

# GREEN AND ALTERNATE ENERGY (GAE)

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**GAE 31032 ENERGY AND POWER GENERATION 3 Credit Hours**

This course covers fundamentals of energy and energy conversion processes. Students will have an exposure to various techniques of electric power generation including both conventional and alternative energy systems and conservation techniques. Includes a lab experience in electric power generation from renewable energy sources.

**Prerequisite:** PHY 12202 or PHY 13002 or PHY 13012.

**Schedule Type:** Laboratory, Lecture, Combined Lecture and Lab

**Contact Hours:** 2 lecture, 2 lab

**Grade Mode:** Standard Letter

**GAE 32000 FUEL CELL TECHNOLOGY 3 Credit Hours**

Designed to provide a general perspective to fuel cell technology. Students are introduced to the various types of fuel cells, historical perspective, terminology, applications, fuel cell operation, basic electrochemical and thermodynamics principles involved in fuel cells, fuel cell components, materials and systems. Students learn basic fuel cell design principles and calculations.

**Prerequisite:** PHY 13012 or PHY 13002.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GAE 42002 ENERGY MANAGEMENT SYSTEMS 3 Credit Hours**

This course covers an introduction to energy fundamentals, energy systems, lighting, heating, ventilation and air conditioning, control systems for energy management. Alternative energy sources and green buildings will also be covered. The course focuses on improving energy efficiency, reducing energy use and reducing energy cost.

**Prerequisite:** PHY 12202 or PHY 13002 or PHY 13012.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter

**GAE 42004 ADVANCED FUEL CELL TECHNOLOGY 3 Credit Hours**

Covers the theory and applications of fuel cell technology with an emphasis to proton exchange membrane fuel cells (PEMFCs). Students learn fuel cell component, stack and system design principles and fabrication methods, performance characterization, fuel cell testing and diagnostics methods. Students are introduced to transport phenomena in fuel cells. Introduction to hydrogen storage, generation and delivery, as well as hydrogen safety and regulations.

**Prerequisite:** GAE 32000.

**Schedule Type:** Lecture

**Contact Hours:** 3 lecture

**Grade Mode:** Standard Letter