

ME 750I – Advanced Design of HVAC Systems

Fall 2001

Catalog Data:

ME 750I Advanced Design of HVAC Systems Credits 3. Theory, analysis, and design of air-conditioning systems based on thermodynamics, and heat transfer fundamentals. Emphasis is on design procedures for space air-conditioning, related equipment sizing, and system integration. Prerequisites: ME 621, 622 and ME 502.

Textbook: F. C. McQuiston and J. D. Parker, Heating, Ventilating, and Air-Conditioning: Analysis and Design, 5th ed., John Wiley & Sons, Inc., 2000. (ISBN: 0-471-35098-2)

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References:

- TRANE Air Conditioning Manual, McGill/Jensen, Inc., St. Paul, MN, 1994.
- ASHRAE Fundamentals Handbook, latest edition.

Topics (1 class = 75 min.):

1. Introduction to air-conditioning and refrigeration systems. (1 class) 8/20
2. Moist air properties, psychrometric processes, and analysis of space air-conditioning for design and off-design conditions. (4) 8/20, 8/27, 9/10
3. Environmental comfort and health requirements for building air quality. (2) 9/10, 9/17
4. Heat transmission in building structures. (2) 9/17, 9/24
5. Cooling load analysis. (4) 10/1, 10/8
6. Duct design (4) 10/8, 10/15
8. Room air distribution (2) 10/15, 10/22, 10/29
9. Cooling coils and fans (4) 10/22, 10/29, 11/5, 11/12
10. Presentation (4) 11/5, 11/12, 11/19, 11/26

- a. Complete list of appropriate assumptions
- b. Cooling loads for various regions. These must be calculated at least for 3 different time periods and during different time of a given day.
- c. Design appropriate duct system to provide necessary air with appropriate filtering and grill systems.
- d. List of selected machinery, including blowers, chillers, ducts, and other equipment.
- e. Provide performance curves for the complete system along with anticipated performance variation due to change in number of personnel, outdoor temperature, and other important parameters.
- f. Provide a breakdown of first costs for the entire system and operating costs.

Graduate students are expected to do their projects independently

HOMEWORK:

Due to the nature of the class schedule and the course structure, home work problems will be assigned regularly. The students are expected to solve the problems and bring them to every test. The students will be asked to submit specific homework problem(s) at the time of the test. *Please note many problems in this course are open-ended, and, therefore, you may have different solutions to the same problem.*