

Course Topics

EEE 598: Renewable Electric Energy Systems

Prerequisite: Open to EE graduate students. Basic understanding power electronics, electric machine, and control

Course Description: Due to ultimate energy supply constraints imposed by fossil fuel and ever increasing energy demand from consumers, renewable energy is attaining much more prominent position as a promisingly viable and necessary solution. This course covers the critical technical constituents that advance electrical utilization of renewable energy. The lecture topics are divided into two modules: electric power conversion and grid integration.

Course Topics

- **Overview of Renewable Energy System**

- Big picture in energy supply and demand, need for more energy
- Renewable energy sources (hydro, solar, wind, tidal, waves)
- Cost and environmental impact

- **Power Conversion**

- Solar cells technology (crystalline, amorphous) and characteristics
- Wind turbine system configurations
- Power converter topologies for solar and wind
- Control of dc-dc converter and dc-ac inverters
- Control of different types of generator-inverter systems
- Fuel cell technology and characteristics and control

- **Grid Integration**

- Grid-connected and off-grid PV systems
- Compliance with power quality and safety code for solar and wind systems
- Wind and solar intermittency management (on technical side)
- Distributed Generation
- Microgrid