

Academic Year/course: 2022/23

29835 - Electrical Installations

Syllabus Information

Academic Year: 2022/23

Subject: 29835 - Electrical Installations

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

326 - Escuela Universitaria Politécnica de Teruel

Degree: 440 - Bachelor's Degree in Electronic and Automatic Engineering

444 - Bachelor's Degree in Electronic and Automatic Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

The objective of the course is for the student to calculate and design electrical installations, using their specific regulations and legislation and acquire a set of functional foundations that allow them to develop autonomous learning strategies in the field of electrical engineering.

These approaches and objectives are aligned with some of the 2030 Agenda for Sustainable Development Goals, SDG, (<https://www.un.org/sustainabledevelopment/es/>) and certain specific goals, in such a way that the acquisition of the Learning outcomes of the subject provides training and competence to the student to contribute to a certain extent to their achievement:

- Goal 7: Affordable and clean energy.
Target 7.2. By 2030, significantly increase the share of renewable energy in the energy mix.
- Goal 9: Industry, innovation and infrastructure
Target 9.1. Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

1.2. Context and importance of this course in the degree

The solid knowledge and skills acquired in this subject complement those acquired when taking the subjects of "Physics II" (1st), "Fundamentals of Electrotechnics" (1st) and "Electrotechnics" (2nd), all of which constitute the set of functional foundations that will allow the student to develop activities and guided or autonomous learning strategies in the field of electrical engineering.

1.3. Recommendations to take this course

It is recommended to have passed the subjects of "Physics II", "Fundamentals of Electrical Engineering" and "Electrical Engineering".

Continuous study and work, from the first day of the course, are essential to successfully pass the subject.

It is important to resolve any doubts that may arise as soon as possible, for which the student has the advice of the teacher, during face-to-face classes and at the tutoring schedule established by the teacher.

2. Learning goals

2.1. Competences

BASIC COMPETENCES

1. That students know how to apply their knowledge to their work or vocation in a professional way and possess the competencies that are usually demonstrated through the development and defense of arguments and problem solving within their area of study.
2. That the students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences.
3. That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

SPECIFIC COMPETENCES

1. Applied knowledge of electrical engineering.

GENERAL COMPETENCES

1. Ability to conceive, design and develop engineering projects, as well as to draft and sign projects in the field of industrial engineering for the purpose of the Degree.

TRANSVERSAL COMPETENCES

1. Ability to solve problems and make decisions with initiative, creativity and critical reasoning.
2. Ability to communicate and transmit knowledge, skills and abilities in Spanish.
3. Ability to use the techniques, skills and tools of Engineering necessary for the practice of it-
4. Ability to manage information, management and application of technical specifications and legislation necessary for the practice of Engineering.
5. Ability to learn continuously and develop autonomous learning strategies.

2.2. Learning goals

To pass this subject, the student must demonstrate that ...

Calculates and designs electrical installations in low and medium voltage.

Know and select the characteristics of materials, cables, switchgear and measuring equipment used in low and medium voltage electrical installations.

Understand, select and properly use electrical protection techniques.

Select and use suitable tools for the design of low and medium voltage electrical installations.

Know and use the specific legislation and regulations for low and medium voltage electrical installations.

Identify, classify, and describe the different types of electrical power generation systems and power plants.

2.3. Importance of learning goals

The knowledge, techniques and tools acquired in this subject enable to carry out electrical installation projects; therefore, they will allow the student who takes it to develop them in their professional activity.

In addition, the knowledge acquired in this subject will be very useful to continue your training in the field of electrical engineering.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that she has achieved the expected learning outcomes by ...

The evaluation of the subject that will be global.

The overall grade of the student will be obtained as the sum of the weighted grades of the evaluation activities that are exposed below, having to obtain to pass the subject a minimum of 50% of the maximum value of this global grade, with the condition of having passed the Laboratory practices.

Evaluation activities during the teaching period:

3.1 Laboratory Practices (10%)

The laboratory practices will be evaluated in the laboratory sessions themselves. The grade for this activity will be from 0 to 10 points and will represent 10% of the overall grade. The student who does not attend a session, except for just cause, at the scheduled time will have a grade of 0 in said session. In order to pass the course, it is necessary to obtain a minimum score of 5 points out of 10, having attended all the practical sessions.

3.2 Tutored Work (70%)

In order to encourage the continuous work of the student, during the first weeks of the course the professor of the subject will propose the completion of a supervised work that will account for 70% of the overall mark.

