

[GJK101] FOUNDATIONS OF ELECTRONIC ENGINEERING

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING		Subject	?	
Semester	2	Course	1	Mention / Field of specialisation	
Character	OPTIONAL	Modality	Face-to-face	Language	EUSKARA/CASTELLANO
Plan	2020	Hours/week	5	Total hours	90 class hours + 60 non-class hours = 150 total hours
Credits	6				

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

RGJ181 They communicate, search and structure written information: they write a clear and concise project report following the criteria established in the guide for written reports using the appropriate software.

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

2 h.

NCH

2 h.

TH

4 h.

EVALUATION SYSTEM

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

W

100%

MAKE-UP MECHANISMS

(No mechanisms)

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

CH - Class hours: 2 h.

NCH - Non-class hours: 2 h.

TH - Total hours: 4 h.

RGJ182 They communicate, search and structure orally the information correctly: they make a clear and concise oral presentation and defense of the project, considering the aspects gathered in the oral communication guide and using the proper software approp

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

2 h.

NCH

1 h.

TH

3 h.

EVALUATION SYSTEM

Presentation and defence of exercises, case studies,

W

100%

MAKE-UP MECHANISMS

(No mechanisms)

computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

Comments: Continuous assessment. Retake is not foreseen.

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

RGJ191 They use the right methodology to find solutions to problems and to develop projects: analyse problems properly, look for meaningful information to face them and propose solutions.

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
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

	<i>W</i>
Observation (technical capacity, attitude and participation)	100%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous assessment. Retake is not foreseen.

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

RGJ192 They use the right methodology to find solutions to problems and to develop projects: analyse problems properly, look for meaningful information to face them and propose solutions.

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
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

	<i>W</i>
Self-assessment	30%
Co-assessment	35%
Observation (technical capacity, attitude and participation)	35%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous assessment. Retake is not foreseen.

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

RGJ1311 They analyse analogue circuits with simplified models of real transistors and operational amplifiers.

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Computer simulation exercises, individually and/or in teams	4 h.	4 h.	8 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.
Carrying out exercises and solving problems individually and/or in teams	8 h.	6 h.	14 h.

EVALUATION SYSTEM

	<i>W</i>
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/or oral tests or individual coding/programming tests
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: 22 h.

TH - Total hours: 52 h.

RGJ1312 They know the basic principles of semiconductors and analyses non-linear circuits with simplified models of diodes.

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	20 h.	15 h.	35 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	4 h.	4 h.	8 h.
Carrying out exercises and solving problems individually and/or in teams	6 h.	4 h.	10 h.

EVALUATION SYSTEM

	<i>W</i>
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/or oral tests or individual coding/programming tests
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.

RGJ1313 They know how to design and size power amplifiers, power supplies and conditioning circuits required for a given application

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
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	22 h.	8 h.	30 h.

EVALUATION SYSTEM

	<i>W</i>
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, no retake foreseen

CH - Class hours: 22 h.

NCH - Non-class hours: 8 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

Topic related web quires
Moodle Platform
Lab practical training
Subject notes
Computer practical training

Bibliography

MALVINO, A., BATES, D.J. 2006. Electronic Principles. McGraw-Hill Education
MUHAMMAD, H. R. 2011. Microelectronic Circuits: Analysis and Design. Cengage Learning
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