Course Number and Name

BEE019 & Smart Grid

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Dr.V.Jayalakshmi

Text Books and References

Text Books:

1.Vehbi C. Güngör, DilanSahin, TaskinKocak, SalihErgüt, ConcettinaBuccella, Carlo Cecati, and Gerhard P. Hancke, Smart Grid Technologies: Communication Technologies and Standards IEEE Transactions On Industrial Informatics, Vol. 7, No. 4, November 2011.

References:

- 1. Xi Fang, SatyajayantMisratuGunlismarXueterandeDajsmarYang "Smart Grid The New and Improved Power Grid: A Survey", IEEE Transaction on Smart Grids, 2011.
- 2. Stuart Borlase "Smart Grid : Infrastructure, Technology and Solutions", CRC Press 2012.
- 3. https://www.youtube.com/watch?v=JwRTpWZReJk&list=PLzcxA4YJjE1s6NOlhCA34vrsFC eokjs9_
- 4. https://iit.edu/news/iittoday/?tag=smart-grid

Course Description

To enable the students acquire knowledge on smart grid, different options of architectural design and communication technology for various aspects of smart grid, System analysis and stability analysis in smart grid, renewable energy sources and storage integration with smart grid.

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	Pı	rerequisites		Co-requisites				
	Power C	Generation System		Nil				
required, elective, or selected elective (as per Table 5-1)								

Required

Course Outcomes (COs)

CO1: To understand The concepts and design of Smart grid.

CO2: To understand the various communication and measurement technologies in smart grid.

CO3: To study the smart meters used in smart grid.

CO4: To learn the renewable energy resources and storages integrated with smart grid.

CO5: To familiarize the high performance computing for Smart Grid applications.

Student Outcomes (SOs) from Criterion 3 covered by this Course

Student Sutcomes (SOS) from effection 5 covered by this course												
COs/SOs	a	b	с	d	e	f	g	h	i	j	k	1
CO1	L	М	Н	L	L	Н	М	L	М	М	L	М
CO2	М	Н	М	Н	L	М	М	L	М	М	L	L
CO3	М	L	Н	М	М	М	L	L	М	М	Μ	М
CO4	Н	Н	Н	L	Н	М	Н	L	Н	М	Н	Η
CO5	Н	Н	М	М	М	М	Η	L	Н	М	Η	Η
List of Topics Covered												

UNIT I INTRODUCTION TO SMART GRID

Evolution of Electric Grid, Concept, Definitions and Need for Smart Grid, Smart grid drivers, functions, opportunities, challenges and benefits, Difference between conventional & Smart Grid, Concept of Resilient &Self Healing Grid, Present development & International policies in Smart Grid, Diverse perspectives from experts and global Smart Grid initiatives.

UNIT II SMART GRID TECHNOLOGIES

Technology Drivers, Smart energy resources, Smart substations, Substation Automation, Feeder Automation ,Transmission systems: EMS, FACTS and HVDC, Wide area monitoring, Protection and control, Distribution systems: DMS, Volt/VAr control, Fault Detection, Isolation and service restoration, Outage management, High-Efficiency Distribution Transformers, Phase Shifting Transformers, Plug in Hybrid Electric Vehicles (PHEV).

UNIT III SMART METERS

Introduction to Smart Meters, Advanced Metering infrastructure (AMI) drivers and benefits, AMI protocols, standards and initiatives, AMI needs in the smart grid, Phasor Measurement Unit(PMU), Intelligent Electronic Devices(IED) & their application for monitoring & protection.

UNIT IV POWER QUALITY MANAGEMENT IN SMART GRID

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

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