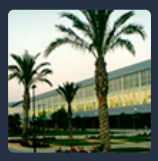

MATHEMATICS 2

Universitat d'Alacant
Universidad de Alicante

34007 - MATHEMATICS 2 (2024-25)

General

Code: 34007
Lecturer responsible:
CURADO NAVARRO, MANUEL

Credits ECTS:	**6,00**
Theoretical credits:	1,20
Practical credits:	1,20
Distance-base hours:	3,60

Departments involved

- **Dept:** SCIENCE OF COMPUTING AND ARTIFICIAL INTELLIGENCE
  Area: SCIENCE OF COMPUTING AND ARTIFICIAL INTELLIGENCE
  Theoretical credits: 1,2
  Practical credits: 1,2
  This Dept. is responsible for the course.
  This Dept. is responsible for the final mark record.

Study programmes where this course is taught

- DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION
  Course type: CORE (Year: 1)
- DEGREE IN COMPUTER ENGINEERING
  Course type: CORE (Year: 1)

Competencies and objectives

Course context for academic year 2024-25

Degree in Computer Engineering

Course content (verified by ANECA in official undergraduate and Master’s degrees) for academic year {0}

General Competences (CG)

- **CG1 :** Capacitat per a resoldre els problemes matemàtics que es poden plantejar en l'enginyeria. Aptitud per a aplicar els coneixements sobre àlgebra lineal, càlcul diferencial i integral, mètodes numèrics, algorísmica numèrica, estadística i optimització.

Exclusive skill taught in this course

No data

Learning outcomes (Training objectives)

No data

Specific objectives stated by the academic staff for academic year 2024-25

As general training objective is that the students acquire knowledge of the basic materials and technologies that enable learning and development of new methods and technologies, as well as to provide the versatility to adapt oneself to new situations. They must also acquire the ability to solve problems with initiative, decision making, autonomy and creativity and the ability to learn to communicate and transmit knowledge, abilities and skills of the profession of Engineer in Computer Science.

Content and bibliography

Content for academic year 2024-25

THEORY

Lesson 1: Functions of several variables

1. Definition of functions of several variables.
2. Limits and continuity of functions of two variables.
3. Exercises.

Lesson 2: Differential Calculus. Applications

1. Derivative applications of functions of one variable.
2. Derived from functions of several variables.
    1. Partial derivatives. Derivatives of a higher order.
    2. Vector gradient.
    3. Hessian and Jacobian Matices.
    4. Optimization of functions of several variables.
3. Exercises.

Lesson 3: Integral Calculus. Applications

1. The problem of the area. Definition of integral.
2. Fundamental theorems of integral calculus.
3. Indefinite integrals.
4. Improper integrals.
5. Applications of integral Applications.
6. Multiple integrals
    1. Double integrals definition.
    2. Iterated integrals.
    3. Fubini's theorem.
    4. Applications.
7. Exercises.

Lesson 4: Errors

1. Absolute and relative error.
2. Significant digits.
3. Arithmetic operations errors.

4. Errors in scientific computing.
5. Exercises.

Lesson 5: Solving equations

1. Bisection method.
2. Secant method. Regula Falsi.
3. Newton's method.
4. Several variables. Gradient descent.
5. Exercises.

Lesson 6: Interpolation

1. Definition of Interpolation.
2. Lagrange polynomials.
3. Neville Algorithm.
4. Divided differences.
5. Hermite interpolation.
6. Splines.
7. Exercises.

Lesson 7: Parametric curves

1. Definition of parametric curves.
2. Bezier curves.
    1. Bezier definition.
    2. Decalteljau definition.
3. Bezier surfaces.
4. Exercises.

PRACTICES

Practice 1: Introduction.

Practice 2: Derivatives.

Practice 4: Integration.

Practice 5: Solving equations.

Practice 6: Interpolation and Parametric Curves.

Related links

No data

Bibliography

Análisis matemático y métodos numéricos	
Author(s):	García Celayeta, Berta ; Higueras Sanz, Inmaculada
Issue:	Pamplona : Universidad Pública de Navarra, 2007;
ISBN:	978-84-9769-200-7
Category:	Básico

Análisis numérico, décima edición	
Author(s):	Burden, Richard L. ; Faires, J. Douglas
Issue:	México D.F. : International Thomson Editores, 2016;
ISBN:	978-607-526-404-2
Category:	Sin especificar

Análisis y métodos numéricos : ingeniería técnica en informática de gestión	
Author(s):	Quesada, José María
Issue:	Jaén : Servicio Publicaciones Universidad de Jaén, 2004;
ISBN:	978-84-8439-222-4
Category:	Básico

