Course guides
230903 - C - Calculus

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 749 - MAT - Department of Mathematics.
Degree: BACHELOR'S DEGREE IN ELECTRONIC ENGINEERING AND TELECOMMUNICATION (Syllabus 2018).
(Compulsory subject).

Academic year: 2020 ECTS Credits: 6.0 Languages: Catalan

LECTURER

Coordinating lecturer: Josep M. Aroca Farrerons
Others: Aroca Farrerons, Josep M.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUDES

Specific:
CE3. (ENG) GREELC: Comprendió i domibbi dels conceptes bàsics sobre les lleis generals de la macànica, termodinànica, camps i ones i electromagnetisme i la seva aplicació per a la resolució de problmes propis de l'enginyeria. (Mòdul de formació bàsica).

Generic:
CG3. (ENG) GREELEC: coneixmetn de matèries bàsiques i tecnològies que el capacitin per a l'aprenentatge de nous mètodes i tecnologies, així com que el dotin d'una gran versatilitat per adaptar-se a noves situacions.

Transversal:
CT6. (ENG) GREELEC: APRENENTATGE AUTÒNOM: Detectar deficiències en el propi coneixement i superarles mitjançant la reflexió crítica i l'elecció de la millor actuació per ampliar coneixements.

Basic:
CB1. (ENG) GREELEC: Que els estudiants hagin demostrat tenir i comprendre coneixements en una àrea d'estudi que neix de la base de l'educació secundària general, i que sol trobar un nivell que, si bé es recolza en llibres de text avançats, inlou també alguns aspectes que impliquin coneixements procedents de la vanguardia del seu camp d'estudi.

TEACHING METHODOLOGY

Problem solving classes
On campus lessons
Individual work (no face to face lessons)
Short answer controls and homework
Final exam (long answer exam)
LEARNING OBJECTIVES OF THE SUBJECT

Achieving sufficient level of one variable Calculus to deal with, or to base the treatment of phenomena that can be described in these terms. Also support of parties other subjects that require mastery of real functions of one variable. Introduction to functions defined by series.

Learning outcomes:

Clearly expresses the process of planning and problem solving, and problems that require the use of calculus of one variable. Comprehend and dominates the most useful methods for solving problems in the field of one variable. He/she is able to confront the equations and numerical description of problems with descriptive statement. He/she uses more than one source, and uses it as complementary to observe the events described in the main text. Identifies problems and models from open situations. Study alternatives for their resolution.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>13,0</td>
<td>8.67</td>
</tr>
<tr>
<td>Hours large group</td>
<td>52,0</td>
<td>34.67</td>
</tr>
<tr>
<td>Self study</td>
<td>85,0</td>
<td>56.67</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

Unit 1. Real numbers

Description:

Full-or-part-time: 11h 30m
Theory classes: 5h
Self study : 6h 30m

Unit 2. Functions

Description:

Full-or-part-time: 16h 06m
Theory classes: 7h
Self study : 9h 06m
Unit 3. Limits of functions

Description:
Uncertainties: infinite/infinite (rational functions), infinity-infinity (difference of roots or logarithms), 1^infinity (number e).

Full-or-part-time: 16h 06m
Theory classes: 7h
Self study: 9h 06m

Unit 4. Continuity

Description:

Full-or-part-time: 9h 21m
Theory classes: 4h
Self study: 5h 21m

Unit 5. Differentiability

Description:

Full-or-part-time: 16h 06m
Theory classes: 7h
Self study: 9h 06m

Unit 6. Taylor polynomials

Description:

Full-or-part-time: 11h 30m
Theory classes: 5h
Self study: 6h 30m

Unit 7. Analysis of the variation of functions

Description:

Full-or-part-time: 9h 12m
Theory classes: 4h
Self study: 5h 12m
# Unit 8. Primitives

**Description:**

**Full-or-part-time:** 16h 06m  
Theory classes: 7h  
Self study : 9h 06m

# Unit 9. Riemann's Integral

**Description:**

**Full-or-part-time:** 9h 12m  
Theory classes: 4h  
Self study : 5h 12m

# Unit 10. Improper integrals.

**Description:**

**Full-or-part-time:** 9h 12m  
Theory classes: 4h  
Self study : 5h 12m

# Unit 11. Numerical series and power series

**Description:**

**Full-or-part-time:** 13h 48m  
Theory classes: 6h  
Self study : 7h 48m

# Unit 12. Numerical methods

**Description:**

**Full-or-part-time:** 11h 30m  
Theory classes: 5h  
Self study : 6h 30m
ACTIVITIES

FINAL EXAMEN

Description:
Final exam

Full-or-part-time: 3h
Theory classes: 3h

CONTROL

Description:
Short answer controls

Full-or-part-time: 3h
Theory classes: 3h

GRADING SYSTEM

Kind of exams to do and weight on the final evaluation:

Final exam: 60%
Continuous evaluation: 40%

On this subject will be evaluated the degree competences:

- Self-directed learning (Elementary level)
- Ability to identify, formulate and solve engineering problems (Elementary level)

EXAMINATION RULES.

The standard ones for this kind of controls

BIBLIOGRAPHY

Basic:
- Gracia, I.; Padró, C. Apunts de teoria per a l'assignatura de càlcul. (Atenea) [on line]. [Consultation: 13/05/2020]. Available on: https://atenea.upc.edu/login/index.php.

Complementary: