

SUBJECT TEACHING GUIDE

G274 - Calculus II

First Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	First Degree in Industrial Electronic Engineering and Automatic Control Systems			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	G274 - Calculus II				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Knowledge Field	Industrial engineering, mechanical engineering, automation engineering, industrial organization engineering and navigation engineering				
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION				
Name of lecturer	DAVID LÁZARO URRUTIA				
E-mail	david.lazaro@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 5. DESPACHO (S5014)				
Other lecturers	JUAN CARLOS SAMPEDRO PASCUAL				

4. OBJECTIVES

The goal of the course is to know the basic principles of multiple and vector integration and differential equations, and their practical applications in different engineering problems. The course presents classic methods of integration and scientific software to solve the proposed problems

6. SUBJECT PROGRAM

CONTENTS

1	MULTIPLE INTEGRALS
1.1	Concept of double integral and calculation methods
1.2	Change of variables in double integrals
1.3	Practical applications of double integrals
1.4	Triple integrals
1.5	Change of variables: cylindrical and spherical coordinates
1.6	Applications of triple integrals
2	LINE AND SURFACE INTEGRALS
2.1	Scalar and vector fields
2.2	Parameterized curves
2.3	Line integral of scalar fields
2.4	Line integral of vector fields
2.5	Conservative fields
2.6	Green's theorem
2.7	Surfaces in space
2.8	Surface integrals of scalar fields
2.9	Surface integrals of vector fields
2.10	Divergence and Stoke's heorems
3	DIFFERENTIAL EQUATIONS AND INTEGRAL TRANSFORMS
3.1	Concept of differential equations and application examples
3.2	Separable differential equations
3.3	First order linear differential equations
3.4	Exact equations and integrating factors
3.5	Linear differential equations with constant coefficients
3.6	Systems of first order linear differential equations
3.7	Introduction to partial differential equations
3.8	Fourier transform
3.9	Laplace transform
3.10	Application to solve differential equations

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Assessment of the first thematic block	Written exam	No	Yes	20,00
Assessment of the second thematic block	Written exam	No	Yes	20,00
Assessment of the third thematic block	Written exam	No	Yes	20,00
Monitoring activities in class	Others	No	Yes	20,00
Participation in virtual learning platform	Activity evaluation with Virtual Media	No	Yes	20,00
TOTAL				100,00
Observations				
The course will have a continuous assessment process				
Observations for part-time students				
Part-time students will have a different evaluation process based on exams and practical work				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
Materiales en formato electrónico disponibles en el curso virtual de la asignatura