

Información del Plan Docente

Academic Year	2017/18
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.Introduction****1.2.Recommendations to take this course****1.3.Context and importance of this course in the degree****1.4.Activities and key dates****2.Learning goals****2.1.Learning goals****2.2.Importance of learning goals****3.Aims of the course and competences****3.1.Aims of the course****3.2.Competences****4.Assessment (1st and 2nd call)****4.1.Assessment tasks (description of tasks, marking system and assessment criteria)****5.Methodology, learning tasks, syllabus and resources****5.1.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 team work 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.

5.2.Learning tasks

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

Theory 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 theory knowledge acquired in the theory classes. They provide students with a 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.

5.3.Syllabus

The program of the course will consist of 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.

5.4.Course planning and calendar

29627 - Power lines

Schedule sessions and presentation of works

Theory lectures, problem-solving activities and laboratory sessions are carried out in 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. 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>

5.5. Bibliography and recommended resources

[BB: Bibliografía básica / BC: Bibliografía complementaria]

- [BB] Barrero González, Fermín. Sistemas de energía eléctrica / Fermín González [Madrid] : Thompson, D.L. 2004
- [BB] Cálculo y diseño de líneas eléctricas de alta tensión. Aplicación al reglamento de líneas de alta tensión (RLAT). R.D. 223/2008 de 15 de febrero / Pascual Simón Comín... [et al.] . - 1ª ed., 1ª imp. Madrid : Ibergarceta Publicaciones , 2011
- [BB] Grainger, John J.. Análisis de sistemas de potencia / John J. Grainger, William D. Stevenson ; traducción Carlos Lozano Sousa ; revisión técnica Pedro Rendón Torres . 1a ed. en español México : McGraw-Hill, 1996
- [BB] Reglamento de líneas de alta tensión y sus fundamentos técnicos Jorge Moreno Mohino ... [et al.]. 1ªed., 5ª impr. Madrid Paraninfo Cengage Learning 2011
- [BB] Tora Galván, José Luis. Transporte de la energía eléctrica : líneas aéreas a M.A.T. y C.A. / José Luis Tora Galván . Madrid : UPCO, 1997
- [BC] García Gracia, Miguel. Circuitos de parámetros distribuidos : aplicación a líneas de transporte de energía eléctrica / Miguel García Gracia, Andrés Lombart Estropiñán, Miguel Ángel García García . - [1a. ed.] Zaragoza : Prensas Universitarias de Zaragoza, 1996
- [BC] Llorente Antón, Manuel. Manual de cables eléctricos aislados / [Manuel Llorente Antón] Madrid : Profepro, 2002

Listado de URL

- Disponibles en <http://moodle.unizar.es>:1- Transparencias (apuntes) de la asignatura.2- Hojas de problemas y guiones de prácticas.3- Recursos docentes especiales[<http://moodle.unizar.es>]
- Reglamento sobre condiciones técnicas y garantías de seguridad en líneas eléctricas de alta tensión. Real Decreto 223/2008 de 15 de febrero.[<http://www.boe.es/boe/dias/2008/03/19/pdfs/A16436-16554.pdf>]