



# Course guide

## 3200371 - ELP1 - Power Electronics I

**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 ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Compulsory subject).

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

### LECTURER

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**Coordinating lecturer:** Lamich Arocas, Manuel

**Others:** Suñe Socias, Victor Manuel

### PRIOR SKILLS

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To ensure that students are able to follow and assimilate the content of the subject, they will be expected to have passed the second-year subjects Electrical Systems and Electronic Systems.

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

1. ELO: Knowledge of the foundations and applications of digital electronics and microprocessors
2. ELO: Applied knowledge of electrotechnics.
5. ELO: Capability for designing analog , digital and power electronic systems.

**Transversal:**

3. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
4. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.

### TEACHING METHODOLOGY

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### LEARNING OBJECTIVES OF THE SUBJECT

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Review the basics of electrotechnics that are necessary to understand the subject.  
Analyse the various types of semiconductors used in power electronics.  
Understand the types and basic structures of static power converters and learn to interpret and analyse their functioning.  
Learn to select and calculate the size of the various active and passive elements that make up a power converter.  
Become familiar with the various drive systems of direct-current and alternating-current motors.  
Understand the various fields of application of the presented topologies.



## STUDY LOAD

Type	Hours	Percentage
Hours small group	22,5	20.00
Hours large group	22,5	20.00
Self study	67,5	60.00

**Total learning time:** 112.5 h

## CONTENTS

### TOPIC 1: Introduction

**Description:**

Pending

**Full-or-part-time:** 25h

Theory classes: 8h

Practical classes: 2h

Self study : 15h

### TOPIC 2:

**Description:**

Pending

**Full-or-part-time:** 36h 15m

Theory classes: 10h

Practical classes: 2h 30m

Laboratory classes: 2h

Self study : 21h 45m

### TOPIC 3:

**Description:**

Pending

**Full-or-part-time:** 50h

Theory classes: 12h

Practical classes: 3h

Laboratory classes: 5h

Self study : 30h

## GRADING SYSTEM

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.

If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.



## BIBLIOGRAPHY

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### Basic:

- Hart, Daniel W. Electrónica de potencia. Madrid: Prentice Hall, 2001. ISBN 8420531790.
- Mohan, Ned. Power electronics : converters, applications, and design. 3rd ed. New York: John Wiley and Sons, 2003. ISBN 0471226939.
- Rashid, M.H.; Navarro, R.; El Filali, B. Electrónica de potencia [on line]. 4a ed. Mèxic DF: Pearson, 2015 [Consultation: 17/03/2023]. Available on : [https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB\\_BooksVis?cod\\_primaria=1000187&codigo\\_libro=6191](https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6191). ISBN 9786073233255.