EE603   Renewable Energy and Smart Grid

Credit: 3-0-0-3   Approval: Approved in 2nd Senate

Prerequisite: EE 203 Electromechanics, EE 303 Power Systems

Students intended for: UG/MS/PhD

Elective or Core: Elective   Semester: Odd/Even

Course objective: The increasing number of renewable energy sources (RES) and distributed generators (DG) requires new strategies for the operation and management of the electricity grid in order to maintain or even to improve the power supply reliability and quality in the future. The major objective of this course is to develop an appropriate methodology to assess renewable energy sources from a utility perspective that is compatible with the technical and economic assessment techniques employed by utility engineers and planners. An introduction to the smart grid concept has been covered.

Course content:

Basic concepts, definitions and classifications of energy resources; grid code and characteristics; electrical output characteristics of various renewable energy sources; compatibility issues and options.

Introduction to major RES, grid integration issues, challenges and methodologies, power electronics converters for grid integration, hybrid systems and virtual power plants, storage, Cost of interconnection and responsibilities, forecasting, scheduling of RES, regulatory issues and energy markets. Introduction to smart grid concept.

Text & Reference Books:

Ali Kehani, Mohammad N. Marwali, Min Dai, Integration of Green and Renewable Energy in Electric Power Systems, Wiley Interscience, 2009.

Gil Masters, *Renewable and Efficient Electric Power Systems*, Wiley-IEEE Press, 2004.

Felix A. Farret, M. Godoy Simoes, Integration of Alternative Sources of Energy, IEEE Press and Wiley Interscience Publication, 2006.

John Twidell and Tony Weir, Renewable Energy Resources, Talyor and Francis, 2006.

T. Ackermann, Wind Power in Power Systems, John Wiley

Other Sources: IEEE Transactions on Smart Grid