

## **B.Tech (EEE) Syllabus for Admission Batch 2015-16, 8<sup>th</sup> Semester**

**PEL8J001**

### **SMART GRID**

#### **Module-I:**

Evolution of Electric Power Grid, introduction to smart Grid, Concept, definitions, architecture and functions of Smart Grid. Need of Smart Grid. Difference between conventional & smart grid. Opportunities & Challenges of Smart Grid,

Introduction to Smart Meters, Real Time Pricing, Smart Appliances. Automatic Meter Reading(AMR). Outage Management System(OMS). Home & Building Automation, Substation Automation, Feeder Automation, Smart Sensors, Geographic Information System (GIS). Intelligent Electronic Devices(IED) & their application for Monitoring & Protection.

#### **Module-II:**

Phasor Measurement Units (PMU), Wide Area Measurement System (WAMS), Wide-Area based Protection and Control

Micro-grid concepts, need and application, Issues of Interconnection. Protection & control systems for micro-grid.

Storage systems including Battery, SMES, Pumped Hydro. Compressed Air Energy Storage.

#### **Module-III:**

Variable speed wind generators, fuel-cells, micro-turbines. Integration of renewables and issues involved, Advantages and disadvantages of Distributed Generation.

Power Quality & EMC in smart Grid. Power Quality issues of Grid connected Renewable Energy Sources. Power Quality Conditioners for micro-grid. Web based Power Quality monitoring, Power Quality Audit.

#### **Suggested Books:**

1. Ali Keyhani, "Design of Smart power grid renewable energy systems" ,Wiley IEEE,2011.
2. Clark W. Gellings, "The Smart Grid: Enabling Energy Efficiency and Demand Response",CRCPress, 2009.
3. Stuart Borlase, " Smart Grid: Infrastructure,Technology and solutions " CRC Press.
4. Janaka Ekanayake, Nick Jenkins, KithsiriLiyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", Wiley.
5. Andres Carvallo, John Cooper, "The Advanced Smart Grid: Edge Power Driving Sustainability: 1", Artech House Publishers July 2011
6. Mladen Kezunovic, Mark G. Adamiak, Alexander P. Apostolov, Jeffrey George Gilbert "Substation Automation (Power Electronics and Power Systems)", Springer