Distributed Generation and Renewable Integration: forecasting tools and EMS towards Smart Grid / Smart City paradigm

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Overview

In recent years, the rapid increase of Distributed Generation (DG) installations, especially those based on Renewable Energy(RE) sources, is expected to address the environmental concerns. Among various kinds of renewable energy based DGs, wind and photovoltaic (PV) power generation are relatively mature and are the fastest growing DG technologies. In addition to renewable energy sources, alternative energy sources or micro sources such as fuel cells and microturbines have also been used increasingly in recent years for power generation. A common feature of the renewable energy based or micro sources based DG systems is the power electronics interface that is required to convert the energy sources output to the grid ready voltages. These power electronics also provide enhanced flexibility for the DG operation and energy management. Decentralized Generations are natural extensions of smart grids. Their ability for on-site decentralized power generation helps in reducing peak loads and hence better management of the central grid. The generated energy is supplied to the local area and may or may not be connected to the main grid depending on its Geo-location. It has all the functions of the larger grid, generation, transmission, and distribution, but supplies energy to only limited area, hence it is called micro-grid. For proper operation of a microgrid, energy management strategies are important to regulate the output powers of each DG as well as the voltage and frequency of the microgrid systems. Additionally, to achieve improved power quality in a microgrid, proper design and control of the DG interfacing converters to provide the ancillary services are important.

This course is organized in two modules that should be taken together. The topics in Module A will expose the participants to the Renewable energy and DG grid integration, Power electronics in grid integration, architecture and design principle, infrastructure, ICT, storage and smart metering technologies. Wind forecasting tools for grid stability will also be discussed. In Module B, future smart grid and smart city models, R & D projects and experiences in Europe, energy policy and optimal sizing and siting of DG will be emphasized.

Course participants will learn these topics through lectures. Also case studies and assignments will be shared to stimulate research motivation of participants.

Modules	**A: Renewable Integration, Forecasting in smart grids : May 23 – May 27/ 2016** **B: Distributed generation and smart cities. : May 30 – June 3 /2016** **Minimum number of participants for the course is Thirty.**
You Should Attend If…	• You are an engineer or a researcher from power industry or public sector organizations including R&D laboratories. • You are a student at the levels (BTech/MTech/PhD) or Faculty from reputed academic and technical institution interested in the area of RE integration and DGs in Smart grids.
Fees	The participation fees for taking the course is as follows: Participants from abroad : US $500 Participants from Industry /Consultancy firm : Rs. 8000/- Faculty (Internal & External) and scientists : Rs. 4000/- Students (with award of grade) : Rs. 2000/- Students (without award of grade) : Rs. 1000/- The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility and is exclusive of boarding and lodging. The participants will be provided with twin sharing accommodation on payment basis (subject to availability).

The Faculty

Prof. Francesco Grimaccia, is a faculty of Electrical Engineering at Energy Department, Politecnico di Milano University, Italy. His main research interests are related to soft computing techniques development and application in different fields, such as renewable integration in smart grid, photovoltaic and other innovative energy harvesting devices.

Dr. Siva Kumar K, is Assistant Professor in the Department of Electrical Engineering, Indian Institute of Technology Hyderabad, India. His main research interests are in the area of power electronic controls, Multi level inverters, Induction Motor drives, Micro grids, Power quality and control.

Prof. Maheswarapu sydulu is a faculty of Electrical Engineering at National Institute of Technology, Warangal, India. His main areas of interest include real time power system studies, Distribution system studies, Artificial Intelligence and Meta heuristic applications in PS studies, Renewable Energy and Smart grids.

Dr. Sailaja Kumari Matam, is Associate Professor in the Department of Electrical Engineering at National Institute of Technology, Warangal, India. Her main areas of interest include, wind integration issues in power systems, power system restructuring issues, Artificial Intelligence applications in PS.

Coordinators:

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