

NorthWest Arkansas Community College
Division of Science and Mathematics

Discipline Code

MEEG

Course Number

2403

Course Title

Thermodynamics

Catalog Description

The course is intended for potential engineering students in the second year of study. It is the study of the 1st and 2nd laws of thermodynamics. Availability of energy, properties of liquids, gases, and vapors; non-flow and flow processes.

Prerequisites

PHYS 2054 and MATH 2564

Credit hours

3 credit hours

Contact hours

40 Lecture hours and 25 Drill hours

Load hours

3.67 load hours

Semesters Offered

Fall, Spring

ACTS Equivalent

MEEG 2403. Thermodynamics

Grade Mode

A-F

General Education Outcomes Supported

- Students develop higher order thinking skills.
- Students can employ a variety of sources to locate, evaluate, and use Information.

Student Learning Outcomes

Students successfully completing this course will possess an understanding of fundamental engineering concepts and will:

- Develop an ability to answer questions related to laws of thermodynamics.
- Describe physical properties of pure substances,
- Apply problem solving techniques to problems in thermodynamics,
- Describe the concept of energy transformation and its relationship to the variables in thermodynamics.
- Describe the concept of entropy,
- Describe power cycles
- Relate the concept of efficiency to heat engines
- Describe the properties of gas mixtures
- Describe the properties of gas mixtures

Standard Practices: Topics List

- Introduction and Basic Concepts
- Energy Conversion and General Energy Analysis
- Properties of Pure Substances
- Energy Analysis of Closed Systems
- Mass and Energy Analysis of Control Volumes
- The Second Law of Thermodynamics
- Entropy
- Energy: A Measure of Work Potential
- Gas Power Cycles
- Vapor and Combined Power Cycles
- Refrigeration Cycles
- Thermodynamic Property Relations
- Gas Mixtures
- Gas Vapor Mixtures and Air-Conditioning
- Chemical Reactions
- Chemical and Phase Equilibrium
- Compressible Flow

Learning activities

- Courses must, at a minimum, cover the core learning outcomes for each topic. Faculty may add to these outcomes, but may not omit any of them.
- Since developing student higher order thinking skills and information literacy are essential outcomes of this course, all instructors should include learning activities that develop these outcomes in their courses and identify them in course syllabi. Instructors should describe how these activities will be evaluated in their course syllabi and/or reflected in their gradebooks.

Forms of Assessment and Grading Guidelines:

- Each instructor will include a set of departmental questions on each exam and on the final exam. These questions will be in direct support of the Student Learning Outcomes. The questions will compose at least 10% of the students' overall grade in the course and will be graded according to a standard grading rubric. The results of these questions and overall student performance will be reported when final grades are turned in.

Grading guidelines

- In class quizzes: Each instructor will give students in class quizzes on regular basis. The questions in the quizzes will support students' learning outcomes. Quizzes will constitute 5% of the students overall grade.
- Three proctored exams will constitute at least 80% of the students' final grade.
- Homework assignments comprise the remaining grade.