



## Syllabus

### ESC 235 Thermodynamics

#### General Information

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**Date**

March 7th, 2018

**Author**

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**Department**

Science and Technology

**Course Prefix**

ESC

**Course Number**

235

**Course Title**

Thermodynamics

#### Course Information

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**Credit Hours**

3

**Lecture Contact Hours**

3

**Lab Contact Hours**

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**Catalog Description**

This is a first course in thermodynamics. It introduces the student to the fundamental concepts of thermodynamics. The topics covered are: first and second laws of thermodynamics, thermodynamic processes as applied to perfect gases and pure substances, energy analysis of heat engines including Carnot, Otto, Diesel, and Stirling, Brayton cycle, gas turbines, jet propulsion, Rankine cycle, power plants, heat pumps, and refrigeration systems.

**Key Assessment**

This course does not contain a Key Assessment for any programs

**Prerequisites**

MAT 271

**Co-requisites**

None

**Grading Scheme**

Letter

## First Year Experience/Capstone Designation

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This course DOES NOT satisfy the outcomes applicable for status as a FYE or Capstone.

## SUNY General Education

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This course is designated as satisfying a requirement in the following SUNY Gen Ed category

None

## FLCC Values

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**Institutional Learning Outcomes Addressed by the Course**

Vitality  
Inquiry  
Perseverance  
Interconnectedness

## Course Learning Outcomes

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**Course Learning Outcomes**

1. Analyze a system that converts heat energy into mechanical energy using the laws of thermodynamics.
2. Calculate the thermal efficiencies of different types of heat engines.
3. Analyze and calculate the coefficient of performance of a refrigeration system.

## Outline of Topics Covered

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- I. First Law of Thermodynamics for a Closed System
- II. Air as a Working Fluid
- III. Equation of State
- IV. Boundary Work, Internal Energy, Specific Heat
- V. Isobaric, Isochoric, and Isothermal Processes
- VI. Isentropic Process

- VII. Polytropic Process
- VIII. Internal Combustion Engines
- IX. Otto Cycle, Diesel Cycle, Stirling Cycle
- X. First Law of Thermodynamics for an Open System
- XI. Brayton Cycle: Stationary Gas Turbines
- XII. Brayton Cycle: Jet Propulsion
- XIII. Intro to Power Plants, Water as a Working Fluid
- XIV. Steam Quality
- XV. Steam Tables, Enthalpy, Entropy
- XVI. Boiler, Pump, Turbine and Condenser Processes
- XVII. Basic Rankine Cycle
- XVIII. Rankine Cycle with Reheat
- XIX. Refrigeration Systems
- XX. Wet and Dry Compression Cycles
- XXI. Heat Pumps