Course Description: There are fundamental bottlenecks for current photovoltaic technologies to become a noticeable source of energy: material availability, energy input, cost, efficiency, and even public acceptance of the unpredictable energy source. This course will explore some of these bottlenecks and focus on potential solutions. Topics to be covered include: The grand energy challenge. Different methods for solar energy utilization. Review of solar cell physics. Wafer silicon photovoltaic technology. Survey of other photovoltaic technologies. Optical/electrical loss mechanisms and remedies. Multijunction tandem cells and concentrating systems. Efficiency limits. Resource limitations to terawatt photovoltaics. Potential Earth-abundant materials for photovoltaics. Approaches to low-cost thin-film and 3-dimensional photovoltaics. Terawatt low-cost wafer silicon photovoltaics. It is intended to expose students to some of current focuses in photovoltaic research and commercialization.

Credit Hours: 3-0

Prerequisites: Entry-level course on photovoltaics such as EEE 498 Solar Energy or EEE 598 Solar Cells, or EEE 436 and consent of instructor

Class Time and Place: Tuesdays and Thursdays 9:00 – 10:15 am, ECG G320

Instructor’s Contact Information:
Professor Meng Tao
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Extension: 5-9845
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Office Hours: Tuesdays and Thursdays 10:30 am – noon. Please email or call if you need to see me at other times.

Textbook:

References:
• Additional reading materials from the literature

Course Assignments: Homework, individual and team projects, a term paper, and an oral presentation at the end of the semester. While discussions among students are encouraged, all the assignments are required to be finished independently by each student.

Grading: There will be no mid-term or final exams. The final grade will be based on homework, projects and term paper (including oral presentation):

\[ \text{Final Grade} = 0.5 \times \text{Homework/Project} + 0.3 \times \text{Term paper} + 0.2 \times \text{Oral presentation} \]

Each homework problem will be worth 10 points, and each project will be worth 20 – 30 points depending on the amount of work involved.

Penalty for Late Homework/Project/Term Paper:
All homework and projects are due every Thursday at 9:00 am before class. Anything turned in after that will be considered at least one day late. 20% of the full points will be deducted for each extra day past the due day.

Due Date for Term Paper: April 19, 2012