

Academic Year: ( 2019 / 2020 )

Review date: 22-01-2020

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: LEDESMA LARREA, PABLO

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 1

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Electrical power engineering fundamentals

**OBJECTIVES**

1. Ability to complete a power line project, according to the Spanish regulations.
2. Basic knowledge of the switchgear used in electric substations.
3. Ability to use technical documents used in power systems such as regulations and standards.

**DESCRIPTION OF CONTENTS: PROGRAMME**

- 1.- Power lines electrical parameters.
- 2.- Overhead mechanical design.
- 3.- Electric insulation in overhead lines.
- 4.- Pylons and Safety distances.
- 5.- Grounding
- 6.- Design of power lines
- 7.- High voltage switchgear and measuring transformers
- 8.- Configuration of substations.

**LEARNING ACTIVITIES AND METHODOLOGY**

- Master classes.
- Resolution of numerical examples.
- Project of an overhead power line.

**ASSESSMENT SYSTEM**

ORDINARY CALL: 40% continuous evaluation + 60% final exam.

Continuous evaluation: partial exams and a project designing an overhead power line.

Laboratory practices are mandatory to pass the ordinary call.

The teacher can exempt any student from the final examination as long as they have made all intermediate exercises with a minimum grade of 3 in every of them, and have an average partial test grade equal/greater than 6 points (not including the line project). The students accomplishing these conditions and wanting to improve their grades can do the final exam considering that the grade will be weighted with the continuous evaluation one.

60 % Final exam consisting of theory and problems of the whole subject .

**EXTRAORDINARY CALL**

Best grade between:

- 40% continuous evaluation + 60% final exam, and
- 100% final exam.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

**BASIC BIBLIOGRAPHY**

- Bacigalupe Camarero, Fernando Líneas aéreas de media y baja tensión : cálculo mecánico, Paraninfo.
- Checa L.M. Líneas de transporte de energía, Marcombo Boixareu Editores, 1988
- Ministerio de Industria, Turismo y Comercio Reglamento sobre condiciones técnicas y garantías de seguridad en líneas de alta tensión : Real Decreto 223/2008, de 15 de febrero. BOE, BOE.
- Moreno Clemente, Julián Cálculo de líneas eléctricas aéreas de alta tensión, Moreno, J..
- Pascual Simón, Fernando Garnacho, Jorge Moreno, Alberto González Cálculo y diseño de líneas eléctricas de alta tensión, Garceta, 2011
- Tora Galván J.L. Transporte de la Energía Eléctrica, Universidad Pontificia de Comillas, 1997