

BE 411: ENERGY AND ENVIRONMENTAL AUDITING

COURSE OUTLINE (ONLINE CONTENT DELIVERY, 3 CREDITS)

This course will provide the foundation for understanding industrial energy uses, outlines energy auditing method of various energy-consuming systems such as motors, air compressors, lighting, heating, cooling, and building envelope. The course will also focus on quantifying industrial waste, waste discharging to the environment, environmental permitting, and environmental impact analysis. Students will learn to use DOE's energy assessment tools. Students will analyze data and write energy recommendation. After taking this course, students will have a necessary foundation to become energy and environmental auditor.

PREREQUISITES

course in electrical circuits AND a course in thermodynamics; Alternatively, Instructor Permission

EXPECTED COURSE OUTCOMES

At the end of the course, the students should be able to:

1. Understand best practices in motor operation, analyze energy bills, identify improper motor use, when to recommend a variable frequency drive and safety precautions.
2. Understand the compressed air system, best practices of using compressed air, identify improper operations of compressed air, and optimal controls of multiple air compressors.
3. Understand industrial heating, best practice in boiler operation, water treatment, steam loss through flashing, and writing recommendations on process heating
4. Understand industrial chiller, condenser and evaporator performance assessment, evaporative cooling, heat recovery, and best practices in refrigeration.
5. Understand lighting and luminaire efficiencies.
6. Audit building envelopes, and HVAC
7. Understand Industrial Energy Management and ISO 50001.

TENTATIVE COURSE OUTLINE:

- Each module will be divided into 5 to 15-minute videos. About ten videos per modules. Each module will be followed by case studies like example problem or mini-quiz.
- An area expert will deliver the content, handouts, and examples and quizzes.
- A take-home type exam will be given at the end of the course work.

COURSE MATERIAL

Lecture notes, posted videos, handouts.

1. Watch a total of 15-60 minutes of videos each week. Videos will be released each week.
2. Turn in homework problems on due dates.
3. Zoom or one-on-one help sessions available on request or set time.