

29619 - Electrical Machines I

Syllabus Information

Academic year: 2023/24

Subject: 29619 - Electrical Machines I

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 430 - Bachelor's Degree in Electrical Engineering

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

The purpose of this course is that the student acquires the basic knowledge about rotating electrical machines, alternating current and single and three-phase transformers and their need and use in energy transformation processes.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the 2030 Agenda of United Nations (<https://www.un.org/sustainabledevelopment/es/>) and certain specific targets, such that the acquisition of the learning results of the subject will contribute to some extent to the achievement of targets 7.2 and 7.3 of Goal 7, and target 8.8 of Goal 8.

This subject requires knowledge acquired in the subjects of Fundamentals of Electrical Engineering, Mathematics I, II and III and Physics I and II.

2. Learning results

The student, in order to pass this subject, must demonstrate the following results...

- Understand the principles of operation of electrical machines and has the ability to apply them to the analysis of steady-state operation.
- Have the ability to identify, classify and describe the behavior of electrical machine systems through the use of analytical methods and modeling techniques of electrical machine analysis.
- Have the ability to apply quantitative methods and computer programs to the analysis of electrical machines to solve engineering problems.
- Understand user and consumer needs in the selection of electrical machines.
- Know the fundamental characteristics of materials, equipment, processes and products related to electrical machines.
- Have laboratory and workshop skills.
- Include the use of technical literature and other sources of information.
- Understand the codes of practice and industry standards for electrical machines.
- Become aware of quality aspects.

3. Syllabus

BLOCK 1: Introduction to alternating current electrical machines.

BLOCK 2: Transformers.

2.1 Single-phase transformer.

2.2 Three-phase transformer.

2.3 Association of three-phase transformers in parallel.

BLOCK 3: Alternating current rotating electrical machines.

3.1 Asynchronous or induction machines .

3.3 Synchronous machines.

BLOCK 4: Coupled alternating current machines.

4. Academic activities

- 45 hours of lectures, distributed in 3 hours per week. Theoretical content will be presented, and will develop problems and practical cases coordinated with the theoretical presentations.

- 15 hours of laboratory practice.

- 18 hours of supervised work, which will consist of solving problems and practical cases proposed by the professor, similar to those solved in the classroom.

- 67 hours of personal study, spread over the 15 weeks of the term.
- 2 hours of control test of evaluable activities.
- 3 hours of exams, corresponding to the official call for exams

5. Assessment system

In order to encourage the student's continuous work, an evaluation system will be applied per term consisting of: - Laboratory practices (15% of the final grade, minimum 5 out of 10). A score of 50% will be given to the previous preparation (test start practice) and 50% to its realization (results, aptitude...). A practice not performed is scored 0. No make-up work can be done at, except with official proof.

- Evaluable activities (15% of the final grade).
- Exam (70% of the final grade, minimum 5 out of 10): a written test, to be taken within the period of exams, with a theoretical part (multiple choice) and a practical part (exercises). Each of the parts accounts for 50% of the grade of the exam.

Those students who do not complete the evaluable activities, may choose to pass the course through the global evaluation tests that will be scheduled on the dates of the official calendar of exams of the center, consisting of:

- Convocation exam (70% of the final grade, minimum 5 out of 10. Also minimum of 3.5 out of 10 in theory and practice): written test of similar characteristics to the assessment. In this case, negative answers on the theorytest subtract points.
- Practical exam (30% of the final grade, minimum 5 out of 10). It will consist of:
 - a first written exam, multiple-choice, eliminatory,
 - a second written exam, also eliminatory, and
 - a third experimental test in the laboratory.