AET - ALTERNATIVE ENERGY TECHNOLOGY

AET 5110 Fundamental Fuel Cell Systems Cr. 4
Introduce various types of fuel cells, materials properties of electrodes and polymeric membranes, and electrochemical mechanisms. Reforming of various types of hydrocarbon fuel to hydrogen, and reforming technology. Offered Fall.
Restriction(s): Enrollment limited to students in the College of Engineering.
Equivalent: CHE 5110, EVE 5130, ME 5110

AET 5120 Fundamentals of Alternative Energy Technology Cr. 4
Cover engineering fundamentals and basic design of electric-drive vehicle powertrains by understanding and analyzing the relevant multi-physics and applying the associated equations and simple models. Offered Winter.
Restriction(s): Enrollment is limited to Graduate level students, enrollment limited to students in the College of Engineering.
Equivalent: ME 5120

AET 5150 Advanced Energy Storages Cr. 4
Fundamentals of all major energy storage methods, including storage of energy as heat, in phase transitions and reversible chemical reactions, and in organic fuels and hydrogen; principles of energy storage in mechanical, electrostatic and magnetic systems. Offered Fall, Winter.
Restriction(s): Enrollment is limited to students with a class of Applicant Masters, Candidate Masters, Unranked Grad, Graduate Certificate or Senior, enrollment is limited to Graduate or Undergraduate level students, enrollment limited to students in the College of Engineering.
Equivalent: EVE 5150

AET 5250 Alternative Energy Technology System and Design Cr. 4
Topics such as: batteries, flywheels, capacitors, motors, controllers, power management, heat dissipation, systems containment, manufacturing processes, systems dynamics. Lectures and design projects. Offered Fall.
Prerequisites: AET 5120
Restriction(s): Enrollment is limited to Graduate or Undergraduate level students, enrollment limited to students in the College of Engineering.

AET 5310 Fundamentals of Battery Systems for Electric and Hybrid Vehicles Cr. 4
Fundamental electrochemistry and engineering aspects for electric propulsion batteries, including lead acid, nickel metal hydride, and lithium ion technologies. Offered Winter.
Restriction(s): Enrollment is limited to Graduate level students, enrollment limited to students in the College of Engineering.
Equivalent: CHE 5120, EVE 5120, ME 5215

AET 5330 Modeling and Control of Power Electronics and Electric Vehicle Powertrains Cr. 4
Basic methodologies for modeling, control system design, system coordination, and optimization of renewable power sources and power electronics systems. Offered Winter.
Restriction(s): Enrollment is limited to Graduate or Undergraduate level students, enrollment limited to students in the College of Engineering.
Equivalent: ECE 5330, EVE 5430

AET 5410 Energy, Emissions, Environment (E3) Design Cr. 4
Provides students the tools to uncover the relation between energy consumption and energy generation and optimize processes to take most advantage of low emitting energy options. Exposes students to design tools and methodologies from a diverse group of sources including US EPA, DOE, EIA, and the latest in emerging research. Offered Fall.
Equivalent: CE 5410, STE 5410

AET 5510 Introduction to Photovoltaics Cr. 4
Basic theories of semiconductor materials and solar cells. Several types of solar cell materials and their structures. Vacuum deposition techniques and PV systems. Offered Fall.

AET 5600 Alternative Energy Product Realization System Cr. 4
Identification of a strategy for application of technology in the marketplace; application development, integration into vehicle production, concurrent engineering manufacturing issues, quality and testing in manufacturing. Offered Fall.
Equivalent: EVE 5600, IE 6405

AET 5640 Energy and the Environment Cr. 4
Sustainability problems of our present energy systems and of potential solution in utility and transportation sectors. Energy evolution and decarbonization process from fossil fuels. Impacts of greenhouse gas emissions. Principles of renewable energy systems. Offered Fall.
Restriction(s): Enrollment limited to students with a class of Applicant Masters, Candidate Masters, Unranked Grad, Graduate Certificate or Senior.
Equivalent: EVE 5640

AET 5700 Process and Materials Safety for Alternative Energy Technology Cr. 4
Fundamentals concerning fires and explosions, control strategies to prevent accidents, fault tree analysis to optimize control strategies, and risk analysis. Regulations and standards relevant to the design, manufacture, and operation of fuel cell and reforming processes. Offered Winter.
Equivalent: CHE 5700

AET 5810 Power Management for Advanced Energy Storage Systems and its Applications Cr. 4
Operating principles and modeling of energy storage techniques; control and power management, power electronic converters, electric machines, and power systems; power management strategies of hybrid energy systems including HEV and alternative energy systems. Offered Fall, Winter.
Prerequisites: ECE 4470
Restriction(s): Enrollment limited to students in the College of Engineering.
Equivalent: EVE 5810

AET 7410 Alternative Fuels: Properties, Processing, and Characterization Cr. 4
Exploration of the latest alternative fuels: their physical and chemical properties, production technologies, and standardization characterization tests. Offered Spring/Summer.
Restriction(s): Enrollment is limited to Graduate level students.
Equivalent: CHE 7410

AET 7990 Directed Study Cr. 1-4
Independent projects on subjects of interest in advanced energy technology. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.
Repeatable for 4 Credits
AET 7991 Internship in Industry Cr. 1-4
Industrial internship in alternative energy technology. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

AET 8996 Directed Research Cr. 1-4
Independent research projects. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

AET 8999 Master's Thesis Research and Direction Cr. 1-8
Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.
Repeatable for 99 Credits