

1. ECE 465: Electrical Energy Generation Technologies
2. 3 credits. 2-75 minute lecture sessions/week
3. George Collins
4. Without the Hot Air. MacKay, D. 2009.
  - a. Professor notes
5. Course Information
  - a. Various electrical energy generation alternatives. Comparisons based on cost, reliability, availability and environmental impact.
  - b. Prerequisites: ECE 202 with a C or higher
  - c. Selected Elective: Electrical Engineering; Computer Engineering
6. Goals for the Course
  - a. Course Learning Objectives
    - i. Discuss sustainable and green energy sources of energy as compared to traditional fossil fuel and nuclear energy sources
    - ii. Analyze the sustainable and green energy sources of energy options currently used and available
    - iii. Utilize hard numbers, “metrics” with “units”, such as energy cost in \$/Watt or \$ per Joule
    - iv. Define and discuss factors including the land area and water volume needed to generate a GW of power from wind, solar, hydro, tides, waves ,nuclear, and fossil fuels
    - v. Identify quantitative comparisons between various energy pathways, hidden costs of pollution and the remediation costs to reduce pollution will be covered
  - b. Student Outcomes
    1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
    3. An ability to communicate effectively with a range of audiences
    4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
    7. An ability acquire and apply new knowledge as needed, using appropriate learning strategies
7. Topics Covered
  - Motivations for Sustainable Energy
  - Factors to consider related to Sustainable Energy
  - Transportation: Planes, Cars
  - Wind (including Offshore wind)
  - Solar

Heating and Cooling  
Hydroelectricity/ Hydrocarbon Energies  
Sustainable fossil fuels  
Nuclear Energy  
Geothermal Energy  
LED Lighting Systems