ME 4332 Renewable Energy Systems (Elective)

Catalog Description
Renewable and efficient energy systems are introduced. Various energy conversion and storage technologies are explained and analyzed, along with their respective advantages and limitations.

Course information
- prerequisites and co-requisites* *ME 3322, ME 3340, ME 3345**
- *(3-0-0-3) 3 hours of lecture per week, 3 credit hours*

Textbook
- *Twidell, J. and Weir, T., Renewable Energy Resources (2nd Ed.), Taylor & Francis, 2006.*
- Other references:
    National Renewable Energy Laboratory (NREL) website

Course coordinator
Dr. Comas Haynes

Topics Covered

1) Principles, overview and importance of renewable energy
2) Review of thermal sciences (i.e., pertinent thermodynamics/transport phenomena)
3) Solar-based heating and power generation
4) Fluidic power generation (aerial and waterway)
5) Biomass and biofuels
6) "Subsurface" thermal energy utilization (OTEC and geothermal)
7) Energy systems, storage and transmission/transportation
8) Energy efficiency measures
9) Opportunities for, and challenges to, societal implementation

Course Objectives:

Objective 1: To provide students an appreciation for the need and promise of simultaneously renewable/efficient, alternative, and "clean" energy technologies

Objective 2: To teach the prevalent types and applications of renewable and efficient energy systems

Objective 3: To teach students the basic principles of operation of renewable and efficient energy converters

Objective 4: To train students to apply thermal science fundamentals to the design/analysis of renewable and efficient energy system components

Objective 5: Expose students to the diversity of beneficial applications currently utilizing renewable energy (e.g., "solar cell roofs") and efficient and future implementations of such technologies

Objective 6: Introduce students to societal catalysts and challenges regarding renewable and efficient energy implementation ("clean energy" incentives, energy security, codes and regulatory needs, etc.)