1. ME4131W, Thermal Environmental Engineering Laboratory.

2. 4 credits, 4 contact hours.

3. Instructors: C. Hogan, U. Kortshagen

4. Text: Course packet written by Kuehn and Ramsey

5. Specific course information
   a. Catalog description: Experiments in psychrometrics, refrigeration, air-conditioning, indoor air quality, and other topics related to refrigeration, building heating/cooling, and indoor air quality.
   b. Prerequisites: ME 3333, ME 4031W, ME upper division.
   c. Elective for ME students.

6. Course outcomes (Numbers shown in brackets are linked to program outcomes 1-7)
   a. An ability to test & document the performance of real building mechanical systems. [1,4,5,6]
   b. An ability to operate laboratory equipment in a safe manner. [6]
   c. An ability to select and install instrumentation appropriate to characterize a refrigeration system. [1,2,5,6]
   d. An ability to write effective laboratory reports. [3,6]
   e. An ability to use data acquisition software (e.g., C or C++). [1,2,6]
   f. An ability to operate automatic data acquisition systems. [6]
   g. An ability to analyze the experimental data including uncertainty analyses. [3,6]
   h. An ability to interpret experimental results and make comparisons with theoretical system performance predictions. [1,6]
   i. An ability to make recommendations to improve existing experimental procedures. [1,2,6]

7. Course topics:
   a. Automated data acquisition.
   b. Fan performance and duct air flow measurements.
   c. Mixing of outdoor and return air, mixed air dampers, stratification.
   d. Particulate filtration, particle sampling and measurement.
   e. Refrigeration – walk-in cooler performance, both steady and transient behavior.
   g. Heating and humidifying, or cooling and dehumidifying, system performance.
   h. Desiccant dehumidification.
   i. Room air flow, local ventilation, flow visualization techniques.
   j. Small refrigeration system instrumentation and test.