ENERGY MANAGEMENT SYSTEMS AND SUPERVISORY CONTROL AND DATA ACQUISITION

Course Code: 15EE2103 **L P C**
3 0 3

Pre requisites: Power Systems.

Course Outcomes: At the end of the course**,** the student will be able to
CO1: Understand Energy management systems.
CO2: Understand the various solution techniques of Unit Commitment
CO3: Understand the regional operations of power systems.
CO4: Understand about Supervisory control and data acquisition.
CO5: Understand the SCADA Communications protocol.

UNIT-I (10-Lectures)
Energy Management Centers and Their Functions, Architectures, recent Developments. Characteristics of Power Generating Units and Economic Dispatch

UNIT-II (10-Lectures)
Unit Commitment (Spinning Reserve, Thermal, Hydro and Fuel Constraints); Solution techniques of Unit Commitment. Generation Scheduling with Limited Energy
Energy Production Cost – Cost Models, Budgeting and Planning, Practical Considerations.

UNIT-III (10-Lectures)
Interchange Evaluation for Regional Operations, Types of Interchanges. Exchange Costing Techniques.

UNIT-IV (10-Lectures)
Introduction to Supervisory Control and Data Acquisition. SCADA Functional requirements and Components.

General features, Functions and Applications, Benefits. Configurations of SCADA, RTU (Remote Terminal Units) Connections

UNIT-V (10-Lectures)

Power Systems SCADA and SCADA in Power System Automation. SCADA Communication requirements. SCADA Communication protocols: Past Present and Future. Structure of a SCADA communications Protocol. (10 Lectures)

TEXT BOOKS:

1. Handschin, E. *"Energy Management Systems"*, Springer Verlag, 1990.
2. Green, J. N, Wilson, R, "*Control and Automation of Electric Power Distribution Systems*", Taylor and Francis, 2007.

REFERENCE BOOKS:

1. John D Mc Donald, *"Electric Power Substation Engineering*", CRC press, 2001.
2. Wood, A. J and Wollenberg, B. F, *"Power Generation Operation and Control*", 2nd Edition John Wiley and Sons, 2003.
3. Turner, W. C, " *Energy Management Handbook*", 5th Edition, 2004
4. Handschin, E. "*Real Time Control of Electric Power Systems*", Elsevier, 1972.

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