

Course: 2024 / 2025 - Course planning



[GEC303] MATERIALS SCIENCE, TECHNOLOGY AND CHEMISTRY **GENERAL INFORMATION** Studies DEGREE IN INDUSTRIAL ELECTRONICS Subject MECHANICAL AND CHEMICAL ENGINEERING ENGINEERING OF MATERIALS Semester 1 Mention / Field of Course 2 specialisation Character COMPULSORY Plan 2022 Modality Face-to-face Language EUSKARA/CASTELLANO Total hours 64.98 class hours + 47.52 non-class hours = 112.5 Credits 4,5 Hours/week 3.61 total hours 2030 AGENDA GOALS PROFESSORS MATEOS HEIS, MODESTO GARRAMIOLA ALDAY, FERNANDO REQUIRED PREVIOUS KNOWLEDGE Subjects Knowledge PHYSICS I (No previous knowledge required) PHYSICS II LEARNING RESULTS LEARNING RESULTS кс sĸ AB ECTS GER203 - To know and use the principles of material resistance x 1.48 2 54 GER204 - To know the fundamentals of science, technology and chemistry of materials x G-RTR1 - To develop interdisciplinary projects specific to their specialty and of gradual complexity, x 0,32 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 0,16 G-RTR2 - To express information, ideas and the arguments that support them in an orderly, clear and x coherent manner, orally and in writing, based on quality information, self-made or obtained from different sources, using inclusive and non-discriminatory language 4.5 Total: KC: Knowledge or Content / SK: Skills / AB: Abilities **ENAEE LEARNING RESULTS** ENA103 - Knowledge and comprehension: Awareness of the multidisciplinary context of engineering. 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. 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. 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. 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. SECONDARY LEARNING RESULTS 1RGE290 (1 sem) СН NCH ΤΗ LEARNING ACTIVITIES Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in 1 h. 2 h. 3 h. interdisciplinary contexts, real and/or simulated, individually and/or in teams MAKE-UP MECHANISMS **EVALUATION SYSTEM**

Observation (technical capacity, attitude and participation) 100%

Observation (technical capacity, attitude and participation)





Comments: Continuous assessment

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

1RGE294 (1 sem)					
LEARNING ACTIVITIES			СН	NCH	тн
Development and writing of records, reports, presentations, audiovisual material, etc. on ,66 h. 1,34 h. 2 h. projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams					
EVALUATION SYSTEM	W	MAKE-UP MECHANIS	MS		
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%	Presentation and defen practical work, simulatic term projects, end of de and problems Comments: Continuous	ce of exerci on practical gree projec s assessme	ses, case stud work, laborato t, master's the nt.	ies, computer ry practical work, sis, challenges
CH - Class hours: ,66 h. NCH - Non-class hours: 1,34 h. TH - Total hours: 2 h.					

RGE204 [!] Identifica y analiza las solicitaciones que soportan las estructuras o elementos estructurales para asegurar el comportamiento mecánico adecuado de estos.

LEARNING ACTIVITIES			СН	NCH	тн
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning			2 h.	10 h.	12 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints			2 h.		2 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects			10 h.	2 h.	12 h.
Carrying out work experience in real environments and w	riting the	corresponding report	4 h.	7 h.	11 h.
EVALUATION SYSTEM	w	MAKE-UP MECHANISM	IS		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	6%	Individual written and/or coding/programming tes	oral tests ts	or individual	
Individual written and/or oral tests or individual coding/programming tests	85%	Comments: - Students v retake the exam Final ne	vith less th ote of the o	an a 5 at the c	control point must control point 25%
Prototype / Product Comments: - Control point: minimum grade 5 PBL proj grade: 30% product, 20% technical content of the report ar individual technical defense.	9% ject nd 50%	and retake 75% In the p the individual defense.	roject / PE	L there will no	t be any retake of
CH - Class hours: 18 h. NCH - Non-class hours: 19 h. TH - Total hours: 37 h.					
1RGE291 (1 sem)					
LEARNING ACTIVITIES			СН	NCH	тн





