EEL 4281 Photovoltaic Power Systems

Credits: 3


Specific course information
  a. Brief description of the content of the course: Sun parameters; PV system components; PV system design, including environmental and economic considerations; PV cell technologies and device theory.
  b. Prerequisites: EEE 3300 – Electronics 1
  c. Required, elective, or selected elective: Elective

Specific goals for the course
Specific outcomes of instruction:

  The student will understand the relationship of the insolation, orbit and rotation of the Earth
  The student will learn the concepts of PV cells, module and array
  The student will be able to design PV systems for simple PV-powered fan, pump, lighting systems and with load constraint
  The student will learn how to design realistic PV projects such as PV-powered cabin, residential, small to medium grid-tied PV systems
  The student will be able to effectively communicate in writing answers to qualitative questions on tests.

Brief list of topics to be covered

  Background on current world energy use
  Solar spectrum, insolation, sun tracking techniques
  Shading effects
  PV orientation considerations
  Introduction to PV systems
  Energy storage
  PV system loads and availability
  Maximum Power Trackers and Linear current boosters
  PV Systems Examples
  Cost considerations, life cycle costing
  Stand-alone PV systems design; residential and cabin considerations
  Battery sizing considerations
  Utility interactive PV systems; small to medium sizes
  Present and Proposed PV cells