

UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

Course: MATHEMATICS					Code: 57301					
Type: BASIC					ECTS credits: 12					
Degree: 409 - CHEMISTRY					Academic year: 2021-22					
Center: 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY					Group(s):20 23					
Year: 1					Duration: AN					
Main language: Spanish					Second language: English					
Use of additional languages:					English Friendly: Y					
Web site:					Bilingual: N					
Lecturer: HENAR HERRERO SANZ - Group(s): 23										
Building/Office Department			Phone	one number Emai			Office hours			
Margarita Salas/341 MATEMÁTICAS			926295	5412	henar.herrero@uclm.es					
Lecturer: HELIA DA CONCEICAO PEREIRA SERRANO - Group(s): 20 23										
Building/Office Department			Phone number		Email	Office hours				
Margarita Salas/Despacho 327 MATEMÁTICAS				926052237		heliac.pereira@uclm.es	Send an email to make an appointment.			

2. Pre-Requisites

To achieve the learning objectives is necessary knowledge and skills that are supposed to be guaranteed in the training prior to entering the university. In particular, basic knowledge of geometry, algebra and trigonometry, elementary mathematical operations (pow

3. Justification in the curriculum, relation to other subjects and to the profession

As in any scientific discipline, in Chemistry, Mathematics is an indispensable tool for the understanding and development of any of its branches. Mathematics is the foundation and origin of modern theories of atomic and molecular structure, they allow to deal with principles of a structure of

The mathematical concepts studied in the Mathematics course provide an essential tool and constitute a precise language that is used by most of the basic subjects. The subject of Mathematics helps to enhance the abstraction, rigor, analysis and synthesis capacitie

4. Degree competences achieved in this course					
Course competences					
Code	Description				
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.				
E17	Develop the ability to relate to each other the different specialties of Chemistry, as well as this one with other disciplines (interdisciplinary character)				
G01	Know the principles and theories of Chemistry, as well as the methodologies and applications characteristic of analytical chemistry, physical chemistry, inorganic chemistry and organic chemistry, understanding the physical and mathematical bases that require				
T02	Domain of Information and Communication Technologies (ICT)				
T03	Proper oral and written communication				
T05	Organization and planning capacity				
T07	Ability to work as a team and, where appropriate, exercise leadership functions, fostering the entrepreneurial character				
T08	Skills in interpersonal relationships				

5. Objectives or Learning Outcomes Course learning outcomes Description

- Cesciption Know the matrix theory and know how to carry out the corresponding calculations. Get used to teamwork, express yourself orally and in writing, and behave respectfully. Knowing how to derive, integrate and represent functions of one and several variables, as well as the meaning and applications of the derivative and the integral.
- Know how to model chemical processes through differential equations, solve them and interpret results. Know how to use the language of Mathematics.

Unit 1: Linea	Ir Algebra
Unit 1.1	Matrix and determinants
Unit 1.2	Linear equations systems
Unit 1.3	Solving linear equations systems with MatLab
Unit 2: Vecto	or Spaces
Unit 2.1	Definition of vector space
Unit 2.2	Vector subspaces
Unit 2.3	Linear combination. Generator systems
Unit 2.4	Linear independence and dependence
Unit 2.5	Basis. Dimension
Unit 2.6	Subspaces equations
Unit 2.7	Change of basis
Unit 3: Eucli	dean vector spaces
Unit 3.1	Scalar product. Euclidean vector space
Unit 3.2	Norm and angle
Unit 3.3	Orthogonality. Gram-Schmidt method
Unit 4: Linea	ar transformations
Unit 4.1	Linear transformation
Unit 4.2	Kernel and image
Unit 4.3	Matrix representation
Unit 4.4	Operations
Unit 4.5	Change of basis
Unit 5: Eiger	nvalues and eigenvectors
Unit 5.1	Eigenvalues and eigenvectors
Unit 5.2	Proper subspaces
Unit 5.3	Diagonalizing a matrix
Unit 5.4	Diagonalizing a matrix with Matlab
Unit 6: One v	variable Integral and differential calculus
Unit 6.1	Limits and continuity
Unit 6.2	Derivative
Unit 6.3	Maximum and minimum. Convexity
Unit 6.4	Taylor polinomial
Unit 6.5	Definite and indefinite integrals
Unit 6.6	Improper integrals
Unit 6.7	Graphics, derivation and integrals with Matlab
Unit 7: Multi	variable differential calculus
Unit 7.1	Multivariable functions
Unit 7.2	Global and directional limits. Continuity
Unit 7.3	Partial derivatives. Gradient
Unit 7.4	Chain rule
Unit 7.5	l aylor polinomial
Unit 7.6	Unitical points, maximum and minimum.
Unit 7.7	Lagrange multiplier method
Unit 7.8	Graphics, derivation and optimization with Matiao
	Deble integrais
Unit 8.1	Doble Integrals
Unit 8.2	Inple megnals
Unit 8.3	Linear Integral
Unit 8.4	Surface Integral
Unit 8.5	
Unit 9: Urdin	lar y uniciential equations
Unit 0.0	Solving first order differential equations
Unit 9.2	Solving instander under effetation equations
Unit 9.3	Qualitative properties of differential equations
0111 9.4	Quantative properties of uniciential equations of uniciential equations

