UNIVERSIDAD DE CASTILLA - LA MANCHA
GUÍA DOCENTE

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1. General information

Course: CALCULUS I

Type: BASIC

Degree: 351 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING

Center: 106 - SCHOOL OF MINING AND INDUSTRIAL ENGINEERING

Year: 1

Main language: Spanish

Use of additional languages:

Web site:

Code: 56301

ECTS credits: 6

Academic year: 2019-20

Group(s): 55 56

Duration: First semester

Second language: Spanish

English Friendly: Y

Bilingual: N

Lecturer: **CARLOS FUNEZ GUERRA** - Group(s): **55**				
Building/Office	**Department**	**Phone number**	**Email**	**Office hours**
Despacho 2.09 - Edificio E¿lhuyar	MATEMÁTICAS	6049	carlos.funez@uclm.es	L-16h30m - 17h30m 19h30m - 20h30m M-16h30m - 17h30m 19h30m - 20h30m

Lecturer: **PEDRO JOSE MORENO GARCIA** - Group(s): **56**				
Building/Office	**Department**	**Phone number**	**Email**	**Office hours**
Elhuyar / Matemáticas	MATEMÁTICAS	6049	PedroJose.Moreno@uclm.es	To be published on the centre's notice board.

Lecturer: **DOROTEO VERASTEGUI RAYO** - Group(s): **55 56**				
Building/Office	**Department**	**Phone number**	**Email**	**Office hours**
Elhuyar / Matemáticas	MATEMÁTICAS	926052122	doroteo.verastegui@uclm.es	Se publicará en Moodle

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2. Pre-Requisites

In order to achieve the learning objectives of the subject, knowledge and skills that have been guaranteed in pre-university training are required. In particular, he will learn the knowledge of geometry and basic trigonometry, elementary mathematical operations (powers, logarithms, fractions) and the fundamentals of graphic representation of functions. With regard to the basic skills in the handling of instruments is the elementary management of computers: access, file management, folders, etc.

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

The industrial engineer uses the knowledge of Physics, Mathematics and engineering techniques to develop his professional activity in aspects such as control, instrumentation and automation of processes and equipment, as well as the design, construction, operation and maintenance of industrial products. . This training allows you to participate successfully in the different branches that integrate industrial engineering, such as mechanics, electricity, electronics, etc., adapt to the changes of technologies in these areas and, where appropriate, generate them, thus responding to needs that arise in the productive and service branches to achieve the well-being of the society to which it is owed.

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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 Mechanical 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.
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.
	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and

CB02	justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Know the use of the functions of one and various variables including its derivation, integration and graphic representation

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

Be familiar with the concepts of differential geometry and use them appropriately.

To know the fundamentals and applications of Optimization

Additional outcomes

6. Units / Contents

Unit 1: Elemmental concepts. Elemental functions. Limits and continuity

Unit 2: Differential calculus

Unit 3: Integral calculus

Unit 4: Introduction to ordinary differential equations

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	R	Description
Class Attendance (theory) [ON-SITE]	Combination of methods	A01 A02 A03 A07 A12 B01 CB01 CB02 CB03 CB04 CB05	1	25	N	-	-	
Individual tutoring sessions [ON-SITE]	Problem solving and exercises	A01 A02 A03 A08 A13 A17 B01 CB01 CB02 CB03 CB04 CB05	0.2	5	N	-	-	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	A02 A07 A13 B01 CB01 CB02 CB03 CB04 CB05	0.6	15	Y	N	N	
Workshops or seminars [ON-SITE]	Problem solving and exercises	A02 A08 A12 A13 A17 B01 CB01 CB02 CB03 CB04 CB05	0.1	2.5	N	-	-	
Computer room practice [ON-SITE]	Practical or hands-on activities	A02 A07 B01 CB01 CB02 CB03 CB04 CB05	0.3	7.5	Y	N	N	
Final test [ON-SITE]	Assessment tests	A01 A02 A03 A07 A08 A12 A13 A17 B01 CB01 CB02 CB03 CB04 CB05	0.2	5	Y	Y	Y	
Other off-site activity [OFF-SITE]	Self-study	A02 A03 A08 B01 CB01 CB02 CB03 CB04 CB05	3.6	90	N	-	-	
		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

R: Rescheduling training activity

8. Evaluation criteria and Grading System

Evaluation System	Grading System		Description
	Face-to-Face	**Self-Study Student**	
Final test	70.00%	70.00%	Final test with teorical questions and problems.
Progress Tests	20.00%	20.00%	For the evaluation of the academic works carried out by the students in class, a memory should be given where the approach of the problem will be assessed, the use of appropriate terminology and notation to express the mathematical ideas and relationships used, the choice of the most appropriate procedure for each situation, the justification of the different steps of the procedure used, the results obtained and the cleaning and presentation of the document.
Assessment of problem solving and/or case studies	5.00%	5.00%	For the evaluation of the practices in the computer room, with application of specific software, the delivery of the work carried out in the same ones and a documentation with the resolution of the same will be valued.
Assessment of activities done in the computer labs	5.00%	5.00%	Finally, there will be a written test that will consist of questions, theoretical questions and problems whose evaluation criteria will be similar to those of the academic works described above.

