

Template for ABET course syllabi (new format)

1. *Course number and name*
ENGR 303: Thermodynamics
2. *Credits and contact hours*
3 Credits; three 1- hour lectures/sessions per week.
3. *Instructor's or course coordinator's name*
Course Coordinator: Dr. Ahmad R. Ganji
Course Instructor : Dr. Ed CHeng
4. *Text book, title, author, and year*
Yunus A. Cengel and Michael A. Boles, Thermodynamics, Engineering Approach, 6th Ed., McGraw Hill, 2006.
 - a. *other supplemental materials*
Any other basic course in Thermodynamics, such as: Michael J.Moran and Howard N. Shapiro, *Fundamentals of Engineering Thermodynamics*, John Wiley & Sons, any edition.
5. *Specific course information*
 - a. *brief description of the content of the course (catalog description)*
Application of thermodynamics to a wide variety of energy exchanging devices; properties of the pure substance, ideal gases and mixtures; power and refrigeration cycles.
 - b. *prerequisites or co-requisites*
PHYSICS 240 - General Physics with Calculus III
 - c. *indicate whether a required, elective, or selected elective course in the program*
The course is required for Mechanical Engineering and can be taken as elective by Civil and Electrical Engineering students.
6. *Specific goals for the course*
 - a. *specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*
 - The student will demonstrate basic understanding and knowledge of thermodynamic properties of substances;
 - The student will demonstrate basic understanding and knowledge of first law of thermodynamic and its application to open and closed systems;
 - The student will demonstrate basic understanding and knowledge of the second laws of thermodynamic and its application to open and closed systems.
 - The student will demonstrate basic understanding and knowledge of conservation of mass and its application to engineering systems;

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- The student will demonstrate the ability to perform basic thermal analysis of power and refrigeration cycles, and calculate the properties of gas mixtures.
- b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcomes: a, e

7. *Brief list of topics to be covered*

- Subject of Thermodynamics: Basic Concepts and Definitions;
- Work, Heat, and Energy;
- Conservation of Energy (First Law of Thermodynamics), Internal Energy, and Their Application to Engineering Systems;
- Properties of Pure Substances: Vapor, Perfect Gas, Liquid and Solid Phases, and Phase Mixtures;
- Second Law of Thermodynamics;
- Entropy and Its Applications to Engineering Systems;
- Thermodynamic Cycles; Gas and Vapor Power and Refrigeration Cycles; (3 weeks)
- Properties of Gas Mixtures; and (1 week)