EEE 565 Solar Cells
Fall 2013

Course Objective: To introduce the basic concepts of the operation of photovoltaic devices, the major technologies, and the impact of materials and device structure on the conversion efficiency. Students will gain a knowledge of the physics of operation of the major commercial solar cell technologies, and how they are integrated into solar cell systems.

Topics:

1) Photovoltaic Energy Conversion, Solar Spectrum, Light Absorption (1 week)
2) Background on Semiconductor Material/Optical Properties (2 weeks)
3) pn Junctions and Device Physics(1 week)
4) Homojunction Solar Cells (2 weeks)
5) Heterojunction Solar Cells (1 week)
6) Multi-junction Solar Cells (1 week)
7) Light Management (1 week)
8) Organic PV/Advanced Concept Devices (2 week)
9) Photochemical/Dye Sensitized Solar Cells (1 weeks)
10) Commercial Solar Cell Technologies (2 weeks)
11) Module and Grid Integration Issues (2 weeks)

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Class Schedule: T-Th 12:00-1:15 pm PSF 123

Office Hours: TBD

Prerequisites by Topic:

Basic background in electronic properties of materials

Textbook:

Jenny Nelson, The Physics of Solar Cells, Imperial College Press, 2003; ISBN-13 978-1-86094-340-9

Grading:

Homework assignments (50%); Midterm (20%), Final/Final Project (30%)