Power systems engineering

Academic Year: (2019 / 2020) **Review date: 10/05/2018 23:02:37**

Department assigned to the subject:

Coordinating teacher: MORENO LOPEZ DE SAA, MARIA ANGELES

Type: Electives ECTS Credits : 6.0

Year : Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

It is advisable to have passed "Electrical power engineering fundamentals " and "Electrical Technology" subjects.

OBJECTIVES

The students will acquire:
- Capacity to understand the fundamentals of the f-P regulation as well as the voltage control in power systems.
- Ability to understand the problem of stability of a power system and analyze transient stability in simple cases, applying the criterion of equal areas.
- Knowledge about the basic principles of electricity markets and the technical and economic aspects of power system operation, including transmission constraints.
- Ability to understand the meaning of the main power quality indices regarding the continuity of supply in transmission and distribution networks.
- Capacity to differentiate the various disturbances that occur in a power system , recognizing their causes, effects, forms of mitigation and applicable regulations.

DESCRIPTION OF CONTENTS: PROGRAMME

- Introduction to the operation of electric power systems.
- Voltage and frequency control.
- Power system stability: transient stability.
- Operation of power systems in liberalised environments.
- The Iberian electricity market. European markets.
- Transmission and distribution grids.
- Power quality in power systems.

Lab sessions:
- Transient stability: critical fault clearance time .
- PVPC. Electric bill analysis.
- Voltage and current harmonic measurements.

LEARNING ACTIVITIES AND METHODOLOGY

Activities performed in the subject are:

- Master classes. Presentation of the main concepts. Discussion and clarification of doubts about the concepts. We will work on transparencies that will be given to students to facilitate learning in addition to reference texts required in the subject.

- Practical exercises classes. Sessions where suggested problems are solved by teams.

- Laboratories. Students will get a practical case study and will analyse and obtain simulation and analysis data. They'll work with the topics covered in master and practical classes in the subject. There will be a previous study, work in the laboratory and then provide a written report with the results and

proposed solutions.

ASSESSMENT SYSTEM

% end-of-term-examination/test:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

Assessment in this subject is continuous. Marks will be calculated from assessment of several activities. Within these activities can be included the following:

- Solving problems and case studies.
- Fulfillment of individual or group lab practices.
- Performing short tests.

BASIC BIBLIOGRAPHY

- Gómez Expósito (Ed.) Análisis y operación de sistemas de energía eléctrica, Mc Graw-Hill Interamericana, 2002

- Kirschen & Strbac Fundamentals of Power System Economics, John Wiley & Sons, 2004

- Wood & Woollenberg Power generation, operation and control, John Wiley & Sons, 1996

ADDITIONAL BIBLIOGRAPHY

- Kundur Power system stability and control, Electric Power Reseach Institute, 1994

- Stoft Power system economics, IEEE Press-Wiley Interscience, 2002

- Wood, Woollenberg & Sheblé Power generation, operation and control, Wiley, 2014