[GJK102] FOUNDATIONS OF ELECTRONIC ENGINEERING

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING			**Subject**	?
Semester	2	**Course**	2	**Mention / Field of specialisation**	
Character	OPTIONAL				
Plan	2020	**Modality**	Face-to-face	**Language**	CASTELLANO/EUSKARA
Credits	6	**Hours/week**	5	**Total hours**	90 class hours + 60 non-class hours = **150 total hours**

PROFESSORS

ALMANDOZ LARRALDE, GAIZKA
SEGUROLA ECHAVE, MIREN EDURNE

REQUIRED PREVIOUS KNOWLEDGE

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

SKILLS

VERIFICA SKILLS

SPECIFIC

GJCE24 - To know the fundamentals of electronics

GENERAL

GJCG03 - Addressing and optimising activities of assembly, commissioning, assistance and maintenance of facilities, machinery, and industrial mechatronic systems

CROSS

GJCTR2 - To be able to understand and apply knowledge to problem solving in complex work situations or specialised and professional environments calling for creative and innovative ideas, using self-developed arguments and procedures;

BASIC

G_CB5 - To have developed learning abilities required to embark on subsequent studies with a high level of autonomy.

LEARNING RESULTS

RG201 **They coordinate their work with the other members of the team, contribute in their team to the development of the tasks to be carried out and the creation of a good working climate.**

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	2 h.	2 h.	4 h.

EVALUATION SYSTEM	W
Self-assessment	30%
Co-assessment	35%
Observation (technical capacity, attitude and participation)	35%

MAKE-UP MECHANISMS

Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence

Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.
NCH - Non-class hours: 2 h.
TH - Total hours: 4 h.

RG202 **They make decisions and assess the possible consequences of the selected alternative.**

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	3 h.	1 h.	4 h.

EVALUATION SYSTEM	W
Observation (technical capacity, attitude and participation)	100%

MAKE-UP MECHANISMS

Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence

Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 3 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 4 h.

RG204 They define the problem, the development of the solution, as well as the conclusions in an effective way, making a correct use of the language, in writing.

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.	3 h.	4 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%	Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence **Comments:** Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 4 h.

RG205 They define the problem, the development of the solution, as well as the conclusions in an effective way, making a correct use of the language, orally.

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 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%	Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence **Comments:** Continuous assessment. Retake is not foreseen.

CH - Class hours: 3 h.
NCH - Non-class hours: 0 h.
TH - Total hours: 3 h.

RGJ2039 They analyse analogue circuits with simplified models of real transistors and operational amplifiers.

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	12 h.	10 h.	22 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	18 h.	12 h.	30 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%	Individual written and oral tests to assess technical skills of the subject **Comments:** Compulsory retake if the mark on the written test is < 5. Anyone taking the make-up will be assessed 25%* Checkpoint + 75%* Make-up.
Individual written and/or oral tests or individual coding/programming tests	80%	

CH - Class hours: 30 h.
NCH - Non-class hours: 22 h.
TH - Total hours: 52 h.

RGJ2040 **They know the basic principles of semiconductors and analyses non-linear circuits with simplified models of diodes.**

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	10 h.	8 h.	18 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	20 h.	15 h.	35 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	20%
Individual written and/or oral tests or individual coding/programming tests	80%

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject

Comments: Compulsory retake if the mark on the written test is < 5. Anyone taking the make-up will be assessed 25%* Checkpoint + 75%* Make-up.

CH - Class hours: 30 h.
NCH - Non-class hours: 23 h.
TH - Total hours: 53 h.

RGJ2041 **They know how to design and size power amplifiers, power supplies and conditioning circuits required for a given application**

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	21 h.	9 h.	30 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, no retake foreseen

CH - Class hours: 21 h.
NCH - Non-class hours: 9 h.
TH - Total hours: 30 h.

CONTENTS

1. Semiconductor theory

1. Conductor types

2. Intrinsic semiconductors

3. Extrinsic semiconductors

2. Diode theory

1. Forward and reverse bias

2. Diode curve and approximations

3. Datasheet data

3. Diodes in circuits

1. Half wave rectifiers

2. Full wave rectifiers

3. Ideal transformer

4. Power supplies

4. Transistors

1. Characteristics and biasing

2. Characteristic curve

3. Datasheet data

5. Power amplifiers

6. Operational amplifiers

1. Equivalent circuits

2. Circuits composed by operational amplifiers

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Topic related web quires Moodle Platform Lab practical training Subject notes Computer practical training	MALVINO, A., BATES, D.J. 2006. Electronic Principles. McGraw-Hill Education MUHAMMAD, H. R. 2011. Microelectronic Circuits: Analysis and Design. Cengage Learning http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_lnk.pl?grupo=MECATRONICA22&ejecuta=35&_ST