

ANNEXURE I

SMART GRID COMMUNICATION AND SECURITY

Unit -1: Introduction

Smart grids, Need for smart grids, Smart grid initiatives, Regulated and deregulated power system - Challenges of the future grid, Electric Energy Efficiency in Power Generation & Delivery, Enabling connectivity to consumers, Using a smart grid to evolve the perfect power system, Smart grid communication infrastructure and its role, interoperability issues, security and privacy in the communication infrastructure, Information in today's power system management operations.

Unit - 2: Communications and access technologies for smart grid

Enhanced smart grid measuring functionalities, Demand-side management and demand response, Energy-consumption scheduling model, Energy-consumption control model using utility functions, Vehicle-to-grid systems, communication media, and power line communication standards.

Unit - 3: Smart Grid and Wide Area Networks

Networking technology for WAMs, machine to machine communications, bad data detection, Wireless standards and networks.

Unit - 4: sensing, measurement, control and Automation technologies

Wireless sensor networks, sensor techniques and its protocols, potential methods for sensor and actuator networks, smart metering - Communications infrastructure and protocols, Demand-side integration, Substation automation and its equipment, characteristics of transmission technology, role of IEDs in transmission, distribution system architecture, home area network, Faults in the distribution system, Voltage regulation, Modelling and analysis tools, Applications.

Unit - 5: Information communication and security

Dedicated and shared communication channels, Switching techniques, Communication channels, Layered architecture and protocols, Communication technologies, Standards for information exchange, Encryption and decryption, Authentication, Digital signatures, security and privacy in the communications infrastructure, Cyber security standards, application driven design for a secured smart grid.

References :

1. - Ekram Hossain, zhu han, H.Vincent Poor, "smart grid communications and networking" Cambridge university press, 2012
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3. Clark W. Gellings, "The Smart Grid: Enabling Energy Efficiency and Demand Response", CRC Press, Taylor & Francis group, 2009.
4. Gilbert N. Sorebo, Michel C. Echols. "smart grid security", CRC Press, 2011
5. Nouredine hadjsaid, jean-claude Sabonnadiere. " smart grids", Wiley, 2012
6. IEEE Transactions on Smart Grids, Power Delivery and Power Systems