

Academic Year: (2022 / 2023)

Review date: 26-07-2022

Department assigned to the subject:

Coordinating teacher: ALVAREZ CAUDEVILLA, PABLO

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 1

OBJECTIVES

Know the concept of real function and handle elementary functions and their properties with ease.
Understand the definition of the limit of a function and compute simple limits. Solve indeterminate forms using the L'Hôpital's rule.
Know the notion of derivative, as well as its geometric interpretation. Handle the derivative rules with ease.
Understand the difference between definite and indefinite integral. Calculate simple primitive functions using elementary integration techniques.
By the end of the term, students will be able to:

Know and understand the mathematical principles underlying the engineering field.
Apply their knowledge and understanding to identify, formulate and solve mathematical problems using established methods.
Select and use appropriate tools and methods in order to solve problems.
Combine theory and practice to solve mathematical problems, as well as their possible implications in future applications.
Understand the methods and approaches, their area of application and their limitations.

DESCRIPTION OF CONTENTS: PROGRAMME

Functions and their graphs (6 lessons):
Lines and quadratic functions
Polynomial functions of higher degree
Basic functions: exponential and logarithmic functions
Algebra and composition of functions
Inverse functions
Polynomial division
Rational functions
Inequalities and absolute values

Limits and their properties. Continuous functions (4 lessons):
Definition and computation of limits
Infinite limits
Limits at infinity
Indeterminate limits
Continuity and one-sided limit

Definition and differentiation rules (5 lessons)
The derivative and tangent line
Basic differentiation rules
Product and quotient rules and higher-order derivatives
The Chain rule
L'Hôpital's rule

Primitives (5 lessons)
Antiderivatives and indefinite integration
Area and definite integrals
Integration by substitution
Integration by parts

LEARNING ACTIVITIES AND METHODOLOGY

The teaching methodology will include the following list of experiential activities:

Face to face lessons of a theoretical/practical nature, in which the theoretical content of the program will be presented. The doubts that may underlie or arise from the expositions or exercises proposed for the group, or individually, will be resolved. The content will be developed mainly on the blackboard, being able to introduce multimedia content to facilitate the student's understanding and connection with other scientific areas. A list of exercises that apply the theoretical content will be proposed and they will be discussed and resolved. Discussion between students and professors will be promoted, in order to solve doubts and develop a critical thinking in the student.

Individual self-assessment. Through Aula Global, a series of practical activities will be available to show the application that the subject has in other sciences or in everyday life. In addition, we will carry out questionnaires with theoretical questions. In this way, the student can experience its own evolution both at the theoretical level and the applications of Mathematics to other disciplines.

Partial exams, including to solve basic exercises. Every two weeks there will be a test to evaluate the knowledge acquired by the student, helpful for the teacher to know the degree of content assimilation by the student. At the end of the test, students will have access to a file with the test solutions.

Private tutorials, in which the student can answer doubts or expand knowledge about the subject. Individualized follow-up will be promoted to ensure that the professor adequately guide the student, trying to correct possible deficiencies both in the assimilation of knowledge and in its application.

Final evaluation consisting of a single test that will include a large part of the contents presented in the lessons and previously evaluated in the partial exams. At the end of the test, students will have the resolution available in order to solve doubts and understand concepts, as well as private tutorials in which to review and/or expand said evaluation.

ASSESSMENT SYSTEM

Partial exams will be held every four sessions. The lowest grade will be ruled out.

Once the course is finished, there will be a final exam.

The final grade will be an average between the final exam and the average of the maximum four partial grades.

BASIC BIBLIOGRAPHY

- Larson, R., Edwards, B. H. Cálculo 1 de una variable, McGrawHill, 2010
- Larson R; Hostetler, R.P Precalculus, Editorial Reverte, 2008