Last update: 14-10-2019

820331 - TDEE - Electrical Energy Transmission and Distribution

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering

Teaching unit: 709 - EE - Department of Electrical Engineering

Academic year: 2019

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

ECTS credits: 6 Teaching languages: Catalan, Spanish, English

Teaching staff

Coordinator: ANDREAS SUMPER

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

Prior skills

Complex numbers

Requirements

Electric systems

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 INFORMATION 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

Last update: 14-10-2019

820331 - TDEE - Electrical Energy Transmission and Distribution

Study load

Total learning time: 150h	Hours large group:	45h	30.00%
	Hours medium group:	0h	0.00%
	Hours small group:	15h	10.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

Last update: 14-10-2019

820331 - TDEE - Electrical Energy Transmission and Distribution

Content

Introduction

Learning time: 6h 30m

Theory classes: 1h 30m
Self study : 5h

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

Overhead lines and cables 1

Learning time: 17h 30m

Theory classes: 4h 30m
Laboratory classes: 3h
Self study : 10h

Description:
Electrical parameters. Equivalent circuits

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

Overhead lines and cables 2

Learning time: 35h

Theory classes: 12h
Laboratory classes: 3h
Self study : 20h

Description:
Overhead lines and cables: Steady state analysis

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

Overhead lines and cables 3: pu

Learning time: 11h

Theory classes: 3h
Laboratory classes: 3h
Self study : 5h

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

Specific objectives:
Ability to perform calculations in pu

Last update: 14-10-2019

820331 - TDEE - Electrical Energy Transmission and Distribution

Transformers	Learning time: 35h Theory classes: 12h Laboratory classes: 3h Self study : 20h

Description:
Transformers: Types, connections, equivalent circuits

Specific objectives:
Ability to model transformers for system analysis

Load flow in power grids	Learning time: 32h Theory classes: 9h Laboratory classes: 3h Self study : 20h

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

Electricity distribution	Learning time: 13h Theory classes: 3h Self study : 10h

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.

Qualification 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. Generic competence (solvent use source of information) is a separate grade. This subject has no reassessment test.

Regulations for carrying out activities

Calculators are permited.

Last update: 14-10-2019

820331 - TDEE - Electrical Energy Transmission and Distribution

Bibliography

Basic:

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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. [2ª ed.]. Barcelona: Marcombo, DL 1985-. ISBN 8460058921.

Stevenson, William D., Jr. Elements of power system analysis. 4th ed. New York [etc.]: McGraw-Hill, cop. 1982. ISBN 0070612781.