

Academic Year: (2019 / 2020)

Review date: 10-05-2019

Department assigned to the subject: Department of Electrical Engineering

Coordinating teacher: MORENO LOPEZ DE SAA, MARIA ANGELES

Type: Electives ECTS Credits : 6.0

Year : 1 Semester : 1

STUDENTS ARE EXPECTED TO HAVE COMPLETED

Students should have basic knowledge about analysis of linear single-phase and balanced three-phase ac circuits.

COMPETENCES AND SKILLS THAT WILL BE ACQUIRED AND LEARNING RESULTS.

Students should be able to:

- Know the basic concepts of Electrical Engineering and related areas.
- Know and understand the basic structure of the power systems, their elements and their functions, representing these correctly in an electrical diagram in both steady state and transient, and interpret their characteristic parameters and their assigned values.
- Understand the basic operating principle of rotating electrical machines (synchronous and asynchronous), find the equivalent circuit in steady state and the torque-speed characteristic curve.
- Interpret the meaning of unit magnitudes in a power system and perform simple analysis of electrical systems.
- Perform calculations specified in the rules of power-flow, short-circuit and transient stability analysis in connecting renewable generation systems.
- Understand and analyze the operation of the synchronous machine and the transformer as a control element for voltage or power flows.
- Understand the fundamental concepts related to the frequency and voltage control in power systems.
- Describe the operation of a simulation tool for power systems and determine the values of the electrical quantities using the tool.

DESCRIPTION OF CONTENTS: PROGRAMME

Part 1. Introduction

- Basics of Electrical Power Engineering
- Introduction to the electric power systems.

Part 2. Elements of power system.

- Transmission lines.
- Transformers.
- Synchronous machines.
- Asynchronous machines.

Part 3. Power systems analysis.

- Per-unit quantities.
- Load-flow solutions and control.
- Symmetrical three-phase faults.
- Power system stability.

Part 4. Power system operation.

- Frequency-power control.
- Voltage control.

LEARNING ACTIVITIES AND METHODOLOGY

- Magisterial classes, tutorship and personal work oriented to the acquisition of theoretical knowledge.
- Problems solution classes, computer sessions, tutorship and personal work oriented to the acquisition of practical skills.

ASSESSMENT SYSTEM

ORDINARY CALL:

Option 1: 100% Continuous evaluation.

It is based in classroom and home exercises, weekly partial tests and personal work with commercial software for power system analysis. They will test the acquisition of basic skills and concepts by the student.

- Weekly partial tests (60%)
- Personal work with power system analysis software (20%)
- Exercises and numerical problems (20%)

Option 2: Final exam (80%) + Personal work with power system analysis software (20%).

This option is designed for those students who can not attend classes regularly.

EXTRAORDINARY CALL: 100% Final exam.

% end-of-term-examination:	0
% of continuous assessment (assignments, laboratory, practicals...):	100

BASIC BIBLIOGRAPHY

- Stevenson Elements of Power Systems Analysis, McGraw-Hill, 1989
- Wood & Wollenberg Power generation, operation and control, John Wiley & Sons, 1996