

**COURSE DATA****DATA SUBJECT**

Code: 44286
Name: Industrial electronic systems for energy conversion
Cycle: Master's Degree
ECTS Credits: 4
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2199 - Master's Degree in Electronic Engineering	Escola Tècnica Superior d'Enginyeria	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2199 - Master's Degree in Electronic Engineering	Industrial electronic	COMPULSORY

COORDINATION

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SUMMARY

This is a subject that should provide the student an overview and practical applications of power electronics. Each application of power electronics or set of related applications is presented as a thematic unit within that unit and power converters involved in each application are explained.

Apart from the purely theoretical course contents will provide the student with general knowledge to solve engineering problems.

This is a mandatory course, which is taught in the first semester of the Master in Electronic Engineering. The total teaching load is 4 ECTS. The workload for students is 100 hours over the semester, of which 40 are on-site and 60 are individual work.

PREVIOUS KNOWLEDGE**RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE**

There are no specified enrollment restrictions with other subjects of the curriculum.



OTHER REQUIREMENTS

Since this is a course that emphasizes and in the final application and every system is composed of other electrical and electronic subsystems is highly recommended to have prior knowledge of basic power electronics.

COMPETENCES / LEARNING OUTCOMES

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Conocer las técnicas avanzadas de análisis de datos.

DESCRIPTION OF CONTENTS

1. Industrial electronic systems for energy conversion.

Fundamentals and mega-targets of Power Electronics.
 Fundamentals of power switches and switching
 Advanced semiconductor
 Topological Fundamentals of the power converters
 Advanced converters: multilevel converters, matrix converters
 Future applications of Power Electronics

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	20,00
Laboratory	20,00
Total hours	40,00

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	25,00
Independent study and work	10,00
Preparation of lessons	10,00
Preparation for assessment activities	15,00
Resolution of case studies	0,00
Total hours	60,00

TEACHING METHODOLOGY



The teaching methods employed in the development of the course are:

a) Theoretical activities.

Expository development of matter with the student's participation in the resolution of specific issues.

b) Practical activities.

Solving practical problems

c) Student's personal work.

Description: Performing outside the classroom to issues and problems as well as the preparation of classes and exams (study). This task will be performed individually and try to promote self-employment.

We will use e-learning platforms (LMS) to support communication with students. Through it the student will have access to course materials used in class, as well as solving problems and exercises.

EVALUATION

The evaluation of the subject will consist of a written test, with theoretical and practical questions, and laboratory.

REFERENCES

- Daniel W. Hart.: Electrónica de Potencia Ed. Prentice Hall, 2001, ISBN: 84-205- 3179-0.
- Mohan, Undeland, Robbins.: Power Electronics. Converters, applications and design. Ed John Wiley & Sons. Inc, 2o edición. 1995.
- J.G. Kassakian, M.F. Schlecht, G.C. Verghese., Principles of Power Electronics, Ed. Addison-Wesley, 1991.
- Jose M. de Juana, Energías renovables para el desarrollo. Editorial Thomson Paraninfo. Madrid, 2007.