

**Linear Algebra**

**Description:**
1. Matrix algebra.
2. Determinants.
4. Inequalities.

**Related activities:**
Activity 1: Lectures.
Activity 2: Individual written test.
Activity 3: Problem and exercise solving.
Activity 4: Computer Lab Sessions.
Activity 5: Questionnaires.

**Related competencies:**
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre: álgebra lineal; geometría; ecuaciones lineales.

**Full-or-part-time:** 36h
- Theory classes: 10h
- Laboratory classes: 6h
- Self study: 20h

**Real functions of real variable**

**Description:**
1. Functions: types and graphs.
2. Limits and continuity.
3. Derivatives.
4. Optimization.
5. Antiderivatives.
6. Areas and volumes.

**Related activities:**
Activity 1: Lectures.
Activity 2: Individual written test.
Activity 3: Problem and exercise solving.
Activity 4: Computer Lab Sessions.
Activity 5: Questionnaires.

**Related competencies:**
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre: álgebra lineal; geometría; ecuaciones lineales.

**Full-or-part-time:** 46h
- Theory classes: 10h
- Laboratory classes: 6h
- Self study: 30h
Analytic Geometry

Description:
2. Lines and planes in space.
3. Incidence relations in space.
5. Distance.
6. Conic Sections.
7. Quadric surfaces.

Related activities:
Activity 1: Lectures.
Activity 2: Individual written test.
Activity 3: Problem and exercise solving.
Activity 4: Computer Lab Sessions.
Activity 5: Questionnaires.

Related competencies:
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre: álgebra lineal; geometría; ecuaciones lineales.

Full-or-part-time: 40h
Theory classes: 14h
Laboratory classes: 6h
Self study: 20h

Trigonometry. Trigonometric functions

Description:
1. Trigonometry.
2. Trigonometric functions.
3. Inverse trigonometric functions.
4. Trigonometric identities.

Related activities:
Activity 1: Lectures.
Activity 2: Individual written test.
Activity 3: Problem and exercise solving.
Activity 4: Computer Lab Sessions.
Activity 5: Questionnaires.

Related competencies:
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre: álgebra lineal; geometría; ecuaciones lineales.

Full-or-part-time: 28h
Theory classes: 6h
Laboratory classes: 2h
Self study: 20h
# ACTIVITIES

## ACTIVITY 1. LECTURES

**Related competencies:**
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre:
- álgebra lineal;
- geometría; ecuaciones lineales.

**Full-or-part-time:** 98h
- Theory classes: 38h
- Self study: 60h

## ACTIVITY 2. INDIVIDUAL WRITTEN TEST

**Description:**
Midterm written exam. Final written exam.

**Material:**
- Calculator.
- One formulae sheet.

**Related competencies:**
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre:
- álgebra lineal;
- geometría; ecuaciones lineales.

**Full-or-part-time:** 2h
- Theory classes: 2h

## ACTIVITY 3. EXERCISES AND PROBLEM SOLVING

**Material:**
- Course material available in Atenea.

**Related competencies:**
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre:
- álgebra lineal;
- geometría; ecuaciones lineales.

**Full-or-part-time:** 20h
- Laboratory classes: 10h
- Self study: 10h

## ACTIVITY 4. COMPUTER LAB SESSIONS

**Material:**
- Course material available in Atenea.

**Related competencies:**
CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre:
- álgebra lineal;
- geometría; ecuaciones lineales.

**Full-or-part-time:** 20h
- Laboratory classes: 10h
- Self study: 10h
ACTIVITY 5: QUIZZES

Material:
Quizzes - virtual campus Atenea.

Full-or-part-time: 10h
Self study: 10h

GRADING SYSTEM

N1: The continuous assessment will be developed mainly in the context of small groups and computer lab sessions.
N2: There will be a mid-semester written exam.
N3: There will be a final (global) written exam at the end of the semester.

Final Mark = 0.25 N1 + 0.30 N2 + 0.45 N3

Students who fail to pass the course can sit for the written exams N2 and N3 in the reassessment exam period.

BIBLIOGRAPHY

Basic:

Complementary: