

Academic Year: ( 2019 / 2020 )

Review date: 17-05-2019

Department assigned to the subject: Mathematics Department

Coordinating teacher: ROMERA COLMENAREJO, ELENA

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

None

**OBJECTIVES**

Acquire and manage the mathematical language that allows understanding, formulate and solve problems that arise in computation and engineering.

Get familiar with the functions of one real variable, their properties of continuity, derivability and graphic representation with their applications.

Understand and be able to manage the formal language of demonstrations of the mathematical results.

Manage sequences and series of real numbers and of functions, understanding the different kinds of convergence.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Real variable functions
  - 1.1 The real line: sets of numbers, properties, absolute values
  - 1.2 Elementary functions and curves
  - 1.3 Polar coordinates
2. Limits and continuity
  - 2.1 Limits of functions. Properties and fundamental theorems
  - 2.2 Continuity of functions. Fundamental theorems
  - 2.3 Uniform continuity
3. Derivatives and their applications
  - 3.1 Definition, properties, derivatives of elementary functions
  - 3.2 Meaning of the derivative. Extrema
- 4 Local study of a function
  - 4.1 Graphic representation
  - 4.2 Taylor's polynomial and its applications
5. Sequences and series of real numbers
  - 5.1 Sequences of numbers.
  - 5.3 Series of positive numbers
  - 5.4 Absolute and conditional convergence
6. Sequences and series of functions
  - 6.1 Sequences of functions. Punctual and uniform convergence
  - 6.2 Series of functions. Punctual and uniform convergence
  - 6.3 Taylor series

**LEARNING ACTIVITIES AND METHODOLOGY**

1. MASTER CLASSES: Development of the theoretic part of the matter
2. PROBLEMS CLASSES: Resolution of problems and exercises in participatory classes
3. TUTORIES: Personal or group assessment for the students

4. SELFEVALUATIONS: Control of the evolution of the student

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

**BASIC BIBLIOGRAPHY**

- M. SPIVAK Calculus, Cambridge University Press, Fourth edition, 2008

**ADDITIONAL BIBLIOGRAPHY**

- B.P. DEMMIDOVICH Problemas y ejercicios de Análisis Matemático, Paraningo, 1980
- D. PESTANA, J.M. RODRÍGUEZ, E. ROMERA, E. TOURÍS, V. ÁLVAREZ, A. PORTILLA Curso práctico de Cálculo y Precálculo, Ariel (Planeta), 2018
- G.L. BRADLEY, K.J. SMITH Calculus , Pearson, 2012.
- S.L. SALAS, E. HILLE, G. ETGEN Calculus one and several variables, Wiley, 10th edition, 2007
- T.M. APÓSTOL Mathematical Analysis, Addison-Wesley, 1974