PURDUE UNIVERSITY FORT WAYNE | Department of Civil and Mechanical Engineering

Course	ME 42700 - Sustainable Energy Sources and Systems
Type of Course	Elective (Group 1) for ME program
Catalog Description	An introduction to energy sources and energy systems with an emphasis on sustainability. Students will apply material from thermodynamics, fluid mechanics, and heat transfer to analyze and design energy systems that utilize non-renewable energy sources such as fossil fuels, nuclear fission and fusion, and hydrogen, as well as renewable energy sources such as solar, wind, biofuels, geothermal, and oceans. Economic, environmental, social and political issues related to energy are also considered.
Credits	3
Contact Hours	3
Prerequisite Courses	ME 301 and ME 321
Corequisite Courses	None
Prerequisites by Topics	Thermodynamics II and Heat Transfer
Textbook	R. A. Dunlap, *Sustainable Energy,* Cengage, current edition.
Course Objectives	To introduce students to energy sources and systems with an emphasis on sustainability; to expose students to Economic, environmental, social and political issues related to energy
Course Outcomes	Students who successfully complete this course will have demonstrated an ability to: 1. Evaluate and compare non-renewable and renewable energy sources for energy content and environmental impact. **(1)** 2. Perform thermal, environmental, and economic analyses of energy systems. **(1)** 3. Design energy systems (including economic analysis) and communicate results either orally and/or in writing. **(2,3)** 4. Understand some of the ethical, economic, environmental, social, and political issues associated with energy and energy systems**. (3,4,7)**
Lecture Topics	1. Introduction to energy and sustainability 2. Review of thermal sciences and efficiency

3. Environmental effects of energy
4. Energy sources, systems, and storage
5. Economic analysis
6. Fossil fuels
7. Nuclear power
8. Hydrogen fuel cells
9. Solar energy
10. Wind energy
11. Biomass energy
12. Geothermal energy
13. Hydropower
14. Ocean energy (waves, tides, and thermal)

Computer Usage	Medium
Laboratory Experience	None
Design Experience	Medium
Coordinator	Donald Mueller, Ph.D., P.E.
Date	27 June 2018