THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Photovoltaics and Energy Conversion

ECE 5832

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Photovoltaic materials and devices; solar cell device physics; solar cell simulation, design and operation; silicon cell technologies; thin film technologies; III-V technologies; nanostructures; terrestrial and space applications.

Prerequisites and Co-requisites:
Prereq: 3030, or Grad standing in Engr or Physics.

Course Goals / Objectives:
- Master understanding of semiconductor physics for photovoltaics
- Master solar cell device physics
- Master solar cell operations, design, and limitations
- Be competent with advanced solar cell designs such as multijunctions
- Be competent with solar cell equivalent circuits
- Be familiar with system implementation of solar cells

Course Topics:

- Photovoltaics, global energy issues and the solar spectrum
- Optical properties of photovoltaic materials
- Electronic and transport properties of photovoltaic materials
- PN junction transport under solar illumination
- Solar cell spectral response and output parameters
- Solar cell simulations
- Non-idealities, material parameters and practical cell design
- Solar radiation and theoretical conversion efficiency limits
- Crystalline silicon solar cell technology
- Thin film technologies
- III-V multijunction and concentrator technologies
- Nanostructure approaches
- Space photovoltaics
- Characterization of solar cells
- In-class presentations

Designation:

Elective