

ARCE 681 -- ARCHITECTURAL ENGINEERING DESIGN II
BUILDING MECHANICAL AND ENERGY SYSTEMS SECTION

ARCE 662 -- WATER SYSTEMS DESIGN
Spring Semester 2014

Time/Place: MWF 2:00 p.m. to 3:50 p.m., 120 Marvin Studios (MARS)

Instructor: Brian A. Rock, Ph.D., P.E., Fellow ASHRAE docrock@ku.edu
Office: 2134-D Learned Hall; drop-in "office hours". 785-864-3603

Catalog Description:

For ARCE 681: Comprehensive architectural engineering design project in a specific area of professional practice.

For ARCE 662: The analysis and design of hydronic systems including piping, plumbing, pumping, and the water-side of heating, ventilating, and air-conditioning (HVAC). Not open for credit to those taking the mechanical/energy section of ARCE 681.

Prerequisites: For ARCE 681: ARCE 680 or consent of instructor, and 5th year senior standing in architectural engineering.

For ARCE 662: ARCE 660 or consent of the instructor.

Textbooks: Fundamentals volume of the ASHRAE Handbook, I-P edition, ASHRAE, Inc., 2009 or 2013.

References: Architectural Graphics Standards. The UPC/IPC and UMC/IMC. ANSI/ASHRAE Standards, especially 55, 62.1, and 90.1.
USGBC's LEED® for New Construction.
SMACNA's HVAC Systems -- Duct Design, 4th ed., 2006.
Handouts, manufacturers' catalogs, duct-sizing calculator, etc.

<i>Grading:</i>	Project Outline Memorandum	5%	Final grades:
	First Draft of the Project Report	10%	90% to 100% = A
	Second Draft of the Proj. Report	10%	80% to 89.9% = B
	Final Pr. Report and Presentation	50%	70% to 79.9% = C
	Homework and quizzes	<u>25%</u>	60% to 69.9% = D
	Total =	100%	Less than 60% = F

Homework must be completed individually. Late work loses 10% per full or partial 24 hrs. Advance written notice, acceptable physical proof and reason, and verification are required for a course obligation to be rescheduled; voluntary events are not acceptable.

Final Exam: The timeslot(s) (Tuesday 5/13, 1:30-4:00 p.m., and/or Wednesday 5/14, 1:30-4:00 p.m.) will be used for your projects' presentations.

Other: 1) Cell phones, etc. off during class. 2) Students are expected to abide by KU's academic integrity policies. Discovered violations are reported to CEAE and the Dean's office. Penalties for academic misconduct range from receiving a zero on a particular assignment or project to dismissal from the School or KU. 3) All course content copyright © Prof. Rock unless prior copyright by others, e.g., ASHRAE. No redistribution without advance written permission. Recording or transmitting any live content, by any party, is specifically prohibited.

Semester Project: Students, individually or as teams, will solve building mechanical and energy systems analysis and/or design problems. Each student/-team is expected to formulate and communicate innovative yet realistic solutions. The analyses and solutions will be presented by the students/teams via well-written, illustrated technical reports and presentations to the class, and possibly via physical models depending on the projects chosen. The reports may be submitted to national design competitions, or, after refinement, for publication.

Project Memo: A one-page business memo. This memo titles, defines, and provides the report's outline for your selected project, and lists, if any, the team members. Each student does the memo individually.

Report Format: This is your team or individual project's report on 8.5" x 11" paper, single-sided, white, 25%-cotton bond paper only (final copy). Thirty five laser-printed pages maximum. Illustrations must be incorporated into the body of the text. Follow the *Technical Writing Hints* handout.

Final Presentation: Your individual presentation of your project should be about 15 minutes long; teams' up to proportionally longer. Have paper copies of your full presentation available for handouts. Overhead and LCD projectors, and a projection screen as well as a TV, VCR, and DVD player will be available in the classroom (120 MARS). If you present with PowerPoint® or other software **you'll** need to secure and setup a laptop computer and needed software. The CEAE office (2150 Learned Hall) has some equipment to check-out but be sure to reserve it **in advance and to pick it up and debug it** well-before your presentation.

The suggested organization of your presentation is:

- Title slide
- Problem Statement
- Background
- Description of your approach
- Results and Discussion
- Conclusions and Recommendations
- Acknowledgments

Lab Project(s): Each person assumes the liability for personal injury during any laboratory work. Do not perform any lab work without proper training, safety precautions, and supervision.

Due Dates:

Project Memo	January 27, 2014 (M)
Project Report's First Draft	March 14, 2014 (F)
Project Report's Second Draft	April 18, 2014 (F)
Final Report (and Model?)	May 7, 2014 (W) ¹
Presentation	In the final exam period(s)

1. The deadline for submitting to the ASHRAE or other competitions may be earlier! Competitions' submissions are voluntary and are separate from those required for this course.

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and

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SPRING 2014 COURSE OBJECTIVES

Methods of teaching: *class discussions, lectures, homework, demonstrations, videos, tour(s), student presentations, ASHRAE meetings, etc.*

For the selected semester individual/team project(s):

- To develop an interesting solution to a design and/or analysis problem in building mechanical and energy systems, or a related field
- To communicate intermediate and final results through documents suitable for wide distribution, and via a classroom presentation

For the technical topics:

- To introduce the “water-side” of HVAC&R/solar-thermal/plumbing/piping/...

A “student night” tour by the KC Chapter of ASHRAE is planned for the evening (~5:30-8:00 p.m.) of Monday, February 3rd. Visit www.kcashrae.org for details.

January 3, 2014