Evaluation activities on the dates provided by the center for the Official Calls:

3.3 Theoretical written test (20% in case of approved practices, 30% in case of suspended practices).

This test will be carried out in order to verify the degree of assimilation of the theoretical contents of the subject.

The assessment of this theoretical written test will be 20% for those students who, during the teaching period, have obtained an approved practices. In this situation, in order to pass the course, an aggregate percentage of the evaluation of the supervised work and of the evaluation of the theoretical written test must be obtained at least 40% of the maximum value of the student's global qualification, having scored in both.

The assessment of this theoretical written test will be 30% for those students who have to take the substitute evaluation of laboratory practices. In this situation, in order to pass the course, an aggregate percentage of the evaluation of the supervised work and of the evaluation of the theoretical written test must be obtained at least 50% of the maximum value of the student's global qualification, having scored in both.

3.4 Substitute evaluation of laboratory practices.

Any student who during the teaching period has not obtained a pass in practicals will take the substitute evaluation of the laboratory practices, which will consist of a practical exam to be carried out in the laboratory of the subject whose qualification will be suitable or not.

3.5 Substitute evaluation of tutored work.

Those students who have not carried out the supervised work during the teaching period will have a substitute written test for the supervised work in which the degree of assimilation of the practical application of the contents of the subject will be checked. This activity will have an assessment of 70% of the maximum value of the student's global grade.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process that has been designed for this subject is based on the continued student work and focuses on the theoretical aspects to understand, analyze and apply this knowledge to solving real problems.

For the development of the subject, on the one hand, theoretical sessions will be held by the whole group, in which the theoretical foundations of the subject will be presented in the form of lectures and supplemented by solving type-problem.

On the other hand, there will be sessions of laboratory, in which each student will work as a member of a small group of students, putting into practice the knowledge acquired in the theoretical sessions.

In parallel, during the teaching period of the semester, the student will perform an assessment under the tutelage of the professor.

4.2. Learning tasks

The course includes the following learning tasks:

- **Lectures (45 hours)**. Sessions of exhibition and explanation of contents, along with problems and cases of the practical application of such contents. The student's participation will be encouraged through questions and brief discussions.

- **Laboratory practices (15 hours)**. The student will have a practice script, previously provided at the beginning of the session of practices, which will be accompanied by explanations and details required for the accomplishment of the practices, in the own session of laboratory, and given by the corresponding Professor.

- **Tutored assessment (18 hours)**. During the first weeks of the course, the professor will pose a tutored assessment of the subject, which applies in a practical way the contents of the subject developed in the different topics of the course students.

- **Autonomous work and study (68 hours)**, spread over the 15-week of the semester. The continued working of the student will be promoted by the various learning activities evenly distributed throughout the semester.

- **Evaluation Test (4 hours)**. The Evaluation tests as well as having a rating function, are also a learning tool for the student to check the degree of understanding and assimilation of knowledge and skills achieved. The evaluation of the subject will be held in a single session and will consist of two tests. In the first test, lasting half an hour, the degree of assimilation of the theoretical contents of the subject will be checked. In the second test, lasting 3 hours and a half, the degree of assimilation of the practical application of the contents of the subject will be checked.

- **Tutoring**. The direct attention to the student, identification of learning disabilities, guidance on the subject and help to the raised exercises and works.

4.3. Syllabus

The course will address the following learning tasks:

- Distribution of electric power.
- Switchgear and electrical protection in low voltage.
- Design of low voltage electrical installations.
- Grounding installations.
- Introduction to the auxiliary installations.
- Recruitment and conditions of power supply.
- Medium voltage installations. Switchgear.
- Electrical substations and transformers. General characteristics. Protections.
- Introduction to power stations.

4.4. Course planning and calendar

The lectures and practical laboratory sessions are taught according to the schedule established by the centre and published prior to the start date of the course.

Each professor will inform his hours of tutoring.

The other activities will be planned according to the number of students and will be announced in advance.

The detailed calendar of the various activities to be carried out will be established once the University and the Center have approved the academic calendar.

The student can find information on the Center's website on:

- academic calendar,
- classrooms and schedules where both theory and problem classes are taught,
- dates of the two official calls for the subject.

4.5. Bibliography and recommended resources

Web links to the recommended bibliography in the subject according to the teaching center of the same:

29835 Electrical Installations, Degree IEyA in the EINA of Zaragoza:

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29835&Identificador=14500>

29835 Electrical installations, Degree IEyA in the EUP of Teruel:

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29835&Identificador=13648>