

EE 703: RENEWABLE POWER GENERATION SOURCES (3-0-0: 3)

Basic Characteristics of Sunlight - Solar Energy Resource – Photovoltaic Cell-characteristics – Equivalent Circuit – Photo voltaic For Battery Charging.

Wind Source – Wind Statistics – Energy In The Wind – Aerodynamics - Rotor Types – Forces Developed By Blade - Aerodynamic Models – Braking Systems – Tower – Control And Monitoring System – Power Performance.

Wind Driven Induction Generators – Power Circle Diagram – Steady State Performance – Modeling – Integration Issues – Impact on Central Generation – Transmission And Distribution Systems – Wind Farm Electrical Design.

Wind – Diesel Systems – Fuel Savings – Permanent Magnet Alternators - Modeling – Steady State Equivalent Circuit – Self-excited Induction Generators – Integrated Wind - Solar Systems.

Micro-hydel Electric Systems – Power Potential – Scheme Layout – Generation Efficiency And Turbine Part Flow - Isolated And Parallel Operation Of Generators – Geothermal – Tidal And OTEC System.

Grid interface of renewable energy resources- Power converters and control for interfacing for solar and wind energy to grid; distributed generation and impact on power distribution systems; microgrids and smart grid technologies using power electronic converters.

References:

1. John F.Walker & Jenkins.N, Wind Energy Technology, John Wiley and Sons, Chichester, U.K, 1997
2. Van Overstraeton and Mertens R.P. Physics, Technology and Use of Photovoltaics, Adam Hilger, Bristol, 1996.
3. Frerics LL, Wind Energy Conversion Systems, Prentice Hall, U.K, 1990