Universidad Zaragoza

Academic Year/course: 2021/22

29622 - Low Voltage Electrical Installations

Syllabus Information

Academic Year: 2021/22
Subject: 29622 - Low Voltage Electrical Installations
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 430 - Bachelor's Degree in Electrical Engineering
ECTS: 6.0
Year: 3
Semester: First semester
Subject Type: Compulsory
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 in LV, using their specific regulations and legislation and acquire a set of functional foundations that allow them to advance in matters of an electrical nature.

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.
- Objective 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

To take the course, solid knowledge of the following subjects is required Physics II (1st), Fundamentals of Electrical Engineering (1st) and Analysis of Electrical Circuits (2nd). On the other hand, certain contents of this discipline are used by other subjects of electrical nature: Power Lines (3rd), Medium and High Voltage Electrical Installations (3rd), Power Electrical Systems (4th), Electrical production facilities with renewable energy (4th) and Power stations (4th).

1.3. Recommendations to take this course

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

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 teacher's advice, during face-to-face classes and at the tutoring schedule established by the teacher.

A very fluent command of Spanish is necessary to follow the programmed activities of the subject.

2. Learning goals

2.1. Competences

Upon passing the subject, the student will have more ...

Ability to conceive, design and develop projects in the field of Electrical Engineering (C1).

Ability to solve problems and make decisions with initiative, creativity and critical reasoning (C4).

Ability to use the techniques, skills and tools of Electrical Engineering necessary for the practice of it (C7).

Ability to work in a multidisciplinary group and in a multilingual environment (C9).

Information management capacity, management and application of technical specifications and legislation necessary for the practice of Electrical Engineering (C10).

Ability to calculate and design low voltage electrical installations (C32).

2.2. Learning goals

To pass this subject, the student must demonstrate the following results:

Identify, classify and describe electrical installations in LV.

Calculate and design electrical installations in BT.

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

Understand, select and properly use electrical protection techniques.

Select and use suitable tools for the design of electrical installations in LV.

Know and use the legislation and regulations specific to LV electrical installations.

Select and understand the use of technical literature and other sources of information in Spanish and English.

2.3. Importance of learning goals

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

In addition, certain techniques and knowledge acquired in this subject will be used in other electrical subjects of this degree; therefore, they are very useful to continue your training in the Degree in 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 qualification of the student will be obtained as the sum of the weighted qualifications of the evaluation activities that are exposed next, having to obtain to pass the subject a minimum of 50% of the maximum value of this global qualification, 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 (10%)

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 10% of the overall mark.

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

3.3 Written tests (80%).

There will be two written tests to be carried out in a single session on the date set by the center in each official call.

In the first written test, the degree of assimilation of the theoretical contents of the subject will be verified, with this activity having a valuation between 20% and 40%, inclusive, of the maximum value of the student's global qualification.

In the second written test, the degree of assimilation of the practical application of the contents of the subject will be verified, with this activity having a valuation between 60% and 40%, inclusive, of the maximum value of the student's global qualification.

In order to pass the course, it is necessary to obtain a percentage in written tests of at least 40% of the maximum value of the grade.

3.4 Additional substitute evaluation of laboratory practices.

The student who has not passed the practices in the teaching period will be able to opt for an additional substitute evaluation of the same, through a practical exam whose qualification will be suitable or not.

The student who performs the substitute evaluation of laboratory practices will obtain his overall grade for the subject as the sum of the grade obtained in the final exam (90%) and in the supervised work (10%), with the conditions to pass to obtain a qualification of apt in the exam of practical laboratory and a minimum qualification of 60% of the maximum value of this global qualification.

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 with 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 work under the tutelage of the professor.

4.2. Learning tasks

The program that is offered to the student to help him achieve the intended results comprises the following activities:

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

- **Individual 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 contents to be developed will be the following:

1.- Three-phase circuits.

2.- Description of a power system.

3.- Calculation of conductor cross-sections in low voltage.

4.- Calculation of short circuit currents in low voltage.

5.- Electrical switchgear in low voltage.

6.- Grounding in low voltage electrical installations.

7.- Protection against electric shock in low voltage.

4.4. Course planning and calendar

The lectures and practical laboratory sessions are taught according to the schedule established by the center 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.

The list and dates of the various activities, together with all kinds of information and documentation on the subject, will be indicated by the teacher in the corresponding face-to-face classes.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29622&Identificador=14505