# Architectural Engineering Design I
## ARCE 680 -- Fall Semester 2013
## *Mechanical Systems Portion*

*Meeting Time:* Mondays, Wednesdays, and Fridays. 1:00 to ~2:50 p.m.
September 30th through November 1st, 2013.

*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, 2009/2013 I-P ed.
HVAC Systems and Equipment volume of the ASHRAE Handbook, 2008 or 2012 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' websites, 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.



The Academic Achievement & Access Center (AAAC) coordinates accommodations and services for all KU students who are eligible. If you have a disability for which you wish to request accommodations and have not contacted the AAAC, please do so

as soon as possible. Their office is located in 22 Strong Hall; their phone number is 785-864-4064 (V/TTY).

*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 10% 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 one third of ARCE 680, so be sure to do very well on every assignment.

Revised: July 30, 2013

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**Fall 2013**

## 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 of a larger building
- ☞ To continue introducing HVAC equipment (e.g., fans, boilers, chillers, and cooling towers)
- ☞ To select, design, and specify HVAC systems that meet the owner's and the occupants' needs as well as building codes' requirements

## 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 of results for lengthy assignments.
- ☞ Orient documents' and drawings' text and pages so that they read from the bottom or the right side.
- ☞ For regular-sized paper, fold the pages lengthwise unless more than about 12 pages. When folded be sure to write your name on the outside. Staple pages together in the upper left-hand corner.
- ☞ For your drawings, use appropriately-sized paper, scales, schedules, titles, etc. Turn in large-format (e.g., 24x36) drawings rolled-up -- with your name, etc. 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.*