Calculus I

Academic Year: (2020 / 2021)   **Review date: 05-12-2020**

Department assigned to the subject: Mathematics Department

Coordinating teacher: ESPINOLA GONZALES, JESUS EDILBERTO

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

OBJECTIVES

By the end of this subject, students will be able to have:

1.   Knowledge and understanding of the of the principles of calculus of one variable, underlying their branch of engineering.

2.   The ability to apply their knowledge and understanding to identify, formulate and solve problems of the calculus of one variable using established methods.

3.   The ability to select and use appropriate tools and methods to solve problems of the calculus of one variable.

4.   The ability to combine theory and practice to solve problems of the calculus of one variable.

5.   The ability to understanding the methods and procedures of the calculus of one variable, its area of application and their limitations.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Real variable functions.
1.1 The real line.
1.2 Elemmentary functions.
1.3 Limits of functions.
1.4 Continuity.

2. Differential calculus in one variable.
2.1 Derivability.
2.2 Extrema of functions.
2.3 Local properties. Graphic representation.
2.4 Taylor's polynomial.

3. Sequences and series
3.1 Sequences of real numbers.
3.2 Series of real numbers.
3.3 Taylor series

4. Integration in one variable.
4.1 Integrable functions, properties of the integral and calculus of primitives.
4.2 The Fundamental Theorem of Calculus.
4.3 Applications: areas, lengths and volumes by sections.

LEARNING ACTIVITIES AND METHODOLOGY

The docent methodology will include:

- Master classes, where the knowledge that the students must acquire will be presented. To   make easier the development of the class, the students will have written notes and also will have the basic texts of reference that will facilitate their subsequent work.

- Resolution of exercises by the student that will serve as self-evaluation and to acquire the necessary skills.

- Small groups classes, in which problems proposed to the students are discussed and developed.

- Tutorials.

ASSESSMENT SYSTEM

The continuous evaluation consists of:
1.- Quizzes (40%):
        1.1- Quiz 1 (20%).
        1.2- Quiz 2 (20%).
2.- Final exam (60%).
3.- The FINAL ORDINARY MARK is the sum of the marks obtained in the final exam (out of 6) and the 2 quizzes (2 points for each one).
4.- The RESIT (EXTRAORDINARY) EXAM is evaluated over 10 points.
5.- The FINAL EXTRAORDINARY MARK is the maximum between:
  - 0.6*RESIT EXAM+ CONTINUOUS EVALUATION (out of 4).
  - RESIT EXAM.

% end-of-term-examination: 60

% of continuous assessment (assigments, laboratory, practicals…): 40

BASIC ELECTRONIC RESOURCES

 - John J. O'Connor and Edmund F. Robertson . The MacTutor History of Mathematics archive: http://www-history.mcs.st-and.ac.uk/
 - OEIS® . The On-Line Encyclopedia of Integer Sequences: https://oeis.org/

 - Wolfram Research . Wolfram|Alpha: Computational Knowledge Engine: http://www.wolframalpha.com/

 - Wolfram Research . Wolfram Mathematica® Online Integrator: http://integrals.wolfram.com/