



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Sustainable Energy and Power Systems I

ECE 3040

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lecture

Course Description:

Introduction to electrical energy systems: history, current trends, renewable and non-renewable sources, rotating machines and their operation, and smart grid initiatives.

Prerequisites and Co-requisites:

Prereq: 2100, 2100.02, 2105, 2020, 2021, 205, 292, or 294 (Spring 2011), and enrollment in ECE or EngPhysics major.

Course Goals / Objectives:

- Master analyzing single-phase and three-phase ac systems
 - Be competent with electromechanical energy conversion
 - Be exposed to the current trends and smart grid initiatives
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Course Topics:

- Historical perspective of electrical energy systems
 - Discussion of traditional and non-traditional energy sources including renewable and green
 - Energy, power, volt-amp 1-phase & 3-phase relationships including "why 3-phase vs 1-phase"
 - Transformers and variable speed drives with associated power electronics, i.e., constant voltage/frequency transformer and a variable voltage/frequency "transformer"
 - Synchronous and induction machines physical and operational basics, including utilizing variable voltage/frequency "transformer"
 - DC machine applications with variable speed drives
 - The electric power industry
 - Introduction to distributed generation systems and comparison with central station systems
 - Introduction to the "smart grid"
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Designation:

Required

Elective