THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Foundations of Data-Driven Sustainable Energy Systems

ENVENG 6020

Credit Hours:
3.00

Course Levels:
Graduate

Course Components:
Lecture

Course Description:
Introduction to issues impacting sustainable energy systems across technology, law and policy, business models, resilience, data, geospatial, and decision sciences.

Course Goals / Objectives:
- Students will understand how energy technologies operate individually and within a broader energy system.
- Students will understand how law and public and regulatory policy influence and shape design and function of energy systems and energy system components
- Students will understand the heterogeneity in players and market actors across the energy system, and key differences in their business models and practices
- Students will understand factors that impact resilience of energy systems, role of environmental, social, and economic influences on system resilience, and the impact of energy systems on the resilience of environmental, social, and economic systems
- Students will understand the roles of human and organizational behavior in influencing both supply- and demand-side considerations in energy systems
- Students will understand how social, environmental, &economic heterogeneity impacts, and is impacted by, energy systems across spatial and organizational scales. Students will assess implications of energy systems on land, water, and resource use
- Students will learn to conceptualize how to use computational techniques, and find, get, or generate & analyze data to address core research questions in energy systems.
- Students will gain exposure to development & use of computational models of energy systems.

Course Topics:

- Energy System Overview
- Energy Technologies and Components
- Background and History of Energy & Environmental Policy and Legal Foundations and Chevron DeferenceSustainable Energy Systems: Defining and Assessing Sustainability
- Resilience of Energy Systems, Resilience Theory, and Measurement
- Competition, Deregulation and Reregulation and Policy Instruments: Cap and Trade (Coasean Markets); Taxation; Regulation
- The Energy Transition and Just Transition
- Energy Markets: Principles and Theories and Sustainable Development; Greening of Industry
- Optimization—Based, Computational, Statistical, and Data-Driven Energy-System Modeling, Management, and Analysis
- Demand Side: Behavioral Decision Making; Equity Issues
- • Transportation, Land and Water Use, and Energy-System Linkages
- Atmospheric Impacts of Energy Use

Designation:

Elective