

Course: ME 50102: **Energy Management Principles**

Catalog Description: Credit 3, class 3

Course composes of energy management principles for industrial application. The importance of energy management, commitment, strategy for continuous improvement and international standard will be described. The course emphasizes on real world applications including: understanding utility billing and identifying costs; identifying and quantifying energy savings opportunities at industrial facilities; determining investment payback scenarios and considerations.

Pre- requisites: None

Co-requisites: None

Text books:

1. Managing Energy from the top to down: Connecting Industrial Energy Efficiency to Business Performance, 1st Edition
Christopher Russell, ISBN: 0-88173-625-2
2. Lecture note materials

Reference Books:

1. Guide to Energy Management, 7th Edition, Barney L. Capehart, Wayne C. Turner, William J. Kennedy, ISBN 0-88173-605-8, CRC press
2. Energy Efficiency Manual, 1th Edition, Donald R. Wulfinghoff, ISBN: 0-9657926-7-6, Publisher: Energy Institute press.
3. Simple Solution to Energy Calculations, 4th Edition, Richard R. Vaillencourt , ISBN: 0-88173-356-3, The Fairmont Press
4. ISO 50001 manual

Coordinator: Ali Razban

Goals: The objective of this course is to familiarize the students with various forms of energy management commitment, energy management data analysis, energy consumption, energy indicator and energy efficiency

improvement in manufacturing environment. The energy management strategy for short and long term will be covered.

Outcomes: Upon successful completion of this course, students will be able to:

1. Understand energy management principles [d, e, g].
2. Understand the energy and environment standards [f, h].
3. Understand the importance of improving energy efficiency [e, f, h, i].
4. Introduce energy management and why there is a need for a common standard [f].
5. Explore the role of the individuals for an effective energy consumption improvement [g].
6. Identify the basic concept of energy management and how it works to improve the industrial facility[e].
7. Understand the possibility, economic, and environmental impact of each energy management decision [h, f].
8. Optimize the energy investment [e].
9. Plan energy strategy for short and long terms [d,e].

Note: The letters within the brackets indicate the Program Outcomes of Mechanical Engineering.

Topics:

- 1. Introduction of energy management**
 - a) The need of energy management
 - b) Energy Policy
 - c) Strategic Planning

- 2. International standards**
 - a) ISO 50001; energy management standard
 - b) ISO 14001; environment management standard

- 3. Effective Energy Management**
 - a) Energy Management Program
 - b) Organizational Structure
 - c) Audit Planning
 - d) Educational Planning
 - e) Reporting/ documentation
 - f) Ownership.

4. Energy utility rates

- a) Utility costs
- b) Rate structures
- c) Calculation of monthly bills
- d) Conducting a load study

5. Energy saving opportunities for industrial facilities

- a) Energy Economic Decision Making
- b) Baseline of plant's current energy use
- c) Potential energy and cost savings by plant energy system (steam, process heating, etc.)
- d) Systems efficiency upgrading
- e) Energy indicator

6. Maintenance procedures in industry

- a) Developing the maintenance system
- b) Maintenance procedures

7. Optimization of energy investment

- a) Managing an Effective Energy Conservation Program Energy implementation and installation costs
- b) Prospective energy financial statements
- c) Purchasing Strategies for Electricity
- d) Identify appropriate returns benchmarks
 - Return on assets
 - Return on equity
 - Return on investment

Evaluation Methods: homework assignments, midterm exam, team project and final exam.

Professional

Components: Energy Engineering Management

Prepared by: Ali Razban

ABET Category: Engineering Science

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