UNIVERSIDAD DE CASTILLA - LA MANCHA
GUÍA DOCENTE

1. General information

Course: ADVANCED MATHEMATICS

Type: BASIC

Degree: 357 - UNDERGRADUATE DEGREE PROGRAMME IN ELECTRICAL ENGINEERING (TO)

Center: 303 - E.DE INGENIERÍA INDUSTRIAL Y AEROESPOACIAL DE TOLEDO

Year: 2

Main language: Spanish

Use of additional languages:

Web site:

Code: 56311

ECTS credits: 6

Academic year: 2021-22

Group(s): 40 41

Duration: First semester

Second language:

English Friendly: Y

Bilingual: N

Lecturer: MARIA FUENSANTA ANDRES ABELLAN - Group(s): **40 41**

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Lecturer: DAMIAN CASTAÑO TORRIJOS - Group(s): **40 41**

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Lecturer: JESÚS CASTELLANOS PARRA - Group(s): **40 41**

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Lecturer: JESUS ROSADO LINARES - Group(s): **40 41**

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Lecturer: DAVID RUIZ GRACIA - Group(s): **40 41**

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2. Pre-Requisites

Not established

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

Not established

4. Degree competences achieved in this course

Course competences

Code	Description
A01	To understand and have knowledge in an area of study that moves on from the general education attained at secondary level and usually found at a level that, while supported in advanced text books, also includes some aspects that include knowledge found at the cutting edge of the field of study.
A02	To know how to apply knowledge to work or vocation in a professional manner and possess the competences that are usually demonstrated by the formulation and defence of arguments and the resolution of problems in the field of study.
A03	To have the capability to gather and interpret relevant data (normally within the area of study) to make judgements that include a reflection on themes of a social, scientific or ethical nature.
A07	Knowledge of Information Technology and Communication (ITC).
A08	Appropriate level of oral and written communication.
A12	Knowledge of basic materials and technologies that assist the learning of new methods and theories and enable versatility to adapt to new situations.
A13	Ability to take the initiative to solve problems, take decisions, creativity, critical reasoning and ability to communicate and transmit knowledge, skills and abilities in Electrical Engineering.
A17	Ability to apply principles and methods of quality control.
B01	Ability to solve mathematical problems that occur in engineering. Aptitude to apply knowledge of: linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimization.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Be able to express yourself correctly both orally and in writing, and, in particular, to know how to use mathematical language to express with precision quantities and operations that appear in industrial engineering. Become accustomed to working in a team and behaving respectfully.

Know how functions and data are approximated through development in series of power and Fourier and their applications

Know how to describe processes related to materials in industrial engineering through ordinary differential equations and in partial derivations, resolve them and interpret results

Know the main approaches for resolution through using numerical methods, to use some statistical software packages at user level, data processing, mathematical calculus and vizualization, set out algorithms and program through programming language of a high level, vizualize functions, geometric figures

and data, design experiments, analyze data and interpret results

Additional outcomes

6. Units / Contents

Unit 1:
    Unit 1.1
    Unit 1.2
    Unit 1.3
Unit 2:
    Unit 2.1
    Unit 2.2
    Unit 2.3
    Unit 2.4
Unit 3:
    Unit 3.1
    Unit 3.2
Unit 4:
    Unit 4.1
    Unit 4.2
    Unit 4.3
    Unit 4.4
Unit 5:
    Unit 5.1
    Unit 5.2
    Unit 5.3
    Unit 5.4
    Unit 5.5
Unit 6:
    Unit 6.1
    Unit 6.2
    Unit 6.3
Unit 7:
    Unit 7.1
    Unit 7.2
    Unit 7.3
    Unit 7.4
    Unit 7.5
Unit 8:
    Unit 8.4
    Unit 8.5