Análisis y métodos numéricos con Geogebra	
Author(s):	Alvarez Sánchez, Rafael ; Ferrández Agulló, Francisco
Issue:	[San Vicente del Raspeig] : -, 2015;
ISBN:	No disponible
Category:	Básico

Cálculo 1 de una variable	
Author(s):	Larson, Ron
Issue:	México : McGraw-Hill, 2010;
ISBN:	978-607-15-0273-5

Category:	Sin especificar

	Geometría moderna para ingeniería
Author(s):	Tortosa Grau, Leandro
Issue:	San Vicente del Raspeig : Editorial Club Universitario, 2012;
ISBN:	978-84-9948-708-3
Category:	Básico

Assessment

Assessment procedures and criteria 2024-25

The evaluation of the June session will be held continuously, taking into account the different training activities:

(1) Reports development and technical reports of the labs.

(2) Written exercises to be undertaken, individually, throughout the semester for continuous evaluation of the technical skills of the subject.

(3) Final test, which will include the entire subject.

The final rating for the June will be obtained by the following expression: **0.5 × (1) + 0.1 × (2) + 0.4 × (3)** it must obtain the minimum score of 4 out of 10 on the average grade of the sections corresponding to the theoretical (2,3) and practical (1).

The July call consists of a theoretical and a practical test, each scoring 50% of the final grade. A minimum of 4 is required in each test. It will be saved for the July call both the final mark of theory and practical June mark, if they were greater or equal than 4; students can choose to attend: (1) only to theory test, (2) only to the practical or (3) both. It being understood that he/she renounces to the corresponding June qualifying tests.

In the case of not reaching the minimum score in the theoretical part or in practice, the final grade will be the smallest value between 4.5 and the arithmetic mean of the marks obtained in the theoretical part and the practical part.

Description	Criteria	Type	Weighting system
Writing exercises	Writing exercises will be made	ACTIVITIES OF EVALUATION DURING THE SEMESTER	10
Development reports and technical reports of laboratory practice	Development reports and technical reports of laboratory practice	ACTIVITIES OF EVALUATION DURING THE SEMESTER	50
Final test	A final test of the theoretical part of the course will be made.	FINAL TEST	40

Official exam dates for academic year 2024-25

Exam session	Date	Time	Group - Classroom(s) allocated	Comments
(C3) Periodo ordinario para asignaturas de segundo semestre y anuales	06/06/2025			Teoría
	06/06/2025			Prácticas
(C4) Pruebas extraordinarias para asignaturas de grado y máster	10/07/2025			Teoría
	10/07/2025			Prácticas

Academic staff

CURADO NAVARRO, MANUEL
Lecturer responsible
THEORY CLASS: Groups: 40
COMPUTER PRACTICALS: Groups: 02 , 03 , 12

ALBEZA PIQUERAS, MIGUEL ANGEL
COMPUTER PRACTICALS: Groups: 06 , 13

ARAUJO DA SILVA COSTA, ANGELO GONÇALO
THEORY CLASS: Groups: 2

SALINAS SERRANO, JOSE MARIA
COMPUTER PRACTICALS: Groups: 03 , 07 , 08

SEMPER LLORET, MARC
THEORY CLASS: Groups: 3
COMPUTER PRACTICALS: Groups: 09 , 10 , 05

VALOR LUCENA, JORGE

COMPUTER PRACTICALS: Groups: 402 , 403

VICENT FRANCES, JOSE FRANCISCO

THEORY CLASS: Groups: 5

Groups

THEORY CLASS

Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. TMP-I2AD (THEORY CLASS) : GRUPO PROVISIONAL PARA FINALIZAR MATRÍCULA	2S	All day	Spanish	0	▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION
Gr. 1 (THEORY CLASS) : 1	2S	Morning	Spanish	115	▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 2 (THEORY CLASS) : 2 (ARA)	2S	Morning	English	15	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 3 (THEORY CLASS) : 3 VAL	2S	Morning	Valencian	25	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 4 (THEORY CLASS) : 4	2S	Afternoon	Spanish	115	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 40 (THEORY CLASS) : 40 I2ADE	2S	Morning	Spanish	92	▪ Allowed VISITING STUDENT EEES ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed VISITING STUDENT NO EEES ▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION
Gr. 5 (THEORY CLASS) : 5	2S	Morning	Spanish	95	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING

COMPUTER PRACTICALS

Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. TMP-I2AD (COMPUTER PRACTICALS) : GRUPO PROVISIONAL PARA FINALIZAR MATRÍCULA	2S	All day	Spanish	0	▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION

Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. 01 (COMPUTER PRACTICALS) : 1	2S	Morning	Spanish	30	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 02 (COMPUTER PRACTICALS) : 2	2S	Morning	Spanish	30	▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 03 (COMPUTER PRACTICALS) : 3	2S	Morning	Spanish	28	▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 04 (COMPUTER PRACTICALS) : 4 (ARA)	2S	Morning	English	15	▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 05 (COMPUTER PRACTICALS) : 5 VAL	2S	Morning	Valencian	25	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 06 (COMPUTER PRACTICALS) : 6	2S	Afternoon	Spanish	29	▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 07 (COMPUTER PRACTICALS) : 7	2S	Afternoon	Spanish	31	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 08 (COMPUTER PRACTICALS) : 8	2S	Afternoon	Spanish	27	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 09 (COMPUTER PRACTICALS) : 9	2S	Morning	Spanish	31	▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 10 (COMPUTER PRACTICALS) : 10	2S	Morning	Spanish	32	▪ Allowed DEGREE IN COMPUTER ENGINEERING ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 11 (COMPUTER PRACTICALS) : 11	2S	Morning	Spanish	33	▪ Allowed DEGREE IN COMPUTER ENGINEERING
Gr. 12 (COMPUTER PRACTICALS) : 12	2S	Morning	Spanish	27	
Gr. 13 (COMPUTER PRACTICALS) : 13	2S	Afternoon	Spanish	27	

Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. 401 (COMPUTER PRACTICALS) : 401 I2ADE	2S	Morning	Spanish	32	▪ Allowed VISITING STUDENT NO EEES ▪ Allowed VISITING STUDENT EEES ▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION ▪ Allowed INTERNATIONAL MOBILITY PROGRAMME
Gr. 402 (COMPUTER PRACTICALS) : 402 I2ADE	2S	Morning	Spanish	31	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed VISITING STUDENT NO EEES ▪ Allowed VISITING STUDENT EEES ▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION
Gr. 403 (COMPUTER PRACTICALS) : 402 I2ADE	2S	Morning	Spanish	29	▪ Allowed INTERNATIONAL MOBILITY PROGRAMME ▪ Allowed VISITING STUDENT EEES ▪ Allowed DOUBLE DEGREE IN COMPUTER ENGINEERING AND BUSINESS ADMINISTRATION ▪ Allowed VISITING STUDENT NO EEES

Timetables

THEORY CLASS

Group	Start date	End date	Day	Start time	End time	Lecture room
1	27/01/2025	23/05/2025	LUN	09:00	11:00	A3/0006
2	27/01/2025	23/05/2025	MIE	11:00	13:00	A3/0007
3	27/01/2025	23/05/2025	VIE	09:00	11:00	A3/0011
4	27/01/2025	23/05/2025	MAR	15:00	17:00	A3/0006
40	27/01/2025	23/05/2025	LUN	11:00	13:00	A2/C01
5	27/01/2025	23/05/2025	MIE	11:00	13:00	A3/0005

COMPUTER PRACTICALS

Group	Start date	End date	Day	Start time	End time	Lecture room
01	27/01/2025	23/05/2025	JUE	11:00	13:00	0039PS002
02	27/01/2025	23/05/2025	MAR	11:00	13:00	0039PS002
03	27/01/2025	23/05/2025	MAR	13:00	15:00	0039PS003
04	27/01/2025	23/05/2025	MIE	13:00	15:00	0039PB055
05	27/01/2025	23/05/2025	VIE	11:00	13:00	0039PB055
06	27/01/2025	23/05/2025	LUN	17:00	19:00	0039PS002
07	27/01/2025	23/05/2025	MAR	17:00	19:00	0039PS002
08	27/01/2025	23/05/2025	MAR	19:00	21:00	0039PS002
09	27/01/2025	23/05/2025	JUE	09:00	11:00	0039PB010
10	27/01/2025	23/05/2025	VIE	13:00	15:00	0039PS002
11	27/01/2025	23/05/2025	JUE	13:00	15:00	0039PS002

Group	Start date	End date	Day	Start time	End time	Lecture room
12	27/01/2025	23/05/2025	MAR	09:00	11:00	0016P2007
13	27/01/2025	23/05/2025	JUE	17:00	19:00	0039PB056
401	27/01/2025	23/05/2025	VIE	11:00	13:00	P3/0-INF1
402	27/01/2025	23/05/2025	MIE	13:00	15:00	P3/0-INF1
403	27/01/2025	23/05/2025	MAR	13:00	15:00	P3/0-INF1