Unit 9.5 Solving ordinary differential equations with Matlab Unit 10: Systems of Ordinary differential equations

Unit 10: Systems of ordinary differential equations Unit 10.1 Solving systems of first order ordinary differential equation Unit 10.2 Qualitative properties of systems of first order ordinary differential equations Unit 10.3 Solving systems of ordinary differential equations with Matlab ADDITIONAL COMMENTS, REMARKS

The contents are divided into 3 parts:

I. Linear Algebra (Unit 1 to Unit 5)

II. Integral and Differential Calculus (Unit 6 to Unit 8)

III. Ordinary Differential Equations (Unit 9 and Unit 10).

7. Activities, Units/Modules and Methodology							
Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB01 E17 G01	2.24	56	N	-	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CB01 E17 G01	1.68	42	N	-	
Computer room practice [ON-SITE]	Practical or hands-on activities	CB01 E17 G01 T02	0.4	10	Y	Y	
Progress test [ON-SITE]	Assessment tests	CB01 E17 G01	0.12	3	Y	N	
Progress test [ON-SITE]	Assessment tests	CB01 E17 G01	0.24	e	Y	Y	
Final test [ON-SITE]	Assessment tests	CB01 E17 G01	0.12	3	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	T03 T05 T07 T08	7.2	180	N	-	
		Total:	12	300			
Total credits of in-class work: 4.8							Total class time hours: 120
Total credits of out of class work: 7.2							Total hours of out of class work: 180
As: Assessable training activity							

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Progress Tests	20.00%	0.00%	
Test	70.00%	90.00%	
Assessment of activities done in the computer labs	10.00%	10.00%	
Total	100.00%	100.00%	

