

FUNDAMENTALS OF MATHEMATICS 1

35504 - FUNDAMENTALS OF MATHEMATICS 1 (2024-25)

General

Code: 35504

Lecturer responsible:

VILLACAMPA ESTEVE, YOLANDA

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

Departments involved

- **Dept:** APPLIED MATHEMATICS

Area: APPLIED MATHEMATICS

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

- [DEGREE IN FUNDAMENTALS OF ARCHITECTURE](#)
Course type: CORE (Year: 1)

Competencies and objectives

Course context for academic year 2024-25

The subject of Mathematical Foundations 1 has been placed in the first semester of the first year because its knowledge constitutes a tool for the better development of other subjects.

In this case, special emphasis is placed on the fundamental elements of the differential and integral calculation of functions of a real variable.

Its contents serve as a basis for other disciplines and the best development of the subject of Mathematical Foundations 2.

In addition, elements of matrix algebra, vector analysis and geometry from the analytical point of view are included.

General Competences (CG)

- **CG.4** : Comprendre els problemes de la concepció estructural, de construcció i d'enginyeria vinculats als projectes d'edificis, a més de les tècniques de resolució d'aquests.
- **CG.5** : Conèixer els problemes físics, les diverses tecnologies i la funció dels edificis, per tal de dotar-los de condicions internes de comoditat i protecció dels factors climàtics.

Skills/Skills

- **CB 1** : Que els estudiants hagen demostrat posseir i comprendre coneixements en una àrea d'estudi que parteix de la base de l'educació secundària general i se sol trobar a un nivell que, si bé es basa en llibres de text avançats, inclou també alguns aspectes que impliquen coneixements procedents de l'avantguarda del seu camp d'estudi.
- **CB 2** : Que els estudiants sàpien aplicar els coneixements al seu treball o vocació d'una forma professional i posseïsquen les competències que solen demostrar-se per mitjà de l'elaboració i defensa d'arguments i la resolució de problemes dins de la seua àrea d'estudi.
- **CB 4** : Que els estudiants puguen transmetre informació, idees, problemes i solucions a un públic especialitzat o no especialitzat.
- **CB 5** : Que els estudiants hagen desenvolupat les habilitats d'aprenentatge necessàries per a emprendre estudis posteriors amb un alt grau d'autonomia.

Inherent transversal

competences:>>Cognitive Instrumental

- **CT.10** : Habilitat per a l'anàlisi i la síntesi. Habilitat per a separar les parts d'un procés d'indagació i habilitat per a recompondre el tot a partir d'unes parts.

UA Basic Transversal Competences

- **CT.6** : Capacitat d'adaptar-se a nous conceptes i mètodes. Capacitat d'aprendre i aplicar, autònomament i interdisciplinària, nous conceptes i mètodes.

Inherent transversal

competences:>>Technological Instrumental

- **CT.21** : Habilitat per a la visió espacial. Habilitat per a entendre i assimilar un objecte, un procés o un espai amb independència de les visualitzacions previstes, a més de la capacitat per a generar-ne de noves.

Specific Competences:>>Preparatory Block

- **CE.11** : Coneixement aplicat del càlcul numèric, la geometria analítica i diferencial i els mètodes algebraics.
- **CE.3** : Coneixement adequat i aplicat a l'arquitectura i l'urbanisme dels sistemes de representació espacial.
- **CE.5** : Coneixement adequat i aplicat a l'arquitectura i l'urbanisme de la geometria mètrica i projectiva.
- **CE.7** : Coneixement adequat i aplicat a l'arquitectura i l'urbanisme dels principis de la mecànica general, l'estàtica, la geometria de masses i els camps vectorials i tensorials.

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

The contents taught in the subject of Mathematical Foundations 1 serve, on the one hand, as a basis for the development of other disciplines and, on the other, provide a basic training of mathematical elements necessary for the knowledge of physical models.

The first block considers the two basic concepts of infinitesimal calculus for the construction of models, the derivative and the integral. For these fundamental concepts, the main objective is the application of the derivative concept as a reason for change and the integral concept for the calculation of areas and volumes. The use of both concepts and their applications constitute a fundamental tool whose development can be carried out with the help of computational software.

In a second block the main objective is the knowledge of vectorial and matrix algebra elements that allow a better development of other disciplines.

The analytical and practical study of the contents is complemented with the use of computer software, a tool that will allow a better learning and application of the contents.

Content for academic year 2024-25

The contents of the subject Mathematical Foundations 1 are presented below.

Syllabus

Unit 1: Differential Calculation of Functions of a Variable.

1. Derived from a real function of a real variable.
 - 1.1 Concept of derivative.
 - 1.2 The derivative and the composition of functions. The chain rule.
 - 1.3 The derivative as a reason for change.
 - 1.4 Applications of the concept of derivative as a reason for change.

