Transmission and distribution of energy

Academic Year: (2019 / 2020)　　　　　　　　　　　　　　**Review date: 08/05/2020 20:55:26**

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: LEDESMA LARREA, PABLO

Type: Electives ECTS Credits : 6.0

Year :　Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Electrical Power Engineering Fundamentals

OBJECTIVES

Ability to solve simple power systems.
Ability to analyze power systems in terms of voltage phasors and flows of active and reactive power.
Ability to describe the most important elements in power lines and substations, and to explain how they work.
Ability to reduce congestions and to improve the voltage profile in a power system by using power plants, shunt devices and tap changers.
Ability to design a program that solves a power flow.
Ability to interpret the results of a power flow.
Ability to identify the main problems that may cause a software tool to fail solving a power flow.

DESCRIPTION OF CONTENTS: PROGRAMME

- Introduction to power systems
        - Structure of power systems
        - Per-unit quantities
        - The single-line diagram
    - Introduction to AC lines (conductors, electric parameters, insulators, corona effect, sag)
    - Introduction to substations (Power transformers, switchgear, protecting devices)
- Electric networks
        - Admittance model
        - Power flow problem
    - Newton-Raphson method
    - Fixed slope method
    - Decoupled methods
- Voltage control
        - Reactive power, shunt capacitors
        - Tap changing transformers
- Power dispatch
- Contingency analysis
- 3-phase short circuit analysis

LEARNING ACTIVITIES AND METHODOLOGY

Practical work in the computer laboratory
Theoretical classes
Solution of practical problems in class
Individual tutorials
Individual presentations of the students

ASSESSMENT SYSTEM

% end-of-term-examination/test: 40

% of continuous assessment (assigments, laboratory, practicals…):   60

Continuous Assessment: (CL*0.7 + QZ*0.2 + OP*0.1)*AT
where
- CL = Computer lab assignments
- QZ = Quizzes
- OP = Oral presentation
- AT = Attendance and participation
Those students that pass the continuous assessment with a grade of 6/10 or more, pass the course without having to do the final exam.

Ordinary call:
- Continuous assessment 60%
- Final exam 40%

Extraordinary call:
Most favorable option between
- Continuous assessment 50%
- Final exam 50%
and
- Final exam 100%

BASIC BIBLIOGRAPHY

 - Grainger, Stevenson Power System Analysis, McGraw-Hill.

 - P. Kundur Power System Stability and Control, EPRI.

 - Pieter Schavemaker; Lou van der Sluis Electrical Power System Essentials, John Wiley & Sons, 2008