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	A01 A08 A12 B01	1	25	N	-	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	A02 A08 A13 A17 B01	0.6	15	N	-	
Individual tutoring sessions [ON-SITE]	Guided or supervised work	A08 B01	0.08	2	N	-	
Computer room practice [ON-SITE]	Problem solving and exercises	A07 A13 A17 B01	0.48	12	N	-	
Study and Exam Preparation [OFF-SITE]	Self-study	A01 A02 A03 A12 A13 B01	3.6	90	N	-	
Progress test [ON-SITE]	Assessment tests	A01 A02 A03 A08 A12 A17 B01	0.12	3	Y	N	
Final test [ON-SITE]	Assessment tests	A01 A02 A03 A08 A12 A17 B01	0.12	3	Y	Y	
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4				**Total class time hours: 60**	
		Total credits of out of class work: 3.6				**Total hours of out of class work: 90**	

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	0.00%	10.00%	
Final test	0.00%	90.00%	

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
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	2
Computer room practice [PRESENCIAL][Problem solving and exercises]	12
Progress test [PRESENCIAL][Assessment tests]	3
Final test [PRESENCIAL][Assessment tests]	3

Unit 1 (de 8):

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	8

Unit 2 (de 8):

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]	10

Unit 3 (de 8):

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]	12

Unit 4 (de 8):

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	5

Unit 5 (de 8):

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	15

Unit 6 (de 8):

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	15

Unit 7 (de 8):

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	15

Unit 8 (de 8):

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	10

Global activity

Activities	hours
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	2
Class Attendance (theory) [PRESENCIAL][Lectures]	25
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Progress test [PRESENCIAL][Assessment tests]	3
Final test [PRESENCIAL][Assessment tests]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	15
Computer room practice [PRESENCIAL][Problem solving and exercises]	12
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Bellido, J. Carlos; Donoso, Alberto; Lajara, Sebastián	Ecuaciones en derivadas parciales /	Paraninfo,		978-84-283-3016-9	2014	
Bender, C. M; Orszag, S. A.	Advanced Mathematical Methods for Scientists and Engineers, 1st	Springer Verlag		978-1-4419-3187-0	1999	

Burden, R. L.; Freires, J. D.; Burden, A. M.	Ed Numerical Analysis	Cengage Learning		978-1305253667	2016
Bellido, J. Carlos; Donoso, Alberto; Lajara, Sebastián	Ecuaciones diferenciales ordinarias /	Paraninfo,		978-84-283-3015-2	2014
García, A.; López, A.; Rodríguez, G. S; A. de la Villa	Ecuaciones diferenciales ordinarias. Teoría y problemas	Glagsa	Madrid	84-921847-7-9	2006
Haberman, R.	Ecuaciones en derivadas parciales con series de Fourier y problemas de contorno	Prentice Hall		978-84-205-3534-0	2008
Pedregal, P.	Iniciación a las ecuaciones en derivadas parciales y al Análisis de Fourier	Septem Ediciones		84-95687-07-0	2001
Pérez García, V.M. y Torres, P.J.	Problemas de ecuaciones diferenciales	Ariel	Barcelona	84-344-8037-9	2001
Redheffer, R.	Differential Equations: Theory and Applications. 1st Ed.	Jones & Barlett		978-0867202007	1991
San Martín, J.; Tomeo V.;Uña I.	Métodos matemáticos: Ampliación de Matemáticas para ciencias e ingeniería	Paraninfo		9788497329804	2015
Simmons G.F.	Ecuaciones diferenciales, con aplicaciones y notas históricas	McGraw-Hill	Madrid	84-481-0045-X	
Simmons, G.	Differential Equations with Applications and Historical Notes, 3rd Ed.	Chapman & Hall		978-1-4987-0259-1	2017
Strauss, W. A.	Partial Differential Equations: an introduction, 2nd Ed.	Wiley		978-0470-05456-7	2009
Zill, D.G.	Ecuaciones diferenciales con aplicaciones al modelado	Cengage Learning		978-970-830-055-1	2010