Unit 2. Differential and Integral Calculation of Functions of a Variable.

1. Primitive Function. Properties.
2. Calculation of primitives.
 - 2.1. General methods of calculating primitives.

Unit 3. Riemann Integral (Defined Integral).

1. Partitions in a closed interval.
2. Integral Function of Riemann.
 - 2.1 Integral of a bounded function in an interval.
 - 2.2 The integral as the limit of a sum.
 - 2.3 Properties of the Riemann integral.
 - 2.4 Calculation of the defined integrals. Barrow rule.
3. Applications of the integral calculation.
 - 3.1 Areas.
 - 3.2 Length of a curve.
 - 3.3 Volumes.

Unit 4. Vectorial Analysis in the plane and in space

1. Fixed (or linked) vectors. Sliding vectors. Free vectors
2. Graphical and analytical representation of vectors.
3. Vector algebra in the set of free vectors
4. Analytical expression of a vector
 - 4.1 Module of a vector.
 - 4.2 Unit vector. Unit vector in the direction of a vector.
 - 4.3 Director cosines of a vector.
5. Scalar product
6. Vector Product
7. Vector equation of the line and e plane.

Unit 5. Theme 5. Eigenvalues and eigenvectors of matrices.

Related links

No data

Cálculo 1 de una variable

Author(s): Larson, Ron

Issue: México : McGraw-Hill, 2010;

ISBN: 978-607-15-0273-5

Category: Básico

Matemáticas básicas para ingenierías

Author(s): Agud Albesa, Lucía

Issue: Valencia : Universidad Politécnica de Valencia, 2019;

ISBN: 84-9048-820-7 (libro e.)

Category: Básico

Cálculo diferencial e integral

Author(s): AYRES, Frank ; MENDELSON, Elliott

Issue: Madrid : McGraw-Hill, 1991;

ISBN: 84-7615-560-3

Category: Básico

Cálculo infinitesimal de una variable

Author(s): Burgos Román, Juan de

Issue: Madrid : McGraw-Hill/Interamericana de España, 2007;

ISBN: 978-84-481-5634-3

Category: Básico

Cálculo

Author(s): Ayres, Frank ; Mendelson, Elliot

Issue: Bogotá : McGraw-Hill, 2001;

ISBN: 958-41-0131-5

Category: Básico

Cálculo : una variable (v.1)

Author(s): Rogawski, Jon

Issue: Barcelona : Reverté, 2016;

ISBN: 978-84-291-5194-7

Category: Básico

Álgebra lineal y geometría : curso teórico-práctico

Author(s): GARCÍA GARCÍA, José ; LÓPEZ PELLICER, Manuel

Issue: Alcoy : Marfil, 1992;

ISBN: 84-268-0269-9

Category: Básico

Problemas de cálculo infinitesimal

Author(s): TEBAR FLORES, E.

Issue: Madrid : Tébar, 2005;

ISBN: 84-7360-206-4

Category: Básico

Schaum`s Outline of Calculus

Author(s): AYRES, Frank ; MENDELSON, Elliott

Issue: - : Mc Graw Hill, 0;

ISBN: 9780071795531

Category: Básico

Schaum`s Outline of Linear Algebra

Author(s): LIPSCHUTZ, Seymour ; LIPSON, Marc

Issue: - : Mc Graw Hill, 0;

ISBN: 9780071794565

Category: Básico

Schaum`s Outline of Advanced Calculus

Author(s): WREDE, Robert ; SPIEGEL, Murray

Issue: USA : Mc Graw Hill, 2009;

ISBN: 9780071623667

Category: Básico

Cálculo I : teoría y problemas de análisis matemático en una variable

Author(s): GARCÍA LÓPEZ, Alfonsa [et al.]

Issue: Madrid : CLAGSA, 2007;

ISBN: 978-84-921847-2-9

Category: Básico

Assessment

Assessment procedures and criteria 2024-25

General System of Assessment

Passing criteria is annually revised taking into account the experience and results of previous years. The assessment is based on the following:

1. The general evaluation system does not provide for a final test, so the overall evaluation will be the result of the various activities organized for this purpose during the semester. These activities consist of the completion of theoretical-practical questionnaires, active assistance and the handing in of practice in computer classes and written tests.
2. The theoretical-practical questionnaires and written tests will be RECOVERABLE at the end of the ordinary and extraordinary period. The active attendance to practical computer classes and the practical computer exams will be NON RECOVERABLE.

Description	Criteria	Type	Weighting system
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Theoretical seminar, tests, computer practices and written exams

Summary of the evaluation:
80% of the total mark is obtained in the 2 partial exams.
10% of the total mark is obtained from the online theoretical-practical questionnaires.
10% of the total mark is obtained from active role in practice classes. (NOT RECOVERABLE)

ACTIVITIES OF EVALUATION DURING THE SEMESTER

100

Continuous assessment.

