

## Battery storage for robots

Academic Year: ( 2023 / 2024 )

Review date: 07-04-2022

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: AMARIS DUARTE, HORTENSIA ELENA

Type: Electives ECTS Credits : 3.0

Year : 4 Semester : 2

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to energy autonomy in robotics
2. Types and technical characteristics of batteries
3. Selection and modeling of batteries
4. Battery energy management systems
5. Examples of applications in autonomous robots.
6. Practical sessions in the laboratory
  - Battery modeling: Experimental characterization of commercial battery parameters (experimentation in laboratory).
  - Control of a battery energy management system (BMS) (experimentation in laboratory).
  - Battery sizing for drones (experimentation in laboratory)

## LEARNING ACTIVITIES AND METHODOLOGY

## THEORETICAL PRACTICAL CLASSES.

Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems.

## TUTORING SESSIONS.

Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on- site attendance.

## STUDENT INDIVIDUAL WORK OR GROUP WORK.

Subjects with 6 credits have 98 hours/0% on-site.

## WORKSHOPS AND LABORATORY SESSIONS.

Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.

## ASSESSMENT SYSTEM

## FINAL EXAM.

Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation varies for each subject between 60% and 0%.

## CONTINUOUS EVALUATION.

Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course. The percentage of the evaluation varies for each subject between 40% and 100% of the final grade.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40