

Architectural Engineering Design I
ARCE 680 -- Fall Semester 2011
Mechanical Systems Portion

Meeting Time: Mondays, Wednesdays, and Fridays. 1:00 to ~2:50 p.m.
September 26th through October 28th, 2011.

Meeting Place: 2148 Learned Hall

Instructor: Brian A. Rock, Ph.D., P.E., Fellow ASHRAE
Office: 2134-D Learned Hall, 864-3603, docrock@ku.edu

Catalog Description:

ARCE 680: Capstone engineering design course that includes the analysis, design, and integration of structural, mechanical, electrical, and lighting systems for a commercial, industrial, or institutional building.

Some References: Notes and handouts from ARCE 660 and 661.
Fundamentals volume of the ASHRAE Handbook, 2009 I-P ed.
HVAC Systems and Equipment volume of the ASHRAE Handbook, 2008 I-P ed.
SMACNA's (and ASHRAE's?) duct design manual.
ASHRAE Standards 62.1 and 90.1.
USGBC's LEED® checklist for new buildings (NC).
Mechanical and Electrical Equipment for Buildings, Stein, Reynolds, and Grondzik.
Uniform or International Mechanical Code, IAPMO or ICC.
Manufacturers' literature, various handouts, and a Ductulator®.

Other: Students are referred to and expected to abide by KU's academic misconduct policies. The mechanical portion instructor's penalties for discovered academic misconduct range from no credit given on a particular requirement to portion failure. Incidences are reported to the course coordinator for potential further action.

Grading: Individual assignments due as stated in class, and will be graded on a 0 to 10 scale each. The duct design assignment will be counted as three assignments. Late work loses one point per 24 hours or fraction thereof. Final scores may be curved up. Your points earned in the mechanical portion will be given to the course coordinator for inclusion in your overall ARCE 680 grade. The mechanical portion is a third of ARCE 680, so be sure to do very well on every assignment.

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Objectives

Methods of teaching: lectures, demonstrations, sample equipment selections, homework, viewing videos, etc.

To expand your building mechanical systems design knowledge and skills, or more specifically:

- ☞ To evaluate the heating, cooling, and ventilation needs for a larger building
- ☞ To continue introducing HVAC equipment (e.g., fans, boilers, chillers, and cooling towers)
- ☞ To design an HVAC system that meets the building's, owner's, and occupants' needs, and to size/select equipment for that system

Homework

- ☞ Be neat. Rewrite/redraw when needed.
- ☞ Use engineering paper (front side only) for calculations, graph or computer paper for graphs, and appropriate paper for large-scale plots.
- ☞ Show all calculations, units, conversions, and references. Box the *final* answer (only!) for each problem.
- ☞ Show one complete sample calculation for repetitive calculations, but show all the results. Provide a cover page with a summary or table of results for lengthy assignments.
- ☞ Orient the text and pages so that they read from the bottom or the right side. Staple pages together in the upper left-hand corner.
- ☞ Fold the pages lengthwise unless more than about 12 pages. When folded be sure to write your name on the outside.
- ☞ For your drawings, use appropriately-sized paper, scales, schedules, titles, etc. Turn in drawings rolled-up -- with your name showing in the title block on the outside -- and secured with a large rubber band.

Note: the fall semester's Fundamentals of Engineering Exam is usually held toward the end of October of each year. If taking the F.E. exam this semester, be sure to plan for your exam preparation as well as for completing all your courses' requirements.