

JAMESTOWN COMMUNITY COLLEGE
State University of New York

INSTITUTIONAL COURSE SYLLABUS

Course Title: Thermodynamics

Course Abbreviation and Number: PHY 2510

Credit Hours: 4

Course Type: Lecture/Lab

Course Description: Students will continue investigations into mechanics with extensive study in thermodynamic systems. Students will analyze and solve problems involving fluid dynamics, energy conservation, and thermodynamic processes.

Prerequisite: MAT 1720, PHY 1710.

General Education Requirements Met

SUNY

Natural Sciences

JCC

Scientific Reasoning

Applied Learning

Student Learning Outcomes:

Students who demonstrate understanding can:

1. Write laboratory reports using proper grammar in which they:
 - a. Write an abstract
 - b. Summarize and analyze observations
 - c. Draw a conclusion
 2. Design and interpret graphs and tables of data
 3. Demonstrate an understanding of:
 - a. The laws of thermodynamics
 - b. Thermodynamic processes
 - c. Heat engines and refrigerators
 4. Choose effective problem solving techniques in the areas of:
 - a. Thermodynamic processes and cycles
 - b. Efficiencies and coefficients of performance
 - c. Ideal Gas Law
 - d. Engine designs
 - e. Energy conservation
 - f. Entropy and Enthalpy
 - g. Statistical mechanics
 5. Use the computer to collect information and analyze data
 6. Demonstrate successful collaboration in the laboratory and/or classroom
 7. Demonstrate competency with standard laboratory equipment
 8. Effectively apply knowledge and skills to a real-world experience, creative project, or independent intellectual investigation.
 9. Thoughtfully reflect on connections between concepts studies in the classroom and insights gained from an applied learning experience/project.
 10. Demonstrate an understanding of the methods scientists use to explore natural phenomena, including observation, hypotheses development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling. [SUNY Gen Ed – Natural Sciences]
 11. Application of scientific data, concepts, and models in one of the natural sciences. [SUNY Gen Ed – Natural Sciences]
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Topics Covered:

- Fluids: to include density, Bernoulli and bulk moduli
- Laws of Thermodynamics
- Thermodynamic processes
- Calorimetry
- PV diagrams and analysis; degrees of freedom
- Quasi-static processes
- Heat engines and heat cycles
- Entropy and irreversible processes

Information for Students

- Expectations of Students
 - [Civility Statement](#)
 - [Student Responsibility Statement](#)
 - [Academic Integrity Statement](#)
- [Accessibility Services](#)

Students who require accommodations to complete the requirements and expectations of this course because of a disability must make their accommodation requests to the Accessibility Services Coordinator.
- [Get Help: JCC & Community Resources](#)
- [Emergency Closing Procedures](#)
- Course grade is determined by the instructor based on a combination of factors, including but not limited to, homework, quizzes, exams, projects, and participation. Final course grade can be translated into a grade point value according to the following:

A=4.0	B+=3.5	B=3	C+=2.5	C=2	D+=1.5	D=1	F=0
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- Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, VA appointments) are welcome and encouraged to communicate these to the instructor.

Effective Date: Fall 2023