ENGRMAE 117 SOLAR AND RENEWABLE ENERGY SYSTEMS

Catalog Data: ENGRMAE 117 Solar and Renewable Energy Systems (Credit Units: 4) Basic principles, design, and operation of solar and other renewable energy systems including solar photo-voltaic, solar thermal, wind, and hydrogen technology (e.g. fuel cell/ electrolyzer). Prerequisite: MAE91 Thermodynamics (Design units: 1).


Instructor: Prof. Wang (4231EG) email: yunw@uci.edu Office Hour: MW 11:00-11:45 Am TA: Yiheng Pang: yihengp@uci.edu; Daniela Fernanda Ruiz Diaz: druizdia@uci.edu

Course Outcomes: Students will be able to:
1. Understand the basic principles of design and operation of solar, wind, and PEM fuel cell.
2. Apply those principles to a wide variety of renewable systems and applications.
3. Calculate thermodynamic efficiencies, and design system cycles in the construct of key performance goals.

Prerequisites By Topic: Introduction to Thermodynamics (MAE 91)

Lecture Topics: Introduction to Renewable Energy (~3 hours)
Fundamentals of Solar Radiation (~3 hours)
Solar Photo-voltaic Cells (~3 hours)
Solar Heating and Cooling (~3 hours)
Solar Process Heat and Thermal Power (~3 hours)
Wind Energy (~4.5 hours)
H2 Economy, Fuel Cell, and Batteries (~9.5 hours)

Class Schedule: Each class meets ~3 hours per week for 10 weeks

Design Content Description Project 1 is to review journal papers related to solar, wind, or PEM fuel cell. Project 2 is to solve an energy-related problem at UCI. Lectures: 100% Laboratory Portion: 0%

Grading Criteria: Problem Sets 25% Class Project 1 12.5% Class Project 2 22.5% Others (e.g. quiz, attendance…) 5% Final 35% 100%

Prepared by Prof. Wang