The continuous assessment is obtained from the realization of several exercises, theoretical tests, practical tests, as well as the assistance and the delivery of computer practices and auxiliary materials throughout the development of the subject.

- Theoretical and practical questionnaires: A maximum of 4 tests (TE). 10% of the total mark and proportional to the number of tests carried out during the semester.
- Computer practice (PO): Attendance and delivery of computer practices. Assessment: 10% NOT RECOVERABLE because they are made in the practical classes.
- Partial exam of knowledge (PARC): Two written exams will be carried out at the end of the ordinary and extraordinary periods. Both partial exams have the same value and they account for 80% of the total mark.

Overall evaluation (EG):

The final mark of the course, (EG), is obtained from the continuous evaluation during the semester and it can be calculated as:

$$EG=10\%PO+10\%TE+40\%PARC1+40\%PARC2$$

If the final mark of the evaluation in the semester **is equal or higher than 5**, it is not necessary to make the final exam.

If the final mark of the evaluation in the semester **is less than 5**, it is mandatory to make a final exam of the entire course content. The exam questions will include the recovery of the tests and the partial exams. We call it FINAL EXAM. The evaluation is calculated as:

$$EG=10\%PO+90\%$$

(FINAL EXAM)

The same evaluation will be applied to the extraordinary call

Official exam dates for academic year 2024-25

Exam session	Date	Time	Group - Classroom(s) allocated	Comments
(C2) Periodo ordinario para asignaturas de primer semestre	17/01/2025			Teoría
(C4) Pruebas extraordinarias para asignaturas de grado y máster	27/06/2025			Teoría

Academic staff



VILLACAMPA ESTEVE, YOLANDA

Lecturer responsible

THEORY CLASS: Groups: 1, 2, 3

COMPUTER PRACTICALS: Groups: 2, 3, 4



NAVARRO GONZALEZ, FRANCISCO JOSE

THEORY CLASS: Groups: 1, 3

COMPUTER PRACTICALS: Groups: 1, 5



ROJAS RUIZ, JAVIER GABRIEL

COMPUTER PRACTICALS: Groups: 6, 7

Groups

THEORY CLASS




Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. 1 (THEORY CLASS) : 1 (ARA)	1S	Morning	English	22	▪ Allowed DEGREE IN FUNDAMENTALS OF ARCHITECTURE
Gr. 2 (THEORY CLASS) : 2	1S	Morning	Spanish	83	
Gr. 3 (THEORY CLASS) : 3	1S	Afternoon	Spanish	80	

COMPUTER PRACTICALS







Group	Semester	Morning or afternoon session	Language	No. of enrolled students	
Gr. 1 (COMPUTER PRACTICALS) : 1 (ARA)	1S	Morning	English	22	▪ Allowed DEGREE IN FUNDAMENTALS OF ARCHITECTURE
Gr. 2 (COMPUTER PRACTICALS) : 2	1S	Morning	Spanish	28	
Gr. 3 (COMPUTER PRACTICALS) : 3	1S	Morning	Spanish	28	
Gr. 4 (COMPUTER PRACTICALS) : 4	1S	Morning	Spanish	27	
Gr. 5 (COMPUTER PRACTICALS) : 5	1S	Morning	Spanish	27	
Gr. 6 (COMPUTER PRACTICALS) : 6	1S	Afternoon	Spanish	27	
Gr. 7 (COMPUTER PRACTICALS) : 7	1S	Afternoon	Spanish	26	

Timetables

THEORY CLASS

Group	Start date	End date	Day	Start time	End time	Lecture room
1	09/09/2024	20/12/2024	JUE	11:00	13:00	EP/S-02M 
2	09/09/2024	20/12/2024	JUE	09:00	11:00	EP/S-02M 
3	09/09/2024	20/12/2024	JUE	15:00	17:00	EP/S-02M 

COMPUTER PRACTICALS

Group	Start date	End date	Day	Start time	End time	Lecture room
1	09/09/2024	20/12/2024	MAR	13:00	15:00	A3/INF1 
2	09/09/2024	20/12/2024	MAR	11:00	13:00	0039PB052 
3	09/09/2024	20/12/2024	MAR	09:00	11:00	0039PB052 
4	09/09/2024	20/12/2024	MAR	13:00	15:00	0039PB052 
5	09/09/2024	20/12/2024	MAR	11:00	13:00	0039PB010 
6	09/09/2024	20/12/2024	MAR	15:00	17:00	0039PB052 
7	09/09/2024	20/12/2024	MAR	17:00	19:00	0039PB052 