ENME489X Fall 2013

# Energy Conversion Systems for Sustainability

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**Course Description:**

This course will focus on energy sustainability with view to changing global energy availability and use and addresses the objective of greatly reducing the dependence on the finite fossil energy sources and move to the environmentally benign sustainable energy. The emphasis will be on sustainability issues, discussion on supply, demand and storage, energy transmission, global warming and carbon management, biomass- resources, uses and production of biofuels, national energy policy discussion, carbon emission, energy security and economics to ensure future energy needs can be met without compromising the ability of future generation to meet their own needs.

**Course Objectives**

To provide an understanding of the concept of sustainable energy future, provide critical and thorough introduction to the subject of energy use, fate of fossil fuels, efficiency, costs and the environmental effects, global warming, understanding of the role of thermodynamic principles in energy conversion, energy transport and storage, automotive fuel economy

**Course Outline**

Part 1 Sustainability
• Sustainable energy, supply, use, costs, efficiency, pollution and climate change
• Energy sustainability issues/discussion on sustainability issues
• Energy systems storage and transmission
• Energy analysis and life cycle assessment
Part II. Efficiency
• Thermodynamics and efficiency calculations
• Energy conversion methods, types of energy sources, conversion, power cycles and efficiency
Part III. Policy and Public Perception
• National energy policy discussion, carbon emission, energy security and economics
• Automotive technologies and fuel economy policy
Part IV. Emissions, global warming and carbon management
• Global warming and carbon management
• Regulations, penalties and emissions burden
Part V. Fossil fuels and biomass for sustainable energy
• Fossil fuels- why discuss fossil fuels in sustainable energy
• Biomass- resources, uses and production of biofuels
• Sustainable Technologies