

COURSE GUIDE

2025/26

Faculty

363 - Faculty of Engineering - Bilbao

Cycle

.

Degree

GMECAN30 - Bachelor`s Degree in Mechanical Engineering

Year

Second year

COURSE

27678 - Industrial Electronics

Credits, ECTS: 6

COURSE DESCRIPTION

The subject of Industrial Technology takes place during the first term of the second year of the three degrees of Industrial Engineering offered at the Engineering School of Bilbao – Mechanics, Electronics and Electricity and Automatics. To successfully pass this course, it is essential to have acquired the following competences:

FB1.- Ability to solve the mathematical problems likely to arise in engineering. Ability to apply knowledge of: linear algebra, geometry, differential geometry, differential and integral calculus, differential equations and partial differential equations, numerical methods, numerical algorithmic, statistics and optimization.

FB2.- Understanding and command of the general laws of the following: mechanics, thermodynamics, fields and waves, electromagnetism and the application of the previous laws to the resolution of problems specific to engineering.

FB3.- Basic knowledge concerning the use and programming of computers, operating systems, databases and computer programs with application in engineering.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

SKILLS

CRI5.- Knowledge of the fundamentals of electronics.

LEARNING OUTCOMES:

- 1.- To acquire and develop a basic knowledge of electronics in the field of Engineering.
- 2.- To apply coherently a basic knowledge of electronics in the diverse fields of action, providing the most adequate solution in each case.
- 3.- To develop an inherent knowledge of the field for the correct implementation of electronic devices; applying the vocabulary and specific terminology; respecting due dates.
- 4.- To work in teams, adopting a flexible attitude towards the proposals of team mates.
- 5.- To demonstrate an appropriate, inquiring attitude towards learning and the applications of the subject

Theoretical and Practical Contents

1. Presentation of Electronics
2. Passive components
3. The diode
4. The bipolar transistor
5. The Operational Amplifier
6. FETs
7. Digital Electronics
8. Combinational logic
9. Sequential logic
10. Advance components

TEACHING METHODS

Master classes (M): exposition of the topics programmed in the different subjects.

Classroom practices (CP): development of exercises and practical problems as a supplement to the master classes; work will be done individually or in small groups.

Laboratory practice (L): practical complement to the subject.



TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	30		15	15					
Horas de Actividad No Presencial del Alumno/a	30		30	30					

Legend: M: Lecture-based S: Seminar GA: Applied classroom-based groups
GL: Applied laboratory-based groups GO: Applied computer-based groups GCL: Applied clinical-based groups
TA: Workshop TI: Industrial workshop GCA: Applied fieldwork groups

Evaluation methods

- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 80%
- Laboratory 20%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

Even though the final evaluation is applied, laboratory practicals are compulsory during the term; the final grade (10 points) is divided in two:

- Written exam (with theoretical questions and exercises): 8 points.
- Laboratory (practicals and exam or project, carried out during the term): 2 points.

NOTE:

- To pass the course it is necessary to obtain at least 50% in each of the aforementioned two parts, at least 40% in each part of the written exam and an overall mark equal or greater than 5. If any of the aforementioned minimums are not reached, the course will not be passed and the maximum mark for the course will be 4 out of 10.

- To withdraw from the call, it is enough not to attend the written exam session. If the laboratory work has been passed, the mark will be kept for the second session. In case of passing only the written exam, the mark will be kept too for the second session.

In the event that the sanitary conditions prevent an on-site activity and/or evaluation, a distance modality will be activated, of which the students will be punctually informed.

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

Two options:

1-Those students who have passed the laboratory practicals during the term will only have to do a written exam.

2-Those who have failed to pass the laboratory practicals during the term will have to do a written exam, plus a practical exam.

In both cases, to pass the course it is necessary to obtain at least 50% both in the written exam and in the laboratory and at least 40% in each part of the written exam. If all these requirements are fulfilled, the course will be pass provided the overall mark is equal or greater than 5. If any of the aforementioned minimums are not reached, the course will not be passed and the maximum mark for the course will be 4 out of 10.

Again, to withdraw from the call, is enough not to appear to the written exam.

In the event that the sanitary conditions prevent an on-site activity and/or evaluation, a distance modality will be activated, of which the students will be punctually informed.

MANDATORY MATERIALS

Available on the platform (eGela):

- Presentations for the master classes.
- Problem statements for the classroom practice.
- Problem statements for the laboratory practice.

Notebook, pen, pencil, rubber, calculator -



BIBLIOGRAPHY

Basic bibliography

S. Acha, M.A. Castro, Electrónica Digital. Introducción a la Lógica Digital. RA-MA
J. Aduriz, J. Berra, O. Jaio, Elektronika Analogikoa. Elhuyar fundazioa.
R. Alvarez Santos, Materiales y Componentes Electrónicos, Editesa
A.P. Malvino, Principios de Electrónica, Mc Graw Hill, 5ª Ed.
S. Martinez, J.A.Gualda, Electrónica de Potencia, Thomson
Martín González, José Luis, coord., Electrónica digital, Delta

Detailed bibliography

R.V. Horonati, Dispositivos Electrónicos de Potencia, Paraninfo
V.P. Nelson et al. Análisis y Diseño de Circuitos Lógicos Digitales, Prentice-Hall
M.H. Rashid, Electrónica de Potencia (Circuitos, dispositivos y aplicaciones), Prentice-Hall
C.J. Sawant Jr. Diseño Electrónico. Circuitos y sistemas, Prentice-Hall, 3ª Ed.
P. Horowitz, W. Hill, The Art of Electronics, Cambridge Univ. Press, 2ª Ed.
A.R. Hambley, Electronics, Prentice-Hall, 2ª Ed.
S.O. Kasap, Electronic Materials and Devices, Mc-Graw-Hill, 3ª Ed.

Journals

Mundo Electrónico
Nueva Electrónica
Elektor
Resistor

Web sites of interest

<http://www.redeweb.com/>
<http://www.irf.com/indexsw.html>
<http://www.ipes.ethz.ch/>
<http://www.national.com/>
<http://www.onsemi.com/>

OBSERVATIONS

It is paramount that students enrolled in the subject have a look to the Student-Subject Guide available on the platform (eGela), where they will find relevant detailed information.

In the event that the sanitary conditions impede the face-to-face realisation of a teaching and/or evaluation activity, a distance-based modality will be activated, of which students will be informed at a due time.