Revised: Fall 2016

AIR 281
Energy Management I

COURSE OUTLINE

Prerequisites:

Prerequisite: Successful completion ENE 100.

Course Description:

Introduces methodology for residential audits covering heat flow analysis, construction methods and materials. Discusses effects of life styles on energy consumption, conservation and practices, renewable energy sources, calculating cost and savings, interviewing and education techniques. Introduces commercial and industrial energy audits, methodology for the performance of audits covering heat flow analysis, construction methods and materials. Part I of II.

Semester Credits: 3 **Lecture Hours: 2 Lab/Recitation Hours: 2**

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AIR 281, Energy Management

Course Outcomes

At the completion of this course, the student should be able to:

1. Describe the role of energy management in the global economy
   a. Economic benefits
   b. Certification process and organizations, service providers
   c. Career paths for engineers in the area of energy management
2. Describe energy supply and consumption patterns in the U.S. and World.
3. Classify energy resources and describe their uses, availability, and environmental impacts.
4. Describe the principles of energy management.
5. Explain the fundamentals for evaluating existing residential structures for energy consumption characteristics.
   a. Describe the components typically covered in an energy audit of a residential environment
   b. Describe the types and use of tools for energy consumption measurement and reporting.
   c. Measurement and reporting techniques.
6. Explain the benefits of deploying energy conservation products and practices.
7. Describe the types of renewable energy technologies available for residential deployment and their benefits and associated costs.
8. Create a business case addressing various residential energy improvements including:
   a. Product or services provided
   b. Technical recommendations
   c. Consumer benefits
   d. Economic factors; ie. Return on Investment

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e. Recommendations to the residential owner or stakeholders

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Required Materials:

None

Textbook:

Text: Krigg, Residential Energy: Cost Savings and Comfort, 6th Edition,Pearson, ISBN-9780133418965

2. Scientific calculator, pencils, and paper
3. Willingness to read text and do assignments
4. Access to a computer (VWCC campus/library or personal)
    a. Microsoft Excel (version 7 or later)
    b. Microsoft Word (version 7 or later)
    c. Microsoft PowerPoint (version 7 or later)
    d. Adobe Reader (version 9 or later)
    e. Mozilla Firefox Browser (latest version)

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Topical Description:

1. Introduction
2. Effective Energy Management
3. Energy Auditing
4. Economic Analysis
5. Boilers and Fired Systems
6. Steam and Condensate Systems
7. Cogeneration and Distributed Generation
8. Waste-Heat Recovery
9. Building Envelope
10. HVAC Systems
11. Motors, Drives, and Electric Energy Management
12. Energy Management Control Systems
13. Lighting
14. Energy Systems Maintenance
15. Insulation Systems
16. Use of Alternative Energy
17. Indoor Air Quality
18. Electric and Gas Utility Rates for Commercial and Industrial Customers
19. Thermal Energy Storage
20. Codes, Standards, & Legislation
22. Control Systems
23. Sustainability and High Performance Green Buildings
24. Electric Deregulation
25. Financing and Performance Contracting
26. Commissioning for Energy Management
27. Measurement and Verification of Energy Savings

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Notes to Instructors

1.

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