	Total:	**100.00%**	**100.00%**	

Evaluation criteria for the final exam:

In order to obtain the final grade, the 3 evaluation systems described are computed, with the specified weights, and a grade equal to or greater than 4 points out of 10 must be obtained in the final written test. If the grade obtained in said test was less than 5 points, it will be considered as the final grade of the subject.

Specifications for the resit/retake exam:

There will be a final written test, whose weight will be 100% of the global grade of the subject and which will consist of questions, theoretical issues and problems where the approach of the subject or problem will be assessed, the use of terminology and appropriate notation to express the ideas and mathematical relationships used, the choice of the most appropriate procedure for each situation, the justification of the different steps of the procedure used, the results obtained and the cleanliness and presentation of the document.

Specifications for the second resit / retake exam:

There will be a final written test, whose weight will be 100% of the global grade of the subject and which will consist of questions, theoretical issues and problems where the approach of the subject or problem will be assessed, the use of terminology and appropriate notation to express the ideas and mathematical relationships used, the choice of the most appropriate procedure for each situation, the justification of the different steps of the procedure used, the results obtained and the cleanliness and presentation of the document.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	**hours**
Individual tutoring sessions [PRESENCIAL][Problem solving and exercises]	5
Workshops or seminars [PRESENCIAL][Problem solving and exercises]	2.5
Computer room practice [PRESENCIAL][Practical or hands-on activities]	7.5
Final test [PRESENCIAL][Assessment tests]	5

Unit 1 (de 4): Elemmental concepts. Elemental functions. Limits and continuity

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Combination of methods]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Other off-site activity [AUTÓNOMA][Self-study]	10

Unit 2 (de 4): Differential calculus

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Combination of methods]	9
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	5
Other off-site activity [AUTÓNOMA][Self-study]	30

Unit 3 (de 4): Integral calculus

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Combination of methods]	9
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	5
Other off-site activity [AUTÓNOMA][Self-study]	35

Unit 4 (de 4): Introduction to ordinary differential equations

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Combination of methods]	4
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	3
Other off-site activity [AUTÓNOMA][Self-study]	15

Global activity

Activities	**hours**
Class Attendance (theory) [PRESENCIAL][Combination of methods]	25
Individual tutoring sessions [PRESENCIAL][Problem solving and exercises]	5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	15
Workshops or seminars [PRESENCIAL][Problem solving and exercises]	2.5
Computer room practice [PRESENCIAL][Practical or hands-on activities]	7.5
Final test [PRESENCIAL][Assessment tests]	5
Other off-site activity [AUTÓNOMA][Self-study]	90
	Total horas: 150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
E. J. Espinosa, I. Canals, M. Meda, R. Pérez, C. A. Ulín	Cálculo diferencial: Problemas resueltos	Reverte			2009	Libro de problemas
L. S. Salas, E. Hille, G. Etgen	Calculus volumen I: Una y varias variables	Cuarta edición en español, Ed. Reverté			2002	Libro de teoría
P. Pedregal	Cálculo esencial	ETSI Industriales, UCLM			2002	Libro de teoría
R. Larson, R.P. Hostetler, B. H. Edwards	Cálculo I	Mc. Graw-Hill Interamericana			2005	Libro de teoría
T. Apostol	Calculus	Vol. I, Segunda edición, Reverté			1990	Libro de teoría
						Algunos recursos en Internet
	http://matematicas.uclm.es/ind-cr/calculoi					

						Algunos recursos en Internet
	http://www.calculus.org/					Algunos recursos en Internet
	http://www.sosmath.org/calculus/calculus.html					Algunos recursos en Internet
	http://ocw.mit.edu/OcwWeb/Mathematics/index.htm					Algunos recursos en Internet
	http://archives.math.utk.edu/visual.calculus/					
A. García, A. López, G. Rodríguez, S. Romero, A. de la Villa	Calculo I. Teoría y problemas de funciones en una variable	CLAGSA	Madrid	84-921847-0-1	1996	
B. P. Demidovich	5000 problemas de análisis matemático	Thompson-Paraninfo			2002	Libro de problemas
B. P. Demidovich	Problemas y ejercicios de análisis matemático	11 edición, Ed. Paraninfo			1993	Libro de problemas
C. H. Edwards, D. E. Penney	Cálculo diferencial e integral	Cuarta Edición, Pearson Educación			1997	Libro de teoría