Total: 100.00% 100.00% According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Progress test [PRESENCIAL][Assessment tests]	3
Progress test (PRESENCIALI/Assessment tests)	6
Enal test (PRESENCIAL VASsessment tests)	3
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Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Computer room practice [PRESENCIAL][Practical or hands-on activities]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Unit 2 (de 10): Vector Spaces	
	Hours
	5
	5
Problem solving and/or case studies [PHESENCIAL][Problem solving and exercises]	2
Study and Exam Preparation [AUTONOMA][Self-study]	11
Unit 3 (de 10): Euclidean vector spaces	
Activities	Hours
Class Attendance (theory) IPRESENCIALIILectures)	4
Problem solving and/or case studies (PRESENCIAL) (Problem solving and exercises)	3
Sudv and Evan Propartian (All TÉMONATION For All Contention of the Stations)	10
	10
Unit 4 (de 10): Linear transformations	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	11
Unit 5 (de 10): Eigenvalues and eigenvectors	
	Houro
Class Attendance (meory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Computer room practice [PRESENCIAL][Practical or hands-on activities]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Unit 6 (de 10): One variable Integral and differential calculus	
Activities	Hours
	9
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Crass Automatice (Interly) [PRESERVCIAL][Productions] Problem solving and/or case studies [PRESERVCIAL][Problem solving and exercises] Computer room practice [PRESERVCIAL][Practical or hands-on activities]	6 2
Crass Auteritative (interly) [PRESERVAL][Jeautes] Problem solving and/or case subdies [PRESERVIAL][Problem solving and exercises] Computer room practice [PRESERVIAL][Practical or hands-on activities] Study and Exam Preparation [AUTÓNOMA][Self-study]	6 2 26
Crass Auteritative (interly) [PRESENCIAL][Problem solving and exercises] Problem solving and/or case studies [PRESENCIAL][Practical or hands-on activities] Study and Exam Preparation [AUTÓNOMA][Self-study] Unit 7 (de 10): Multivariable differential calculus	6 2 26
Criss Autoritative (Interly) [PRESERVIAL][Peatures] Problem solving and/or case studies [PRESERVIAL][Problem solving and exercises] Computer room practice [PRESERVIAL][Practical or hands-on activities] Study and Exam Preparation [AUTONOMA][Self-study] Unit 7 (de 10): Multivariable differential calculus Activities	6 2 26 Hours
Criss Attendance (theory) [PRESENCIAL][Peacures] Criss Attendance (theory) [PRESENCIAL][Peacures] Computer room practice [PRESENCIAL][Practical or hands-on activities] Study and Exam Preparation [AUTONOMA][Self-study] Unit 7 (de 10); Multivariable differential calculus Activities Ciass Attendance (theory) [PRESENCIAL][Lectures]	6 2 26 Hours 8
Criss Attendance (theory) [PRESENCIAL][Pedultes] Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Pedultes] Study and Exam Preparation [AUTÓNOMA][Self-study] Unit 7 (de 10): Multivariable differential calculus Activities Class Attendance (theory) [PRESENCIAL][Lectures] Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	6 2 26 Hours 8 6
Criss Attendance (theory) [PRESENCIAL][Peatures] Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Practical or hands-on activities] Study and Exam Preparation [AUTONOMA][Self-study] Unit 7 (de 10): Multivariable differential calculus Activities Class Attendance (theory) [PRESENCIAL][Lectures] Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][PresENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][PresENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][PresENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][PRESENCIAL][Problem solving and practice [PRESENCIAL][PRESENCIAL][Problem solving and practice [PRESENCIAL][Problem solving and practice [PRESENCIAL][Problem solving and practice [PRESENCIAL][Problem solving and practice [PRESENCIAL][Problem solvi	6 2 26 Hours 8 6 2
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Criss Attendance (theory) [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Practical or hands-on activities] Study and Exam Preparation [AUTONOMA][Self-study] Unit 7 (de 10): Multiple differential calculus Activities Class Attendance (theory) [PRESENCIAL][Lectures] Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Practical or hands-on activities] Study and Exam Preparation [AUTONOMA][Self-study] Unit 8 (de 10): Multiple integrals	6 2 26 Hours 8 6 2 25
Criss Attendance (Ineory) [PRESENCIAL][Peotunes] Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Protectical or hands-on activities] Study and Exam Preparation [AUTÓNOMA][Self-study] Unit 7 (de 10): Multivariable differential calculus Activities Class Attendance (theory) [PRESENCIAL][Lectures] Problem solving and/or case studies [PRESENCIAL][Protectical or hands-on activities] Study and Exam Preparation [AUTÓNOMA][Self-study] Unit 7 (de 10): Multivariable differential calculus Activities Computer room practice [PRESENCIAL][Practical or hands-on activities] Study and Exam Preparation [AUTÓNOMA][Self-study] Unit 8 (de 10): Multipe integrals Activities	6 2 26 Hours 8 6 2 25 Hours
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Criss Attendance (theory) [PRSENCIAL][Pedultes] Problem solving and/or case studies [PRESENCIAL][Pedultes] Study and Exam Preparation [AUTONOMA][Self-study] Unit 7 (de 10)? Multivariable differential calculus Activities Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Computer room	6 2 26 Hours 8 6 2 25 Hours 8 7
Criss Attendance (theory) [PRESENCIAL][Pedical or hands-on activities] Study and Exam Preparation [AUTONOMA][Self-study] Unit 7 (de 10): Multivariable differential calculus Activities Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem sol	6 2 26 Hours 8 6 2 25 Hours 8 7 1
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Criss Attendance (theory) [PRESENCIAL][Potenties] Problem solving and/or case studies [PRESENCIAL][Potenties] Study and Exam Preparation [AUTONOMA][Self-study] Unit 7 (de 10)? Multivariable differential calculus Activities Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Study and Exam Preparation [AUTONOMA][Self-study] Unit 8 (de 10)? [Multivariable differential exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercises] Study and Exam Preparation [AUTONOMA][Self-study] Unit 8 (de 10)? [PRESENCIAL][Problem solving and exercises] Computer room practice [PRESENCIAL][Problem solving and exercise	6 2 26 Hours 8 6 2 25 Hours 8 7 1 1 25 Hours
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Criss Attendance (theory) [PRESENCIAL][Poolem solving and exercises] Computer room practice [PRESENCIAL][Poolem solving and exercises] Cativities Class Attendance (theory) [PRESENCIAL][Poolem solving and exercises] Computer room practice [PRESENCIAL][Poolem solvin	6 2 26 Hours 8 6 2 25 Hours 8 7 1 25 Hours 7 6 1 28 Hours
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Criss Attendance (theory) [PRESENCIAL][Potential exercises] Computer room practice [PRESENCIAL][Potential exercises] Class Attendance (theory) [PRESENCIAL][Potential exercises] Computer room practice [PRESENCIAL][Potential	6 2 2 6 Hours 8 6 2 2 5 Hours 8 7 1 2 5 Hours 7 6 1 2 8 Hours 7 6 6 1 2 8 Hours 6 6 6
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