

Subject Code: 1ET2130104	Subject Title: Elective: 1- Smart Grid and Distributed Generation
Pre-requisite Subject	Fundamentals of Generation and Transmission

Course Objective:

- To understand the concept of distributed generation.
- To analyze the impact of grid integration.
- To study concept of Micro grid and its configuration.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	-	2	4	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Introduction Conventional power generation: advantages and disadvantages, Energy crises, Non- conventional energy (NCE) resources: review of Solar PV, Wind Energy systems, micro-turbines and tidal sources.	4	10	
2	Distributed Generation (DG) Concept of distributed generations, topologies, selection of sources, regulatory standards/ framework, Standards for interconnecting Distributed resources to electric power systems. DG installation classes, security issues in DG implementations.	8	20	
3	Impact of grid Integration Requirements for grid interconnection, limits on operational parameters: voltage, frequency, response to grid abnormal operating conditions, islanding issues. Impact of grid integration with NCE sources on existing power system: reliability, stability.	6	20	
4	Basics of Micro-grid Concept and definition of micro-grid, micro-grid drivers and benefits, review of sources of micro-grids, typical structure and configuration of a micro-grid, AC and DC micro-grids.	4	20	
5	Control & Operation of Micro grid Modes of operation and control of micro grid: grid connected and islanded mode, Active and reactive power control, protection issues, micro grid communication infrastructure, Micro grid economics, Introduction to smart micro grids.	8	30	

Course Outcome:

After learning the course the students should be able to:

- Know what a function of smart grid.
- Issues while implementing the smart grid approach.
- Know concept of distributed generation.

List of Text Books:

1. Distributed generation Micro grid operation By Hatem Hussein Magdy Zeineldin, University of Waterloo (Canada).
2. Micro grids and Active Distribution Networks By S. Chowdhury, S.P. Chowdhury and P. Crossley - The Institution of Engineering and Technology, London.

List of Reference Books:

1. Control and optimization of Distributed generation system By Magdi S Mahmoud – Springer.
2. Distributed generation and its implications for the utility industry By Fereidoon P Sioshansi – Academic Press.

Reference Journal papers:

- Electric power systems research.
- Int. Journal of electric power and energy systems
- IEEE Power & Energy Magazine