

## MME 4460b - Heating, Ventilating and Air Conditioning II COURSE OUTLINE – 2020-2021

**CALENDAR DESCRIPTION:** Design of air distribution components and systems; fan/pump laws; air quality and ventilation; hot water heating systems; steam heating systems; cooling equipment; heat generation and transfer equipment; building automation controls; operations and maintenance.

**PREREQUISITES:** MME 4483a/b

**ACCREDITATION UNITS:** Engineering Science = 50%; Engineering Design = 50%

- TOPICS:**
1. Hydronic system, pumps and piping design (water and steam) for heating or cooling applications
  2. Boiler selection and expansion tank
  3. Air Distribution System Design
  4. Fan selection and furnace sizing and selection
  5. Cooling and Refrigeration cycles and equipment selection
  6. Control Systems
  7. Maintenance and Operations

**SPECIFIC OBJECTIVES:** This is a capstone design course in Mechanical & Materials Engineering that uses an understanding of thermodynamics, heat transfer, fluid mechanics and HVAC principles to achieve “Smart Building Design”

On completion of the course the student will be able to:

1. size and select HVAC equipment and system
2. design hydronic and air distribution systems

**GENERAL LEARNING OBJECTIVES:**

Knowledge Base	X	Individual Work	X	Ethics and Equity	X
Problem Analysis	X	Team Work		Economics and Project Management	X
Investigation		Communication	X	Life-Long Learning	X
Design	X	Professionalism	X		
Engineering Tools	X	Impact on Society	X		

**TEXT:** McQuiston, “Heating, Ventilating and Air Conditioning, Analysis and Design” 6<sup>th</sup> or 5<sup>th</sup> edition, Wiley ISBN 0471350982

- REFERENCES:**
1. *Heating & Cooling of Buildings*, J. Kreider & A. Rabl, McGraw-Hill, 2<sup>nd</sup> Edition, 2002. ISBN #0072373415
  2. *ASHRAE - Handbook of Fundamentals*, 2005.
  3. *Direct Digital Controls for HVAC Systems*, Thomas B. Hartman 1993. ISBN #0070269777
  4. *HVAC Maintenance and Operations Handbook*, Robert C. Rosaler, 1997. ISBN #0070521697
  5. *HVAC Pump Handbook*, Rishel, James B., 1996. ISBN #0070530335

**UNITS:** Imperial and SI

**EVALUATION:** Assignments, ASHRAE , and tours 10%

- Two assignments:
  - 1- Assignment 1 is on Feb 5 and due one week
  - 2- Assignment 2 is on Feb 26 and due in one week
- Attend at least one ASHRAE meeting

Lab 5% (Due at the end of the lab)  
 Mid-term Examination 45% (Friday, March 26<sup>th</sup>)  
 Project 40% (Due Friday April 16<sup>th</sup>)

- If a student is excused from writing a midterm or quiz for legitimate reasons, and with the approval of the Department Chair, the weighting of the final examination can be adjusted accordingly.

**ENGLISH:** In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests and examinations for improper use of English. Additionally, poorly written work, with the exception of final examinations, may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

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**ATTENDANCE:** Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.

**CHEATING:** University policy states that cheating, including plagiarism, is a scholastic offense. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

**NOTE:** **The above topics and outline are subject to adjustments and changes as needed.**