

## 29627 - Power lines

### Syllabus Information

**Academic Year:** 2019/20

**Subject:** 29627 - Power lines

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 430 - Bachelor's Degree in Electrical Engineering

**ECTS:** 6.0

**Year:** 3

**Semester:** Second semester

**Subject Type:** Compulsory

**Module:** ---

### 1.General information

#### 1.1.Aims of the course

#### 1.2.Context and importance of this course in the degree

#### 1.3.Recommendations to take this course

### 2.Learning goals

#### 2.1.Competences

#### 2.2.Learning goals

#### 2.3.Importance of learning goals

### 3.Assessment (1st and 2nd call)

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

### 4.Methodology, learning tasks, syllabus and resources

#### 4.1.Methodological overview

The learning process that is designed for this subject is based on the following:

The learning process will involve the following: theory classes, problem-solving classes, practical activities in the laboratory and field, and cooperative problem-solving activities. The fundamentals of the electrical and mechanical design of overhead and underground power lines will be presented, illustrated with practical examples. In the problem-solving classes, both individual and teamwork will be addressed by the lecturers. Laboratory practice sessions consist of three hours of both lecturing and practicing in small groups, including visits to facilities and field measurement.

#### 4.2.Learning tasks

The program that the student is offered to help you achieve the expected results includes the following activities

Lectures (30 in-class sessions of 50 minutes).

Sessions where the lecturer explains the concepts underlying overhead and underground high voltage lines, illustrated with examples.

Problem-solving activities (15 in-class sessions of 50 minutes).

These activities focus on quantitative problems dealing with the theoretical knowledge acquired in the theory classes. They provide students with deeper learning of the theory contents. The student will be encouraged to work the problems previously and in some stage, they will work cooperatively within teams.

Laboratory sessions (4 laboratory sessions of 3-4 hours).

Teamwork Evaluation (4 in-class sessions).

evaluation is also a learning tool with which the student checks the degree of understanding and assimilation has reached.

Periodically the student exercises and case studies to develop on their own is proposed. These may be obtained from the Digital Teaching Ring (<http://moodle.unizar.es>). This section also includes the preparation of laboratory practices and additional activities.

### 4.3.Syllabus

The program of the course will address the following contents:

1. Introduction to the High Voltage Transmission lines.
2. Elements of overhead and underground high-voltage power lines.
3. Electrical parameters of high voltage lines.
4. Line performance calculations.
5. Mechanical design of overhead spans.
6. Supporting structures.

Laboratory (4 laboratory sessions of 3-4 hours). Includes the following items 1. HV transmission systems.

2. Review the electrical parameters of HV lines.
3. Conductor types, bundle conductor.
4. Corona phenomena on AC and DC lines.
5. Electrical field and magnetic field in HV lines.
6. Insulator selection and clearances.
7. Line and structure locations.

### 4.4.Course planning and calendar

Schedule sessions and presentation of works

Theory lectures, problem-solving activities, and laboratory sessions are carried out on the campus? Rio Ebro? according to the schedule set by the center and published prior to the start date of the course (<http://eina.unizar.es>).

Faculty professors and lecturers have a duty of 6 hours of tutorials per week. These tutorials are not compulsory for students and they are intended to provide students with the information and guidance they need to succeed in their academic work. The timetable of tutorials is published by the Faculty for each semester.

The other activities will be planned depending on the number of students and will be announced in good time. They will be available on <http://moodle.unizar.es>

### 4.5.Bibliography and recommended resources

<http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=7783&p=1>