Course guide
820331 - TDEE - Electrical Energy Transmission and Distribution

Last modified: 08/08/2024

Unit in charge: Barcelona East School of Engineering
Teaching unit: 709 - DEE - Department of Electrical Engineering.

Degree: BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: EDUARD BULLICH MASSAGUÉ

Others: Primer quadrimestre:
EDUARD BULLICH MASSAGUÉ - Grup: T11, Grup: T12
EDORTA LÓPEZ URZAINQUI - Grup: T11, Grup: T12

PRIOR SKILLS

Complex numbers

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEENE-250. Knowledge of the principles of operation of electric power transmission and distribution systems.

CEENE-28. Explain the operating principles of power conversion systems and their application to transport and distribution systems.

Transversal:
2. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

TEACHING METHODOLOGY

The course uses the methodology exhibition by 30%, 10% in laboratories, individual work on self
by 60%. We performed a transversal project on the theme of the course.

LEARNING OBJECTIVES OF THE SUBJECT

Technologies in the field of transport and distribution of electricity
Application of the technologies of transportation and distribution of electricity to the current electrical systems

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours large group	45,0	30.00
Hours small group	15,0	10.00

Total learning time: 150 h

CONTENTS

Introduction

Description:
Introduction. Structure components and functions of the distribution system and electricity transmission

Specific objectives:
Understanding the transmission system and power distribution including economic and comparison of different systems

Related competencies :
06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Full-or-part-time: 6h 30m
Theory classes: 1h 30m
Self study : 5h

Overhead lines and cables 1

Description:
Electrical parameters. Equivalent circuits

Specific objectives:
Knowing the electrical parameters of overhead lines and cables for power transmission

Related competencies :
06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Full-or-part-time: 17h 30m
Theory classes: 4h 30m
Laboratory classes: 3h
Self study : 10h

Overhead lines and cables 2

Description:
Overhead lines and cables: Steady state analysis

Specific objectives:
Ability to perform steady state analysis of overhead lines and cables

Related competencies :
06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Full-or-part-time: 35h
Theory classes: 12h
Laboratory classes: 3h
Self study : 20h

Overhead lines and cables 3: pu

Description:
Calculate the system with pu an overhead lines and cables

Specific objectives:
Ability to perform calculations in pu

Related competencies :
06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Full-or-part-time: 11h
Theory classes: 3h
Laboratory classes: 3h
Self study : 5h

Transformers

Description:
Transformers: Types, connections, equivalent circuits

Specific objectives:
Ability to model transformers for system analysis

Related competencies :
06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Full-or-part-time: 35h
Theory classes: 12h
Laboratory classes: 3h
Self study : 20h

Load flow in power grids

Description:
Load flow in power grids. Admittance and impedance matrices. Statement of the problem, Algorithms resolution.

Specific objectives:
Ability to perform load flow in power grids

Related competencies :
06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Full-or-part-time: 32h
Theory classes: 9h
Laboratory classes: 3h
Self study : 20h

Electricity distribution

Description:
Elements and definitions of the distribution system. Radial network structure. Planning.

Specific objectives:
Knowing the specific elements of the electrical distribution, namely the differences in the transport system and be able to perform an analysis of the electrical distribution system.

Related competencies :
06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Full-or-part-time: 13h
Theory classes: 3h
Self study : 10h

GRADING SYSTEM

The evaluation was carried out by the assessment by the teacher. Partial controls account for 40%, the last control 40% and 20% practice of the final grade. The subject includes the generic competence: solvent use source of information in its práctical works. This subject has no reassessment test. Lab lessons are mandatory to pass the course

EXAMINATION RULES.

Calculators and computers are permited.

BIBLIOGRAPHY

Basic:
- Ramírez Rosado, Ignacio J. [et al.]. Problemas resueltos de sistemas de energía eléctrica. Madrid: Thomson, cop. 2007. ISBN 9788497324083.
- Bergen, Arthur R. Power systems analysis. 2nd ed. Upper Saddle River, N.J: Prentice-Hall, cop. 2000. ISBN 0136919901.
- Elgerd, Olle Ingemar. Electric energy systems theory : an introduction. 2nd ed. New York [etc.]: McGraw-Hill, cop. 1982. ISBN 0070192308.
- Glover, J. Duncan; Sarma, Mulukutla S. Power system analysis and design : with personal computer applications. 2nd ed. Boston: PWS Publishing Company, 1994. ISBN 0534939600.
- Ras Oliva, Enrique. Teoría de líneas eléctricas : de potencia, de comunicación, para transmisión en continua. Barcelona: Marcombo, DL 1973. ISBN 8460066819.
- Stevenson, William D., Jr. Elements of power system analysis. 4th ed. New York [etc.]: McGraw-Hill, cop. 1982. ISBN 0070612781.