[GJM301] THERMAL AND FLUID ENGINEERING

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING			**Subject**	?
Semester	2	**Course**	3	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2025	**Modality**	Face-to-face	**Language**	EUSKARA/CASTELLANO/ENGLISH
Credits	3	**Hours/week**	2.5	**Total hours**	45 class hours + 30 non-class hours = **75 total hours**

2030 AGENDA GOALS

PROFESSORS

MIALDUN, ALIAKSANDR
FENU, BEATRICE

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
PHYSICS I	*(No previous knowledge required)*
PHYSICS II	
CALCULUS I	
MATHEMATICS APPLIED TO ENGINEERING	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GJR316 - To know and apply the basic principles of fluid mechanics and thermodynamics applied to the resolution of engineering problems			x	2,56
G-TR1 - To develop interdisciplinary projects specific to their specialty and of gradual complexity, - becoming aware of respect for human rights and fundamental rights, and analyzing and assessing the impact of the proposed solutions on the SDGs - to acquire and/or apply basic, advanced and/or avant-garde, demonstrating the ability to work in multidisciplinary teams and/or undertake further studies with a high degree of autonomy		x		0,2
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		0,24
			Total:	3

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

SECONDARY LEARNING RESULTS

2RGJ392 (2 sem) Identify and accurately discuss the SDGs that the project addresses, suggesting possible actions for improvement.

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	,5 h.	,5 h.	1 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%

MAKE-UP MECHANISMS

(No mechanisms)

CH - Class hours: ,5 h.
NCH - Non-class hours: ,5 h.
TH - Total hours: 1 h.

2RGJ390 (2 sem) Define and manage the objectives and planning of a project that allows you to acquire and/or reinforce your knowledge of technologies—sometimes reaching the cutting edge of knowledge—and define an effective self-learning strategy.

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	1 h.	1 h.	2 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 2 h.

RGJ3316 They identify the properties of fluids, their hydrostatic and hydrodynamic behaviour and apply the basic concepts and main equations to analyse fluid systems

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	4 h.	3 h.	7 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	3 h.	5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	11 h.	4 h.	15 h.

EVALUATION SYSTEM	W
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	15%
Individual written and/or oral tests or individual coding/programming tests	85%

MAKE-UP MECHANISMS

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

Comments: If a retake exam is needed, the final mark will be obtained 25% first mark 75% second one

CH - Class hours: 17 h.
NCH - Non-class hours: 10 h.
TH - Total hours: 27 h.

RGJ3317 They examine heat transfer by convection, conduction and radiation in addition to sizing heat transfer components between fluids

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	3,5 h.	3,5 h.	7 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2,5 h.	2,5 h.	5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	10 h.	5 h.	15 h.

EVALUATION SYSTEM	W
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	15%
Individual written and/or oral tests or individual coding/programming tests	85%

MAKE-UP MECHANISMS

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

Comments: If a retake exam is needed, the final mark will be obtained 25% first mark 75% second one

CH - Class hours: 16 h.
NCH - Non-class hours: 11 h.

TH - Total hours: 27 h.

2RGJ393 (2 sem)Prepare the project report, providing detailed arguments and using language that is correct, inclusive, and non-discriminatory.

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	1 h.	2 h.	3 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Revision and correction of the written report of the semester project

CH - Class hours: 1 h.
NCH - Non-class hours: 2 h.
TH - Total hours: 3 h.

2RGJ391 (2 sem) Coordinate the work team, encouraging cohesion and a positive atmosphere to achieve the integration of all individuals and their contribution to achieving appropriate performance, both individually and as a group, for the development o(2 sem)

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	1 h.	1 h.	2 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 2 h.

RGJ3318 They design and size fluid and heat transfer systems

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	1,5 h.	1 h.	2,5 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.	1,5 h.	2,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	4 h.	1 h.	5 h.

EVALUATION SYSTEM	W
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	15%
Individual written and/or oral tests or individual coding/programming tests	85%

MAKE-UP MECHANISMS

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

Comments: If a retake exam is needed, the final mark will be obtained 25% first mark 75% second one

CH - Class hours: 6,5 h.
NCH - Non-class hours: 3,5 h.
TH - Total hours: 10 h.

2RGJ394 (2 sem) 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	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.	1 h.	3 h.

EVALUATION SYSTEM	W
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	100%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 3 h.

CONTENTS

1.-PROPERTIES OF FLUIDS1.1.- Basic concepts and definitions1.2.- Fluid properties2.- HYDROSTATICS2.1.- Basic concepts and definitions2.2.- Pressure measurements2.3.- Pascal's law2.4.- Static forces acting on submerged surface3.- HYDRODYNAMICS3.1.- Basic concepts3.2.- Conservation of mass3.3.- Conservation of momentum3.4.- Conservation of energy (Bernouilli's Principle)4.- VISCOUS FLOW4.1.- Pressure drop4.2.- Reynolds experiment4.3.- Poiseuille's equation4.4.- Darcy-Weisbach equation. General concepts4.5.- Localized head loss.4.6.- Pipe jointing5.-HEAT TRANSFER MECHANISMS5.1.-Conduction5.2.-Convection5.3.-Radiation6.-WINGS (extended surfaces)7.-CONVECTION IN PLATES AND TUBES7.1-Determination of the film coefficient8.-DESIGN OF HEAT EXCHANGERS

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
Subject notes

Bibliography

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