

4/4 B.Tech. EIGHTH SEMESTER**EE8T2C****SMART GRID****Credits: 3****Lecture: 3 periods/week****Internal assessment: 30 marks****Tutorial: 1 period /week****Semester end examination: 70 marks****Course Objective:**

In this course, students will learn the fundamentals of smart grid, its purpose, its objectives, its technologies, its architecture and its management. Students will also learn many of the challenges facing the smart grid as part of its evolution.

Course Outcomes:

After completing this course, student is able to

1. Understand various aspects of smart grid
2. Know how a smart grid can be used to meet the needs of a utility
3. Create a frame work for knowledgeable power engineers to operate the grid more effectively.
4. Use various computational tools available to analyze smart grid.

Unit I**Introduction to Smart Grid**

Computation intelligence, stake holder roles and function, definition of smart grid, functions of smart grid components.

Unit II**Communication and Measurement**

Introduction, wide area monitoring system, phasor measurement unit, smart meters and appliances, advanced metering infrastructure, GIS technology, MAS technology, comparison between micro grid and smart grid.

Unit III**Performance Analysis Tools For Smart Grid Design**

Load flow studies in smart grid, challenges, load flow state, congestion management effect, contingencies, classification, steady state contingency analysis, performance indices, sensitivity based approaches, contingency studies for smart grid.

Unit IV**Stability Analysis for Smart Grid**

Introduction to stability, voltage stability assessment types, voltage stability assessment technique, voltage stability indexing, analysis techniques.

Unit V**Computational Tools for Smart Grid**

Introduction, decision support tools, optimization techniques, classical optimization techniques, linear programming, non linear programming, integer programming, dynamic programming, stochastic programming, chance constant programming.

Learning Resources

Text Book:

Smart Grid – Fundamentals of design and analysis by James Mamoh, Wiley – IEEE press

Reference Book:

Smart Grid Technology and Application by Janaka Ekanakye, Kithsiri Liyanage, Jianzhang Wu, Akiihiko Yokoyama and Nick Jeenkins , Wiley publications