

29715 - Basic principles of electrical technology

Syllabus Information

Academic year: 2023/24

Subject: 29715 - Basic principles of electrical technology

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 434 - Bachelor's Degree in Mechanical Engineering

ECTS: 6.0

Year: 2

Semester: First semester

Subject type: Compulsory

Module:

1. General information

The main goal of this subject is that the student acquires the basic knowledge on the use of electrical energy, learns to analyze electrical circuits in their various forms of power supply (direct current and direct current), and understands the principle of operation, main characteristics and the use of electrical machines in energy transformation processes.

These approaches and goals are aligned with the Sustainable Development Goals (SDGs) of the 2030 Agenda of the United Nations () Agenda (<https://www.un.org/sustainabledevelopment/es/>), specifically, the learning activities planned in this subject will contribute to the achievement of target 7.3 of goal 7.

2. Learning results

- Analyze and solve basic DC and AC electrical circuits containing passive elements To know how to use the main electrical measuring devices (multimeters, wattmeters, oscilloscopes, etc.) Select an electrical machine according to energy transformation needs
- Perform, with some dexterity, the electrical assembly of an electrical circuit or machine

3. Syllabus

Block "Circuit Theory":

- Unit 1: Elements of an electrical circuit
- Unit 2: Direct current electrical circuits
- Unit 3: Single-phase alternating current electrical circuits
- Unit 4: Power in single-phase AC electrical circuits
- Unit 5: Three-phase alternating current electrical circuits

Block "Electrical machines":

- Unit 6: Electric machines: general
- Unit 7: Direct current electrical machines
- Unit 8: Asynchronous alternating current electrical machines
- Unit 9: Transformers

4. Academic activities

Theoretical and problem classes: sessions with the teacher in which the subject matter will be explained, combined with the resolution of practical cases: 45 hours.

Laboratory practices: sessions where the student will carry out assemblies and electrical measurements: 15 hours.

Theoretical and practical exercises: Resolution of short exercises proposed to the students to work individually, with content directly related to what has been seen in the theoretical and problem classes: 25 hours.

Study of the subject: Individual study of the contents seen in the classes: 60 hours.

Assessment tests. 5 hours.

5. Assessment system

The subject is assessed according to one of the following systems:

I. **Mixed system**, which is composed of the following assessment activities:

- **Laboratory practices:** 20% of the grade (minimum 5 out of 10 in each of the 5 practices).

- **Partial test:** 20% of the grade
- **Theoretical and practical exercises:** 10% of the grade.
- **Final written test:** 50% of the grade (minimum 4.5 out of 10). It consists of a written test, with a theoretical part,

(multiple-choice test) and a practical part (problem solving), which evaluates all the knowledge seen in the face-to-face classes (a minimum of 4 out of 10 is required for each part in order to average and pass).

II. **Simple system**, based exclusively on a *global final test* consisting of two parts:

- **Final written test:** 80% of the grade (minimum 5 out of 10). It consists of a written test, with a theoretical part (type test) and a practical part (problem solving), which evaluates all the knowledge seen in the classroom classes (a minimum of 4 out of 10 is required in each part to average and pass).
- **Practice test:** 20% of the grade (minimum 5 out of 10). On-site examination in the practical laboratory.