COURSE NUMBER: ME 5103, 4 credits	**COURSE TITLE:** Thermal Environmental Engineering
TERMS OFFERED: Fall Semester	**PREREQUISITES:** ME 3333, Thermal Sciences III, IT upper division or Grad student.
TEXTBOOKS/REQUIRED MATERIAL: "Thermal Environmental Engineering"3rd Edition, By T. H. Kuehn, J. W. Ramsey and J. L. Threlkeld, Prentice Hall 1998 Reference: ASHRAE Handbook Series	**PREPARED BY:** James W. Ramsey and Thomas H. Kuehn **DATE OF PREPARATION:** 3/14/2007
COURSE LEADER(S): T. H. Kuehn and J. W. Ramsey	**CLASS/LABORATORY SCHEDULE:** Four 50 minute sessions per week. **CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES:** 100 % Engineering Topics
CATALOG DESCRIPTION: Thermodynamic properties of moist air; psychrometric charts; HVAC systems; solar energy; human thermal comfort; indoor air quality; heating and cooling loads in buildings.	**COURSE TOPICS:** 1. Review of heat transfer, thermodynamics and fluid flow. 2. Thermodynamic properties of moist air. 3. Psychrometric processes and applications. 4. The psychrometer and humidity measurements. 5. Human thermal comfort and indoor air quality. 6. Winter design heat loss. 7. Solar Radiation as it applies to HVAC applications. 8. Instantaneous heat gains in buildings. 9. Instantaneous Cooling Loads. 10. Energy estimation methods for buildings.

COURSE OBJECTIVES	1. To teach principles of thermodynamics, heat transfer and fluid mechanics as applied to heating, ventilating and air-conditioning (HVAC) systems. 2. To teach problem formulation and solution methods for HVAC systems. 3. To teach HVAC application specific principles such as indoor air quality, human thermal comfort, passive solar gains, and building energy storage. 4. To teach American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) recommended design practice for buildings. 5. Expose students to common engineering design aids such as psychrometric charts, comfort charts, building materials property data and weather data. 6. To expose students to realistic HVAC problems through examples and assignments. 7. To expose students to examples of software, such as EES, that are useful in analyzing psychrometric systems.
COURSE OUTCOMES	**(Letters shown in brackets are linked to program outcomes a-k)** 1. Apply the principles of thermodynamics to mixtures of water vapor and dry-air to establish psychrometric properties. [a, e] 2. Apply the principles of conservation of mass and energy to define and quantify basic HVAC processes. [a, e] 3. To combine basic HVAC processes into various building mechanical systems used in current practice. [c, e, j] 4. Apply basic heat transfer principles to determine building heating and cooling loads. [a, j, k] 5. Apply ASHRAE Standard 62 to achieve acceptable indoor air quality for human thermal comfort, health and safety. [f, h, j] 6. Select and interpret information (e.g. materials properties, weather data, solar radiation data, internal gains, etc.) required for design and analysis of building loads and mechanical systems. [c, e, h, j] 7. Apply ASHRAE recommended design practice and applicable building codes to the design of building mechanical systems. [c, e, f, i, j, k]
ASSESSMENT TOOLS:	1. Exams, Two exams during the semester and a final exam. 2. Homework grading or weekly quizzes.

ME 5103

Nature of Changes:
This document was reviewed in 2007 and no changes were made.