Centre	**University College of Engineering of Vitoria-Gasteiz**
Name of subject	**25971 - Calculus**
Qualification	**Degree in Industrial Electronical and Automation Engineering**
Brief description of the subject content	**Differential geometry, differential and integral calculus, differential equations and partial differential equations, numerical methods, numerical algorithmics.**
Type	**Compulsory**
Credits	**12 ECTS**
Year	**1**
Term(s)	**1st and 2nd**
Department	**Applied Mathematics**
Language	**Spanish and Basque**

Outcomes / Objectives

- Understand and handle the concepts of mathematical analysis and differential geometry which will allow students to efficiently progress in subsequent studies and will provide them with the skills required for learning new methods and theories.
- Apply theoretical results to solve problems derived from basic sciences and technical science, in particular in relation to the qualification profile, and analyse the solutions by drawing conclusions from the results obtained.
- Communicate to others the results of their knowledge processes by written and oral means, making appropriate use of mathematical language, terminology and formulas
- Work in a team, integrating capacities and knowledge.
- Autonomously assimilate new techniques and new knowledge.

Syllabus

Unit 1.- Real Numbers and Complex Numbers

Unit 2.- Differential calculus of single variable and multivariable functions.

Unit 3.- Integral calculus of single variable and multivariable functions

Unit 4.- Differential equations

Unit 5.- Laplace transform

Unit 6.- Sequences and series

Unit 7.- Differential geometry

Methodology

Teaching Method

Face-to-Face Teaching Hours								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
96.0		24.0						

Student Hours of Non Face-To-Face Activities								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
144.0		36.0						

Assessment System

General criteria

1. Written essay exam
2. Practical activities (exercises, cases or problems)

Clarification regarding assessment

In the normal exam session.

- The written exam accounts for 80% of final grade.
- Practical activities account for 20% of final grade.

In the re-sit exam session.

- The written exam accounts for 100% of final grade.

Bibliography

Basic Bibliography

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- KISELIOV, KRASNOV, MAKARENKO. Problemas de ecuaciones diferenciales Ed. Mir
- SPIEGEL. Transformada de Laplace Serie Schaum Ed. Mc Graw-Hill.

In-depth Bibliography

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- LINÉS, E. Principios de Análisis Matemático Ed Reverté
- FERNANDEZ VIÑA J. Ejercicios y Complementos de Análisis Matemático Ed Tecnos

Journals

- SUMA (Publication of the Spanish Federation of Associations of Mathematics Teachers – FESMP)
- SIGMA (Published by the Basque Government Department of Education in collaboration with the Education Support Services – Berritzegunes)
- MAT2 Materials Matemâtics (Electronic journal published by the Department of Mathematics of Universidad Autónoma de Barcelona) mat.uab.es/~matmat/Cast/index.html

Websites

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- http://www.terra.es/personal/casanchi/matematica.htm
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