[GED301] FUNDAMENTALS OF DIGITAL ELECTRONICS

GENERAL INFORMATION

Studies	DEGREE IN INDUSTRIAL ELECTRONICS ENGINEERING	**Subject**	INDUSTRIAL COMPUTING
Semester	1	**Course**	2
Character	COMPULSORY	**Mention / Field of specialisation**	
Plan	2022	**Modality**	Face-to-face
Language	CASTELLANO/EUSKARA		
Credits	4,5	**Hours/week**	3.75
Total hours	67.5 class hours + 45 non-class hours = **112.5 total hours**		

PROFESSORS

ANTIA JUARISTI, ANE

MARTINEZ DE MENDIVIL VARAS, JON

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GER208 - Know the fundamentals of electronics; digital elecronics	x			4,02
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		0,24
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:	4,5

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

ENAEE 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.

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.

ENA111 - Practical application of engineering: Understanding of the applicable techniques and methods fr 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.

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

RGE290 **[!]** ***Proponer los objetivos y la planificación de un proyecto que le permita adquirir y/o reforzar los conocimientos de tecnologías propias de su especialidad,- que en ocasiones llegan a la vanguardia del conocimiento- y definir una estrategía de aprendiz***

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.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
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.

RGE291 **[!]** ***Establecer las responsabilidades de los miembros del equipo utilizando técnicas adecuadas para fomentar la eficiencia del equipo para el desarrollo del proyecto en los plazos establecidos (compartir recursos, aportar ideas, habilidades comunicativas***

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.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
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.

RGE293 **[!]** ***Redacta y estructura correctamente la memoria del proyecto, haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje. Para ello, busca y hace uso de las fuentes de información adecuadas.***

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%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems **Comments:** - Continuous assessment. - It may be asked to redo the document.

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

RGE294 **[!]** ***Realiza una presentación oral del proyecto con argumentos elaborados por sí mismos y haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje.***

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
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 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 **Comments:** - Continuous assessment.

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

RGE216 **[!]** ***Diseña circuitos digitales básicos (combinacionales/secuenciales), representando gráficamente los diagramas de bloques y las máquinas de estado finito***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Computer simulation exercises, individually and/or in teams	8 h.	6 h.	14 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	9 h.	3 h.	12 h.
Carrying out exercises and solving problems individually and/or in teams	5 h.	5 h.	10 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests **Comments:** - Control point: minimum grade 5.	100%	Individual written and/or oral tests or individual coding/programming tests **Comments:** - Students with less than a 5 at the control point must retake the exam. - Final note of the control point: control point 25% and retake 75%.

CH - Class hours: 24 h.
NCH - Non-class hours: 14 h.
TH - Total hours: 38 h.

RGE217 **[!]** ***Diseña y simula circuitos básicos (combinacionales/secuenciales) utilizando VHDL***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	3 h.		3 h.
Computer simulation exercises, individually and/or in teams	15,5 h.	12 h.	27,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	7 h.	3 h.	10 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests **Comments:** - Control point: minimum grade 5.	100%	*(No mechanisms)* **Comments:** - Students with less than a 5 at the control point must retake the exam. - Final note of the control point: control point 25% and retake 75%.

CH - Class hours: 25,5 h.
NCH - Non-class hours: 15 h.
TH - Total hours: 40,5 h.

RGE218 **[!]** ***Implementa circuitos digitales simples utilizando técnicas basadas en ordenador y medios para FPGA/CPLD***

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out work experience in real environments and writing the corresponding report	14 h.	8 h.	22 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	20%	Prototype / Product **Comments:** - In the project / PBL there will not be any retake of the individual defense.

Individual written and/or oral tests or individual coding/programming tests	50%
Prototype / Product	30%

Comments: - PBL project grade: 30% product, 20% technical content of the report and 50% individual technical defense.

CH - Class hours: 14 h.
NCH - Non-class hours: 8 h.
TH - Total hours: 22 h.

CONTENTS

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Topic related web quires
Moodle Platform
Class presentations
Specific Master Software

Bibliography

[1] P. Arruti, J. Errasti and J. C. Lizarbe. (2001, Logika Digitala Eta Mikroprogramagarria Available: www.elhuyar.org/edizioak/produktuak/LOGIKA-DIGITALA.pdf

[2] C. Cole. (2011, 2011). Real Digital - A Hands-on Approach to Digital Design Available: http://www.digilentinc.com/classroom/realdigital/

[3] B. Holdsworth and R. C. Woods, Digital Logic Design. Oxford: Newnes, 2003. http://ezproxy.mondragon.edu:81/login?url=http://www .engineeringvillage.com/controller/servlet/OpenURL?genre=book&is b n=9780750645829

[4] R. F. Tinder, R. F. Tinder and Referex, Engineering Digital Design. San Diego: Academic Press, 2000. ezproxy.mondragon.edu:81/login? url=http://www.engineeringvillage. com/controller/servlet/OpenURL?ge nre=book&isbn=9780126912951