

[GJE306] ADVANCED MATHEMATICS

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING	Subject	?
Semester	1	Course	4
Character	OPTIONAL	Mention / Field of specialisation	???
Plan	2025	Modality	Face-to-face
Credits	6	Language	CASTELLANO/EUSKARA
		Total hours	38 class hours + 112 non-class hours = 150 total hours

PROFESSORS

ELGUEZABAL LAZCANO, BORJA

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
MATHEMATICS I	(No previous knowledge required)
MATHEMATICS II	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
G-TR2 - To express information, ideas and the arguments that support them in an orderly, clear and coherent manner, orally and in writing, based on quality information, self-made or obtained from different sources, using inclusive and non-discriminatory language		x		0,8
R_FB02 - To solve mathematical problems that may arise in engineering. Ability 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			x	5,2
Total:				6

KC: Knowledge or Content / SK: Skills / AB: Abilities

SECONDARY LEARNING RESULTS

RGJFB02 Solve mathematical problems that may arise in engineering. Ability to apply knowledge of: linear algebra; geometry; differential geometry; differential and integral calculus; differential equations and partial derivatives.

LEARNING ACTIVITIES

	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	4 h.	26 h.	30 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	20 h.	20 h.	40 h.
Carrying out exercises and solving problems individually and/or in teams	6 h.	54 h.	60 h.

EVALUATION SYSTEM

Individual written and/or oral tests or individual coding/programming tests

W

100%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 30 h.

NCH - Non-class hours: 100 h.

TH - Total hours: 130 h.

RGJ493 Prepare the project report, providing detailed arguments and using language that is correct, inclusive, and non-discriminatory.

LEARNING ACTIVITIES

	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	4 h.	6 h.	10 h.

EVALUATION SYSTEM

Individual written and/or oral tests or individual coding/programming tests

W

100%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 4 h.
NCH - Non-class hours: 6 h.
TH - Total hours: 10 h.

RGJ494 Give an oral presentation of the project, justifying the proposed solutions with detailed and precise arguments, and using language that is correct, inclusive, and non-discriminatory.

LEARNING ACTIVITIES

Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints

CH

4 h.

NCH

6 h.

TH

10 h.

EVALUATION SYSTEM

Individual written and/or oral tests or individual coding/programming tests

W

100%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 4 h.
NCH - Non-class hours: 6 h.
TH - Total hours: 10 h.

CONTENTS

TOPIC: MULTIVARIABLE FUNCTIONS

○ Domain

○ Limits and continuity

○ Partial and total derivatives, differentials

○ Maximums and minimums, Lagrange

TOPIC: MULTIVARIABLE FUNCTIONS, INTEGRATION

○ Double integrals

○ Triple integrals

○ Double integrals in polar coordinates

○ Triple integrals in cylindrical coordinates

TOPIC: FOURIER SERIES

○ Development of periodic functions using trigonometric functions

○ Development in periods 2π and $2l$

○ Even and odd functions, length of the function

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
 Class presentations
 Subject notes

Bibliography

○ Piskunov. Cálculo diferencial e integral. Limusa. Barcelona. 1983
 ○ Demidovich, Boris Pavlovich. 5000 problemas de análisis matemático. Paraninfo, 2003
 ○ Stewart, James. Cálculo de varias variables. Trascendentes tempranas, 7ed. Cengage Learning. 2017. ISBN: 978-607-481-898-7
 ○ Jon Rogawski. Cálculo varias variables. Universidad de California. Editorial Reverté, 2012. ISBN: 978-84-291-5174-9