

**1. Department, Course Number, and Course Title:**

**MECHANICAL ENGINEERING**

**ME 415 AIR CONDITIONING**

**2. Designation:** Required  Elective   
Lower Division  Upper Division

**3. Course Description:** Psychrometric properties of air, heat loads, air conditioning and heating equipment, and air distribution

**4. Prerequisites:** ME 306 and ME 326 B

**5. Text and Materials:** Heating, Ventilating, and Air Conditioning, Analysis and Design, 5th ed., McQuiston, F.C., and Parker, J.D., and Spitler, J.D, John Wiley and Sons, 2000

References:

Heating and Cooling Buildings, Design for Efficiency. Jan . Kreider, and Ari Rabl, McGraw-Hill, 1994.

Jennings, The Thermal Environment conditioning and Control, Harper & Row, 1978.  
ASHRAE Handbook, 1992

**6. Course Objectives:**

Course Outcomes

- the ability to calculate the properties of moist air, psychrometrics for human comfort, and health.
- an appreciation for the history of air conditioning.
- the ability to estimate building heating, and cooling loads.
- the ability to evaluate physiological reactions to the environment.
- the ability to design hydronic and air distribution systems.
- an introductory understanding of duct design, and fan selection.
- the broad education necessary to understand the impact of engineering solutions in a global/societal context.
- an ability to communicate effectively.
- a desire to be a flexible and adaptable team player.

**7. Topics Covered:** (in Order of Presentation)

- Introduction (Ch. 1)
- Air-conditioning Systems (Ch. 2)
- Moist Air Properties and Conditioning Processes (Ch. 3)
- Comfort and Health-Indoor Environmental Quality (Ch. 4)
- Heat Transmission in Building Structures (Ch. 5)
- Space Heating Load (Ch. 7)
- The Cooling Load (Ch. 8)
- Energy Calculations (Ch. 9)
- Fans and Building Air Distribution (Ch. 12)

**8. Class Schedule:** Number of Sessions per week: 2  
Duration of each session: 1 hour 40 minutes

**9. Contribution of course to meeting the professional component:**

This course is part of the 24 units of technical electives required for the mechanical engineering program.

Engineering Science 2 units  
Engineering Design 2 units

**10. Relationship of course to program objectives:**

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (abet h)
- a knowledge of computer aided design and simulation software

Skill outcomes:

- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (abet c)
- an ability to function on multidisciplinary teams (abet e)
- an ability to communicate effectively (abet g)
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (abet k)
- an ability to select materials and manufacturing processes
- an ability to visualize designs from engineering drawings
- an ability to think in a logical sequential process

Attitudes Outcome:

- a recognition of the need for an ability to engage in lifelong learning (abet i)
- a desire to be a flexible and adaptable team player (collaborative attitude)

**11. Prepared by:** Ram Manvi

06/2006