	W	MAKE-UP MECHANIS	MS		
Observation (technical capacity, attitude and participation)	100%	Observation (technical Comments: Continuou	capacity, at s assessme	titude and par ent	ticipation)
H - Class hours: 1 h. CH - Non-class hours: 2 h.					
H - Total hours: 3 h.					
RGE293 (1 sem)					
EARNING ACTIVITIES			СН	NCH	тн
Development and writing of records, reports, presentations projects/work experience/challenges/case studies/experim ndividually and/or in teams	s, audiovi iental inve	sual material, etc. on estigations carried out	,66 h.	1,34 h.	2 h.
EVALUATION SYSTEM	w	MAKE-UP MECHANIS	MS		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	Reports on the comple exercises, simulation e projects, challenges an Comments: - Continue	tion of exerc xercises, lat d problems ous assessm	bises, case stu poratory exerc nent It may b	idies, compu ises, term be asked to re
H - Class hours: ,66 h.		the document.			
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. I - Total hours: 2 h.		the document.			
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. H - Total hours: 2 h.		the document.			
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. I - Total hours: 2 h.		the document.			
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. I - Total hours: 2 h.		the document.			
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h. RGE205 [!] Conoce las propiedades electromagnética	s de los	materiales y las aplicació	ones de la t	ecnología y c	química de
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h. RGE205 [!] Conoce las propiedades electromagnética ateriales en máquinas electricas y sistemas de almac	s de los enamien	materiales y las aplicació	ones de la t	ecnología y c	química de
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h. RGE205 [!] Conoce las propiedades electromagnética ateriales en máquinas electricas y sistemas de almac	s de los enamien	materiales y las aplicacio	ones de la t	ecnología y c	química de
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h.	s de los enamien subjects i	materiales y las aplicacio to	ones de la t <u>CH</u> 14 h.	ecnología y c <u>NCH</u> 10 h.	guímica de <u>TH</u> 24 h.
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h.	s de los enamien subjects t	materiales y las aplicacions y	ones de la t <u>CH</u> 14 h.	ecnología y c NCH 10 h.	диíтіса de <u>ТН</u> 24 h.
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h. RGE205 [1] Conoce las propiedades electromagnética ateriales en máquinas electricas y sistemas de almac LEARNING ACTIVITIES Personal study and flexible development of concepts and coster more meaningful learning Presentation by the teacher in the classroom, in participate procedures associated with the subjects	s de los enamien subjects o pry classe	materiales y las aplicació to using active dynamics, to es, of concepts and	ones de la t CH 14 h. 20 h.	ecnología y c NCH 10 h.	química de <u>TH</u> 24 h. 20 h.
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h. RGE205 [!] Conoce las propiedades electromagnética ateriales en máquinas electricas y sistemas de almac LEARNING ACTIVITIES Personal study and flexible development of concepts and oster more meaningful learning Presentation by the teacher in the classroom, in participate procedures associated with the subjects Carrying out exercises and solving problems individually a	s de los enamient subjects t ory classe nd/or in to	materiales y las aplicacions to using active dynamics, to es, of concepts and eams	ones de la t CH 14 h. 20 h. 4 h.	ecnología y c <u>NCH</u> 10 h. 4,5 h.	guímica de <u>TH</u> 24 h. 20 h. 8,5 h.
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h. CE205 [!] Conoce las propiedades electromagnética ateriales en máquinas electricas y sistemas de almac EARNING ACTIVITIES Personal study and flexible development of concepts and oster more meaningful learning Presentation by the teacher in the classroom, in participate procedures associated with the subjects Carrying out exercises and solving problems individually a Carrying out work experience in real environments and wr	s de los enamient subjects o pry classe nd/or in te	materiales y las aplicacions to using active dynamics, to es, of concepts and eams orresponding report	DITURES DE LA 1 CH 14 h. 20 h. 4 h. 5 h.	ecnología y c <u>NCH</u> 10 h. 4,5 h. 6 h.	guímica de <u>TH</u> 24 h. 20 h. 8,5 h. 11 h.
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h.	s de los enamien subjects o pry classe nd/or in te iting the c W	materiales y las aplicacio to using active dynamics, to es, of concepts and eams corresponding report MAKE-UP MECHANIS	ones de la t CH 14 h. 20 h. 4 h. 5 h. MS	ecnología y c <u>NCH</u> 10 h. 4,5 h. 6 h.	TH 24 h. 20 h. 8,5 h. 11 h.
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h.	s de los enamient subjects t ory classe nd/or in te iting the c <u>W</u> 3%	materiales y las aplicacion materiales y las aplicacion to using active dynamics, to es, of concepts and eams orresponding report MAKE-UP MECHANIS Individual written and/c coding/programming te Draduet	ones de la t CH 14 h. 20 h. 4 h. 5 h. MS r oral tests o sts	ecnología y c NCH 10 h. 4,5 h. 6 h. or individual	TH 24 h. 20 h. 8,5 h. 11 h.
H - Class hours: ,66 h. CH - Non-class hours: 1,34 h. 1 - Total hours: 2 h.	s de los enamient subjects o ory classe nd/or in to iting the c <u>W</u> 3%	materiales y las aplicacions materiales y las aplicacions to using active dynamics, to es, of concepts and earns corresponding report MAKE-UP MECHANIS Individual written and/co coding/programming te Prototype / Product Comments: - Students	CH CH 14 h. 20 h. 4 h. 5 h. MS r oral tests of sts with less th	ecnología y c NCH 10 h. 4,5 h. 6 h. or individual	TH 24 h. 20 h. 8,5 h. 11 h.
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TH - Total hours: 63,5 h.

1RGE292 (1 sem)



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Goi Eskola Politeknikoa | Mondragon Unibertsitatea

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LEARNING ACTIVITIES			СН	NCH	ТН
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		,66 h.	1,34 h.	2 h.	
EVALUATION SYSTEM	W	MAKE-UP MECHANI	SMS		
Observation (technical capacity, attitude and participation)	100%	Observation (technical capacity, attitude and participatio Comments: Continuous assessment			icipation)
CH - Class hours: ,66 h. NCH - Non-class hours: 1,34 h. TH - Total hours: 2 h.					

CONTENTS

1.- Electromagnetism and magnetic materials. Magnetic forces. Magnetic field lines. Gauss's law. Magnetic field generation. Faraday's law. Magnetic circuits. Introduction to magnetic materials. The permanent m agnet. Electric metals and SMC.2.- Energy storage systems based on electrochemical processes. Lithium-bas ed energy storage technology.3. Resistance of materials. Introduction. Types of stresses and sizing crite ria. Tensile-Compression. Shear-Bending

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	Young, Hugh D. Física universitaria [Sears y Zemansky] vol. 2 (Ed
Subject notes	12).Mexiko: Pearson Educación. 2013. ISBN: 978-607-442-304-4
	Mechanics of Materials, Roy R. Craig Jr., 3rd edition, 2011, ISBN 978-0-470-48181-3, John Wiley and Sons