

Intelligent networks

Academic Year: (2023 / 2024)

Review date: 07-06-2023

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: ALONSO MARTINEZ, MONICA

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

-Electrical Equipment and Systems

OBJECTIVES

The objectives of the course are:

- Know the principles of active intelligent networks (smart grids) and the integration of renewable energy sources in active distribution networks.
- Knowledge of active network operation and control techniques: Stability, frequency-power control, voltage control, state estimation.
- Knowledge of automation and AMR measurement systems in smart grids.
- Know the demand management measures and management of active distribution networks.
- Know the impact of digitization on smart grids before events.

Based on these objectives, at the end of the course the student will be able to:

- design voltage control systems in smart grids with the presence of distributed generation and electric vehicles,
- develop tools that improve the generation-demand balance through the active participation of demand,
- model smart electrical networks for the analysis of vulnerabilities, impact and their mitigation before events.

DESCRIPTION OF CONTENTS: PROGRAMME

- 1.- Introduction.
- 2.- Distributed energy resources: storage facilities and electrical vehicle.
- 3.- Smart grid management: state estimation, voltage control, demand management.
- 4.- Micro grids management.
- 5.- Automation in Smart grids.
- 6.- Smart grids lab.
- 5.- Demonstration Projects and Deployment

LEARNING ACTIVITIES AND METHODOLOGY

Lecturer classes and Practical exercises in the laboratory.

Lecturer classes are taught by Professors from Universidad Carlos III de Madrid and professional experts with experience in the industrial field.

ASSESSMENT SYSTEM

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

Continuous evaluation: laboratory reports, tests or quizz in class, class exercises, digitization research work.

If the student does not pass the minimum mark in the continuous evaluation, they must take a final workt in the ordinary evaluation.

The extraordinary evaluation will consist of the public presentation of a work related to one of the topics of the program

Percentage weight of the Final Exam 0
Percentage weight of the rest of the evaluation 100

BASIC BIBLIOGRAPHY

- M. Bollen The Smart Grid. Adoption the Power System to New Challenges, Morgan & Claypool Publishers, 2011