THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Sustainable Energy and Energy Conversion Lab

ECE 3047

Credit Hours:
1.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture
Lab

Course Description:
Laboratory introducing basics of energy conversion processes for electrical energy supply systems utilizing conventional rotating machines and hardware-in-the-loop simulation system for sustainable energy systems.

Prerequisites and Co-requisites:
Prereq: 3040 (341), and enrollment in ECE or EngPhysics major.

Course Goals / Objectives:
- Master the basic concepts of transformers, 3-phase ac synchronous generators, 3-phase ac induction motors, and dc motors
- Be competent with the data acquisition concepts related to higher voltages and currents
- Be competent with operation of the ac and dc electric machinery in both generating and motoring modes
- Be familiar with the computer simulation tools
- Be exposed to using the real-time simulation platform

Course Topics:

- Introduction to electrical energy systems; laboratory data acquisition system
- Introduction of hardware-in-the-loop based real time simulations; failure modes can be simulated and utilizing D/A capability can monitor real-time v(t)’s and i(t)’s.
- DC machines (motor mode), including variable speed operation
- Transformers and 3-phase synchronous generators
- 3-phase induction machines – motor & generator action, with variable speed motor drive
- Introduction to simulation tools
- Real-time Simulation of DC-DC Converters

Designation:

Elective