SUBJECT TEACHING GUIDE

G321 - Further Calculus

Degree in Chemical Engineering

First Degree in Chemical Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Chemical Engineering First Degree in Chemical Engineering			Type and Year	Core. Year 1 Core. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Mathematics Basic Training Module				
Course unit title and code	G321 - Further Calculus				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Knowledge Field					
Web	https://personales.unican.es/acobo/ampliacioncalculo/				
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	ANGEL COBO ORTEGA
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Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 4. DESPACHO (S4045)
Other lecturers	IVAN LEON MERINO

4. OBJECTIVES
To introduce the student to some important basic concepts of Vector Calculus and Multiple Integration.

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	Change of variables: cylindrical and spherical coordinates
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 theorems
3	DIFFERENTIAL EQUATIONS AND INTEGRAL TRANSFORMS
3.1	Concept of differential equations and application examples
3.2	Analytical solution of differential equations
3.3	Numerical solution of differential equations
3.4	Linear differential equations with constant coefficients
3.5	Systems of first order linear differential equations
3.6	Introduction to partial differential equations
3.7	Fourier and Laplace transforms
3.8	Application of Laplace transform 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 platforms	Activity evaluation with Virtual Media	No	Yes	20,00
Final exam (for students who have not passed the continuous evaluation)	Written exam	Yes	Yes	0,00
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 y cuadernos computacionales distribuidos a través de la plataforma Google Colab