

ECE 618 – Renewable Energy II

FMH 314

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207 Microelectronics

Office Hours: W 4:30-6:00 or by appointment (send e-mail)

Goal: **Expand on the system design details and cost-benefit analysis of several forms of renewable energy**
-- solar electric and heating, wind, waves
Stimulate discussion and independent study of how to implement renewable energy.
assume knowledge of material in ECE 443 (Renewable Energy Systems with textbook “Renewable and Efficient Electric Power Systems” by Gilbert M. Masters Wiley 2004)

Textbook: “Renewable Energy: Power for a Sustainable Future”
Godfrey Boyle (ed.), Oxford **ISBN-13:** 978-0199261789
+ Additional Handouts for material not in book.

Grading: **20% Homework (assigned in class)**
25% Midterm
30% Project Presentation PPT and Written Report
25% Final
A is >85%, B is 75-84%, C is 60-74%, D is 50-59%, F is <50%

Topics:

Week 1 -- Introduction to renewable energy – Fossil Fuels (Global and US use) and Global Warming
Week 2 -- Solar Energy, Solar Electric -- Si Solar cell basics, Solar Radiation and Solar Cell Efficiency
Week 3-- Solar Energy, Solar Electric -- PN junction (ideal and non-ideal) physics basics
Week 4 -- Solar Energy, Solar Electric --Thin Film, Multiple junction and Concentrator Technologies
Week 5 -- Solar Energy, Solar Electric --Solar Panel and Solar Electric Systems Considerations
Week 6 -- Solar Energy, Solar Thermal Heating Systems – Fundamentals and Applications
Week 7-- Wind Energy
Week 8 -- Hydroelectric Energy
Spring Break
Week 9 -- **Midterm exam, Project proposal due.**
Week 10 -- Transportation and Biomass
Week 11 -- Power Generation and Distribution in US and Adaptations for
Week 12 -- Nuclear Energy, Clean Fossil Fuels and Fuel Cells
Week 13, 14-- **Oral Presentations, written report due**