

Energy Management Systems and SCADA - Web course

COURSE OUTLINE

The course provides an introduction to the role of Computers and Communication in Electrical Power Engineering. Energy Management Systems (EMS) and Supervisory Control and Data Acquisition (SCADA) are strongly linked and associated with each other.

EMS deals with the computer operation, optimization and control of power systems. Power System operation, optimization and control, which are the studies carried in an EMS are presented in detail.

SCADA deals with the communication protocols and control of power systems using EMS. Open Systems, protocols for power system protection and relaying under IEC 6180 will also be covered in this course.

This course provides an introductory course material for power system automation and recent advances in technological aspects of computers and communications in networking.

COURSE DETAIL

Sl. No	Topic: Energy Management Systems (EMS)	No. of Hours (25)
1	Energy Management Centers and Their Functions, Architectures, recent Developments.	02
2	Characteristics of Power Generating Units and Economic Dispatch.	04
3	Unit Commitment (Spinning Reserve, Thermal, Hydro and Fuel Constraints); Solution techniques of Unit Commitment.	04
4	Generation Scheduling with Limited Energy.	03
5	Energy Production Cost – Cost Models, Budgeting and Planning, Practical Considerations.	04
6	Interchange Evaluation for Regional Operations, Types of Interchanges.	04
7	Exchange Costing Techniques.	04

Sl. No	Topic: Supervisory Control and Data Acquisition (SCADA)	No. of Hours (15)
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NP-TEL

NPTEL

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Electrical Engineering

Pre-requisites:

- EE591: Computer Methods in Power System Applications (Core).
- EE596: Computer Applications to Power Systems (Elective).

Coordinators:

Dr. K. Shanti Swarup
Department of Electrical Engineering IIT Madras

1	Introduction to Supervisory Control and Data Acquisition.	01
2	SCADA Functional requirements and Components.	02
3	General features, Functions and Applications, Benefits.	01
4	Configurations of SCADA, RTU (Remote Terminal Units) Connections.	02
5	Power Systems SCADA and SCADA in Power System Automation.	03
6	SCADA Communication requirements.	02
7	SCADA Communication protocols: Past Present and Future.	02
8	Structure of a SCADA Communications Protocol.	03

References:

1. Handschin, E. "**Energy Management Systems**", Springer Verlag, 1990.
2. Handschin, E. "**Real Time Control of Electric Power Systems**", Elsevier, 1972.
3. John D Mc Donald, "**Electric Power Substation Engineering**", CRC press, 2001.
4. Wood, A. J and Wollenberg, B. F, "**Power Generation Operation and Control**", 2nd Edition John Wiley and Sons, 2003.
5. Green, J. N, Wilson, R, "**Control and Automation of Electric Power Distribution Systems**", Taylor and Francis, 2007.
6. Turner, W. C, "**Energy Management Handbook**", 5th Edition, 2004.