uc3m | Universidad **Carlos III** de Madrid

Calculus I

OBJECTIVES

The student will be able to formulate, solve and understand
mathematically the problems arising in engineering. To do so it is
necessary, in this first course of Calculus, to be acquainted with
the real functions of one variable, their properties of
continuity, derivability, integrability and their graphic
representation.
The student will understand the concepts of
derivative and integral and their practical applications. Also,
he/she will manage sequences and series of real numbers and of
functions that will apply to numeric approximation of functions. (PO: a)

DESCRIPTION OF CONTENTS: PROGRAMME

1) Real numbers.
2) Sequences and series of real numbers
3) Limits of Functions. Continuity. Differentiation.
4) Taylor Expansions. Local Approximations. Graphical representation.
5) Sequences and series of functions.
6) Riemann Integral. Fundamental Theorem of Calculus. Integration techniques. Geometrical Applications of
Integration.

LEARNING ACTIVITIES AND METHODOLOGY

Theory (2.5 credits. PO a).
Problem sessions working individually and in groups (2.5 credits. PO a).

ASSESSMENT SYSTEM

We follow a continuous-assessment system plus a final exam:

 - The continuous-assessment part consists in two exams with a 40% weight on the final mark (20% each). The exams
will take place, approximately a week after the necessary lessons have been taught and it will be held in regular class
hours, according to the current regulations.

 - The final exam (contributing with weight 60% to the final mark) is compulsory, and will be held at the end of the
semester. (PO: a.)

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

 - Gilbert Strang Calculus, Wellesley-Cambridge Press, 1991

 - J. Stewart Calculus, Thomson Brooks/Cole, 2009

 - JUAN de BURGOS ROMAN Funciones de una variable. Límites, continuidad y Derivadas. 80 Problemas Útiles,
García Maroto Editores, Madrid 2006.

- JUAN de BURGOS ROMAN Cálculo Integral (una y varias variables). 70 Problemas Útiles, García Maroto Editores, Madrid 2006.
- JUAN de BURGOS ROMAN Cálculo Infinitesimal: Definiciones, Teoremas y Resultados, Maroto Editores, Madrid 2006.

ADDITIONAL BIBLIOGRAPHY

- Juan Diego Álvarez Román y Manuel Carretero Cerrajero Cálculo: Un enfoque práctico, Copy Red. S.A, Getafe , 2009

- R. LARSON, R. HOSTETLER y B. EDWARDS Cálculo I, Reverté, 1994.

- S.L. SALAS Y E. HILLE Calculus (primer tomo), Reverté, 1994.

- T.M. APOSTOL Calculus (2 tomos), Iberoamericana.