COURSE NUMBER: ME 3331, 3 credits	**COURSE TITLE:** Thermal Sciences I
TERMS OFFERED: Fall, Spring, Summer	**PREREQUISITES:** Chem 1021, Phys 1301, IT Student
TEXTBOOKS/REQUIRED MATERIAL: *Fundamentals of Engineering Thermodynamics* by, Moran and Shapiro; 5th Edition, 2004. *Thermodynamics: An Engineering Approach* by, Y.A. Cengel and M.A. Boles; 4th Edition, 2002. (representative)	**PREPARED BY:** THT Staff **DATE OF LAST REVISION:** *10 April 2007*
COURSE LEADER(S): THT Staff	**CLASS/LABORATORY SCHEDULE:** Three 50-minutes lectures One 50-minute recitation per week **CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES:** 100% Engineering Topics
CATALOG DESCRIPTION: Properties, equations of state, processes, cycles for reversible/irreversible thermodynamic systems. Modes of work/heat transfer. Equations for conservation of mass, energy, and entropy balances. The application of thermodynamic principles to modern engineering systems.	**COURSE TOPICS:** 1. Nature of thermodynamics, system definitions, properties, processes, reversibility and irreversibility. 2. Properties of matter, their spatial representation and evaluation. Equations of state for simple substances. 3. Introduction to work transfer and heat transfer 4. 1st and 2nd law of thermodynamics for closed systems. 5. Development of the equations for conservations of mass, energy, and entropy balances for control volumes. 6. Mixture properties for systems of ideal gases and gas-vapor mixtures. 7. Applications of thermodynamics to engineering systems including one or more of the following: gas- and vapor-power generation; refrigeration; propulsive systems; heating & cooling systems, psychrometric systems; compressible fluid mechanics, thermochemistry & chemical equilibrium.

COURSE OBJECTIVES	1. To establish a firm understanding of the basic principle of thermodynamics 2. Understand the basic relationships among physical properties of materials 3. Apply the first and second laws of thermodynamics. 4. Develop familiarity with some thermodynamic applications.
COURSE OUTCOMES	**(Letters shown in brackets are linked to program outcomes a-k)** 1. Understanding of thermodynamic properties and equations of state [a, e] 2. Knowledge of first law of thermodynamics [a, e] 3. Apply first law to engineering processes [a, c, e] 4. Understanding second law of thermodynamics [a, c, e] 5. Applying second law of thermodynamics to real systems [a, c, e, k] 6. Understanding of entropy and principle of entropy change [a, c, e] 7. Apply laws of thermodynamics to unsteady and steady open systems [a, c, e] 8. Apply principles of thermodynamics to one or more applications areas, which include: power and reverse cycles (e.g. Rankine, Brayton, Otto, Diesel, etc.); psychrometics; compressible fluid mechanics; gas mixtures; propulsion systems; thermochemistry & chemical equilibrium [a, c, e, k]
ASSESSMENT TOOLS:	1. Exams (multiple midterm and cumulative final) 2. In-class problems and discussions 3. Weekly homework problems and quizzes

ME 3331

Nature of Changes:

• Class will always meet a minimum of 4 times per week (during day school)

• Momentum conservation was removed from Course Topic No. 5

• Course Topics No. 7-8 were rewritten as No. 7

• Course Outcomes 9 & 10 were rewritten to provide some flexibility to instructor in selecting application topics. More detail can be found in Outcome Assessment report for ME 3331.