



Course guide

220101 - ELO - Electronics

Last modified: 19/04/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 710 - EEL - Department of Electronic Engineering.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Lopez Martinez, Antonio Miguel

Others: Ferrer Arnau, Luis Jorge

PRIOR SKILLS

Previous knowledge in electromagnetism laws is recommended.

REQUIREMENTS

Previous knowledge in circuit analysis laws is recommended.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CE11-INDUS. Knowledge of the basics of electronics. (Common module in the industrial branch)

TEACHING METHODOLOGY

The course is divided into three parts:

1. - Sessions exhibition content.
2. - Sessions for practice (exercises and lab).
3. - Self-study and completion of a project.

In the content of the sessions, teachers will introduce the theoretical foundations of the subject, concepts, and examples appropriate to facilitate understanding.

In practical sessions, teachers will guide students in applying theoretical concepts to problem solving in the classroom, and for the design and analysis of different circuits in the laboratory.

The student autonomously, must work to assimilate and fix concepts, and also to develop the project correctly assigned in class.

Teachers will provide a curriculum and monitoring activities (ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

Understanding the fundamentals, theory, semiconductor devices and circuits. Theory and characteristics of operational amplifiers. Non-linear applications. Active filters.

STUDY LOAD

Type	Hours	Percentage
Self study	67,5	60.00
Hours large group	31,0	27.56
Hours small group	14,0	12.44

Total learning time: 112.5 h

CONTENTS

Module 1: Diode

Full-or-part-time: 19h 30m

Theory classes: 5h

Laboratory classes: 2h

Self study : 12h 30m

Module 2: BJT Transistor

Full-or-part-time: 21h

Theory classes: 6h

Laboratory classes: 3h

Self study : 12h

Module 3: M.O.S Transistor

Full-or-part-time: 25h

Theory classes: 7h

Laboratory classes: 3h

Self study : 15h

Module 4: Operational Amplifier

Full-or-part-time: 24h

Theory classes: 7h

Laboratory classes: 3h

Self study : 14h

Module 5: Active Filters

Full-or-part-time: 11h 30m

Theory classes: 3h

Laboratory classes: 1h 30m

Self study : 7h



Module 6: Nonlinear Circuits

Full-or-part-time: 11h 30m

Theory classes: 3h

Laboratory classes: 1h 30m

Self study : 7h

ACTIVITIES

ACTIVITY 1 - THEORY AND PROBLEMS

Full-or-part-time: 44h

Theory classes: 28h

Laboratory classes: 6h

Self study: 10h

ACTIVITY 2 - LABORATORY

Full-or-part-time: 18h

Laboratory classes: 8h

Self study: 10h

ACTIVITY 3 - MIDTERM EXAM

Full-or-part-time: 13h 30m

Theory classes: 1h

Self study: 12h 30m

ACTIVITY 4 - PROJECT

Full-or-part-time: 15h

Self study: 15h

ACTIVITY 5 - FINAL EXAM

Full-or-part-time: 22h

Theory classes: 2h

Self study: 20h



GRADING SYSTEM

Partial exam: 35%
Laboratory practices: 10%
Project: 15%
Final exam: 40%

Re-evaluation: Partial Exam

The unsatisfactory results of the partial exam will be redirected by written test in the same day of the final exam at the same time interval (3 hours). The qualification will be between 0 and 10. The qualification obtained will replace the initial one if it is higher. This test can be done by all students, even those who have passed the partial exam if they wish.

BIBLIOGRAPHY

Basic:

- Rashid, M.H.; Navarro, R.; El Filali, B. Electrónica de potencia [on line]. 4a ed. México: Pearson, 2015 [Consultation: 17/06/2022]. Available on: https://www.ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6191. ISBN 9786073233255.
- Boylestad, R. L.; Nashelshy, L. Electrónica: teoría de circuitos y dispositivos electrónicos [on line]. 10ª ed. México: Pearson Educación, 2009 [Consultation: 10/11/2021]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=8238. ISBN 9786074422924.
- Franco, S. Diseño con amplificadores operacionales y circuitos integrados analógicos. México: McGraw-Hill, 2005. ISBN 9701045955.
- Malvino, A. P.; Bates, D. J. Principios de electrónica [on line]. 7ª ed. Madrid: McGraw-Hill, 2007 [Consultation: 26/09/2022]. Available on: https://www.ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=4146. ISBN 9788448156190.
- Coughlin, R. F.; Driscoll, F. F. Amplificadores operacionales y circuitos integrados lineales. 3a ed. México: Prentice Hall, 1999. ISBN 9701702670.

Complementary:

- Bragós Bardia, R. [et al.]. Circuits i dispositius electrònics: fonaments d'electrònica [on line]. Barcelona: Edicions UPC, 1998 [Consultation: 14/05/2020]. Available on: <http://hdl.handle.net/2099.3/36163>. ISBN 8483012367.
- Fiore, J. M. Amplificadores operacionales y circuitos integrados lineales: teoría y aplicación. Madrid: Thomson, 2002. ISBN 8497320999.