

[GMJ302] PNEUMATIC AND HYDRAULIC DRIVE TECHNOLOGY

GENERAL INFORMATION

Studies	DEGREE IN MECHANICAL ENGINEERING	Subject	?
Semester	1	Course	3
Character	COMPULSORY	Mention / Field of specialisation	
Plan	2022	Modality	Face-to-face
Credits	3	Language	EUSKARA/CASTELLANO/ENGLISH
		Hours/week	2.5
		Total hours	45 class hours + 30 non-class hours = 75 total hours

2030 AGENDA GOALS



PROFESSORS

AZPI-PALOMO ARAMBURU, IÑIGO (GOIERRI)
MARTIN MAYOR, ALAIN
DURAN GOICOECHEA, IARA

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GMR310 - To apply knowledge of the fundamentals of fluid mechanics systems and machines		x		2,56
G-RTR1 - 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-RTR2 - 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

ENAEF LEARNING RESULTS

- ENA102** - Knowledge and comprehension: Knowledge and comprehension of the engineering disciplines of their speciality, at the level necessary to acquire the rest of the competencies of the degree, including notions of the latest advances.
- ENA103** - Knowledge and comprehension: Awareness of the multidisciplinary context of engineering.
- ENA104** - Analysis in engineering: The ability to analyse complex products, processes and systems in their field of study; choose and apply relevant analytical, calculation and experimental methods in a suitable way; and correctly interpret the results of such analyses.
- ENA105** - Analysis in engineering: The ability to identify, formulate and solve engineering problems in their speciality; choose and apply adequately established analytical, calculation and experimental methods; and acknowledge the importance of social, health and safety, environmental, economic, and industrial restrictions.
- ENA106** - Engineering projects: Ability to project, design and develop complex products (parts, components, finished products, etc.), processes and systems of their speciality, which meet the established requirements, including awareness of the social, health and safety, environmental, economic and industrial aspects, as well as selecting and applying appropriate project methods.
- ENA107** - Engineering projects: Project capacity some state-of-the-art knowledge of their engineering speciality.
- ENA108** - Research and innovation: Ability to carry out bibliographic searches and consult and use databases and other information sources with discretion, in order to carry out simulation and analysis with the aim of conducting research on technical topics of their speciality.
- ENA109** - Research and innovation: Ability to consult and apply codes of good practice and security in their speciality.
- ENA110** - Research and innovation: Capacity and ability to project and carry out experimental investigations, interpret results, and reach conclusions in their field of study.
- ENA111** - Practical application of engineering: Understanding of the applicable techniques and methods for analysis, design and research and their limitations in the field of their speciality.
- ENA112** - Practical application of engineering: Practical competency to solve complex problems, carry out complex engineering projects, and conduct investigations specific to their speciality.
- ENA113** - Practical application of engineering: Knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations in the field of their speciality.
- ENA115** - Practical application of engineering: Knowledge of the social, health and safety, environmental, economic and industrial implications of engineering practice.
- ENA118** - Preparation of judgements: Ability to manage complex technical or professional activities or projects of their speciality, taking responsibility for decision making.
- ENA119** - Communication and Teamwork: Ability to effectively communicate information, ideas, problems and solutions in the field of engineering and with society in general.
- ENA120** - Communication and Teamwork: Ability to operate effectively in domestic and international contexts, individually and as a team,

and to cooperate with both engineers and people from other disciplines.

ENA122 - Continued training: Ability to stay up to date on science and technology innovations.

SECONDARY LEARNING RESULTS

1RGM392 (1 sem)

LEARNING ACTIVITIES

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

CH

NCH

TH

1 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)

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings.

Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals.

CH - Class hours: 0 h.

NCH - Non-class hours: 1 h.

TH - Total hours: 1 h.

RGM325 [I] Interpreta circuitos neumáticos y/o hidráulicos basándose en el nombre/símbolo/función y funcionamiento de los componentes utilizados en los sistemas de potencia fluidica

LEARNING ACTIVITIES

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

CH

NCH

TH

3 h.

6 h.

9 h.

Computer simulation exercises, individually and/or in teams

4 h.

3 h.

7 h.

Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects

10 h.

10 h.

Carrying out exercises and solving problems individually and/or in teams

4 h.

2 h.

6 h.

EVALUATION SYSTEM

W

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

12%

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

88%

MAKE-UP MECHANISMS

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

CH - Class hours: 21 h.

NCH - Non-class hours: 11 h.

TH - Total hours: 32 h.

1RGM391 (1 sem)

LEARNING ACTIVITIES

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

CH

NCH

TH

1 h.

1 h.

2 h.

EVALUATION SYSTEM

W

Self-assessment

50%

Observation (technical capacity, attitude and participation)

50%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous assessment and project feedback.

Comments: The average of the marks of the tutor's assessment and the self-assessment carried out by the work team is calculated, using the defined rubrics. Afterwards, the final mark is calculated

taking into account the co-evaluation among the members of the team.

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

1RGM394 (1 sem)

LEARNING ACTIVITIES

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

CH

1 h.

NCH

2 h.

TH

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 evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals.

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

RGM326 [!] *Identifica el valor que añade la utilización de sistemas de potencia fluidica al funcionamiento de máquinas industriales, y en su caso diseña circuitos neumáticos y/o hidráulicos y dimensiona los componentes para lograr el funcionamiento especificado*

LEARNING ACTIVITIES

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

CH

7 h.

NCH

4 h.

TH

11 h.

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

2 h.

4 h.

6 h.

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

9 h.

4 h.

13 h.

Carrying out visits and/or learning trips to other university centres, laboratories, companies and/or thermal power plants

2 h.

2 h.

Comments: A presentation by a company specialised in drivers and machine safety describes the application of Directive 2006-42-EC and introduces the technological trends in drivers.

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: 20 h.
NCH - Non-class hours: 12 h.
TH - Total hours: 32 h.

1RGM390 (1 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	MAKE-UP MECHANISMS		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	(No mechanisms)		
Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals		Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings.		
CH - Class hours: 1 h. NCH - Non-class hours: 1 h. TH - Total hours: 2 h.				

1RGM393 (1 sem)				
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	MAKE-UP MECHANISMS		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	(No mechanisms)		
Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals.		Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings.		
CH - Class hours: 1 h. NCH - Non-class hours: 2 h. TH - Total hours: 3 h.				

CONTENTS

Pneumatics:

- Main Characteristics
- Compressed Air Cycle
- FRL Unit
- Actuators: Motors and cylinders
- Control valves:
- Directional control valves DCV
- Pressure valves
- Check valves
- Flow control valves
- Circuits

Hydraulics:

- Fluid Properties

•Pumps

•Actuators

•Control valves:

•Pressure valves

•Directional control valves DCV

•Flow control valves

•Circuits

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Presentations by external Lecturers
Topic related web quires
Moodle Platform
Class presentations
Video projections
Specific Master Software
Slides of the subject
Programmes

Bibliography

Hidraulika : Oinarrizko maila / D. Merkle, B. Schrader, M. Thomes,
Esslingen (Alemania) : Festo Didactic K.G , cop. 1989
Fluidos, bombas e instalaciones hidráulicas, Salvador de las Heras,
Barcelona : Iniciativa Digital Politécnica , 2011
Rabie, M., Fluid Power Engineering, MacGraw-Hill, 2009