



EGR 284: Solar Power

This course provides an in-depth introduction to solar energy as a sustainable form of power and how it can be utilized for a variety of energy demand applications in residential, commercial, and municipal buildings. The benefits and limitations of various common solar energy technologies used to produce heat, hot water, and electricity are examined. The course looks at the process of siting, sizing and designing of solar hot water and solar photovoltaic electric systems and how to perform an economic and environmental analysis of proposed systems. In the classroom, students gain a basic understanding of the fundamental science of heat and energy and an up-to-date knowledge of the equipment and techniques used in the solar industry. While in the laboratory, students develop the hands-on skills necessary to evaluate, install and maintain solar power systems. Prerequisite: EGR 131 or EGR 151 or permission of instructor. Three lecture and three laboratory hours per week. Instructional Support Fee applies.

Course Student Learning Outcomes

1. Describe and quantify the solar resource and explain what factors influence the availability of solar energy at different locations across the globe. 2. Differentiate between the main categories of solar energy technologies (passive thermal, solar hot water, photovoltaic, and concentrating solar power) and explain which technologies work best for different applications. 3. Conduct a site assessment to determine amount of solar irradiation at a particular location and the properly site and orient a building to optimize solar gain. 4. Identify and explain the type, benefits, limitations, markets and applications of different types of solar thermal and photovoltaic systems. 5. Describe the thermodynamics principals at work in active solar thermal systems. 6. Identify various types of photovoltaic cells and explain how they convert sunlight into electricity. 7. Calculate demand and properly size a solar thermal system and a photovoltaic systems (both stand alone and grid connected) to meet loads of the applications. 8. Calculate the energy output, fuel savings, and emission reductions and explain the associated economics of solar thermal and photovoltaic systems.

Credits: 4

Program: Engineering