

**Mechanical Engineering Program**  
**ME 2380 Thermodynamics, 4 Semester Hours**

<b>Course Description</b>	Defines and calculates thermodynamic properties such as energy, entropy, temperature, and pressure. Work and heat interactions are defined. The first and second laws of thermodynamics and concepts of thermodynamic equilibrium are introduced. Conservation of energy and mass and the entropy balance relation are discussed for open and closed systems. Irreversibility, exergy, and the exergy balance relation are introduced and applied in analyzing thermodynamic systems. Fundamentals of thermodynamics are used to model power generation and refrigeration systems. Covers thermodynamics of nonreacting gas mixtures with applications to air-water vapor mixtures for air-conditioning systems.
<b>Prerequisites</b>	MATH 2321 and PHYS 1151.
<b>Textbooks and/or other required material</b>	<i>Fundamentals of Engineering Thermodynamics</i> by Moran and Shapiro, 7th edition, John Wiley and Sons. All readings and problem sets come from this text. The course covers all of Chapters 1-6, and selections from 7, 8, 9, 10 and 12.
<b>Course Objectives</b>	At the conclusion of the course the student will be able to:  Identify a thermodynamic system and define its boundaries. Identify the state and thermodynamic properties of a system's working fluid. Apply the conservation of mass principle to a control volume. Apply the first law of thermodynamics to closed and open systems Apply the second law of thermodynamics to closed and open systems. Perform applications of mass, energy and entropy balances in systems, such as power cycles, refrigeration and air-conditioning.
<b>Topics Covered</b>	First Law of Thermodynamics, Properties, Control Volume Energy Analysis, Second Law of Thermodynamics, Entropy, Vapor Power Systems, Gas Power Systems, Refrigeration and Heat Pump Systems, Gas mixtures, Psychrometrics.
<b>Class/Laboratory Schedule</b>	Classes meet either 3 times weekly for 65 minutes each or twice weekly for 100 minutes each. There is no laboratory.
<b>Contribution of Course to Meeting the Professional Component</b>	The course contributes 4 semester hours to the engineering topic requirement of the ABET/Engineering Accreditation Commission. It also contributes to the general education requirement.
<b>Relationship of Course Objectives to Program Educational Objectives</b>	This course supports the following Program Educational Objectives 1a, 2, and 4. Copies of the MIE Department's educational objectives are available in the Department office and on its web site.
<b>Relationship of Course Objectives to Program Outcomes</b>	This course supports the following program outcomes; a, c, e, j and p. Copies of the MIE Department's educational objectives are available in the Department office and on its web site.
<b>Assessment Tools</b>	The student's understanding of the material is assessed through graded homework assignments, indicator questions and exams. Homework assignments will be made daily and are expected to be turned in promptly. <u>Indicator questions will be used to establish the minimum level of competency. All topics assessed by indicator questions must be mastered before a grade will be given.</u>