SUBJECT TEACHING GUIDE

G281 - Calculus I

First Degree in Telecommunication Technologies Engineering

Academic year 2026 - 2027

1. IDENTIFYING DATA					
Degree	First Degree in Telecommunication Technologies Engineering			Type and Year	Core. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Mathematics Basic Training Module				
Course unit title and code	G281 - Calculus I				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Knowledge Field	Electrical engineering, electronic engineering and telecommunications engineering				
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION
Name of lecturer	MARCO BRAVIN
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Other lecturers	PAULA CAMUS BRAÑA

4. OBJECTIVES
To understand and have good command of the most important concepts and tools in differential calculus of one and two variables, as well as integral calculus of one variable.
To acquire skills in the use of mathematical software as an aid in the resolution of problems

6. SUBJECT PROGRAM	
CONTENTS	
1	BLOCK 1
1	Lesson 1: Complex Numbers. 1.1 Definition. Graphical representation in the Gauss plane. Ways of defining a complex number. 1.2 Basic operations. Powers and radicals.

1	Lesson 2: Real one-variable functions. 2.1 Definition. Domain and image. Graphics of basic functions. Properties. Continuity. 2.2 Derivative in one point: definition and geometric interpretation. Derivatives calculation. 2.3 Taylor and Maclaurin polinomials. Taylor's Theorem. Applications. Extremes calculation. Equivalent functions.
1	Lesson 3: Numerical series. Power series. 3.1 Definition. Growth and bounds. Convergence. Equivalent series. 3.2 Series of real numbers. Alternating series. Absolute convergence. 3.3 Power series. Definition. Convergence of a power series Theorem.
2	BLOCK 2
2	Lesson 4: Integral calculus of one-variable functions. 4.1 Primitive. Integration methods. 4.2 Riemann´s integral. Integral functions. Mean value Theorem. Fundamental Theorem of integral calculus. Barrow's rule. 4.3 Applications of the definite integral.
2	Lesson 5: Differential calculus of two-variable functions. 5.1 Definition. Domain and image. Level curves and graphics. 5.2 Directional derivative: definition and geometric interpretation. Partial derivatives: definition, geometric interpretation and calculation. Partial derivatives of n order. Tangent plane and linear approximation. Gradient. The chain rule. Implicit functions. 5.3 Extremes. Maxima, minima and tipping points. Relative extremes of differential functions. Conditioned extremes. Lagrange multipliers.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessment	%
Laboratory (computer) practices	Laboratory evaluation	No	Yes	20,00
Theoretical and practical examination	Written exam	No	Yes	20,00
Theoretical and practical examination	Written exam	Yes	Yes	60,00
TOTAL				100,00

Observations

An oral exam will be provided to all students suspected of cheating after the ordinary and extraordinary session.
The final score will be 4.9 (fail) for those students who, while having a mean score of above 5, got less than the minimum score in any of the evaluated activities.
Unjustified answers, inaccurate use of mathematical terminology and concepts and the lack of basic mathematical competences will be penalized.

Observations for part-time students

The subject can be entirely followed through the Moodle website. Those students enrolled part-time, who request it at the beginning of the term, may have a single evaluation, which means having all the theoretical and practical exams of all the subject blocks and the computer practices in the ordinary examination.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Bradley, G. L. And Smith, K. Calculo de una variable y Cálculo de varias variables. Volumen I y II. Prentice Hall. ISBN: 84-89660-76-X.
http://catalogo.unican.es.unican.idm.oclc.org/cgi-bin/abnetopac/?TITN=145826

Smith, R. y Minton, R.B. Cálculo. Volumen 1 y 2. Editorial Mc Graw-Hill. ISBN: 84-481-3861-9.
http://catalogo.unican.es.unican.idm.oclc.org/cgi-bin/abnetopac/?TITN=211158

Steward, J. Cálculo: conceptos y contextos. 3° Edición. Thomson Learning. ISBN: 0-534-40986-5.
http://catalogo.unican.es.unican.idm.oclc.org/cgi-bin/abnetopac/?TITN=331269
http://catalogo.unican.es.unican.idm.oclc.org/cgi-bin/abnetopac/?TITN=332794

Larson, R. y Edwards. B.H. Calculo 1 de una variable. Editorial Mc Graw-Hill. ISBN: 978-607-15-0273-5.
Calculo 2 de varias variables. Editorial Mc Graw-Hill. ISBN: 978-970-19-7134-2
http://catalogo.unican.es.unican.idm.oclc.org/cgi-bin/abnetopac/?TITN=324671