ARCE 662 -- WATER SYSTEMS DESIGN
Spring Semester 2018

Time/Place: TR 9:30 to 10:45 a.m., 2410 LEEP2

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:
The analysis and design of hydronic systems including piping, plumbing, pumping, and the water-side of heating, ventilating, and air-conditioning (HVAC).

Prerequisites: An appropriate course in fluid mechanics/dynamics (e.g., KU's ME 510, AE 345, CE 330, or C&PE 511), or consent of the instructor.

Textbook: Fundamentals volume of the ASHRAE Handbook, **I-P** edition, ASHRAE, Inc., a recent edition (e.g., 2013 or 2017).

References: Architectural Graphics Standards
The UPC/IPC and UMC/IMC
The ASPE Plumbing Engineering Design Handbook
Handouts, manufacturers' catalogs and websites, etc.

Grading:

Project Outline Memorandum	5%	Final grades (no +/-)
First Draft of the Project Report	5%	90% to 100% = A
Second Draft of the Proj. Report	10%	80% to 89.9% = B
Final Pr. Report and Presentation	30%	70% to 79.9% = C
Homework and class exercises	50%	60% to 69.9% = D
Total =	100%	Less than 60% = F

Homework must be original and completed independently; the semester project may be individual or team. 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, Monday, May 7th, 7:30-10:00 a.m., will be used for your semester 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)

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 presentation, if individual, 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 VCR, and CD/DVD player will be available in the classroom (2410 LEEP2). Try logging on to the teaching station's PC and test your presentation (on USB drive?) in advance.

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 25, 2018 (R)
Project Report's First Draft	March 8, 2018 (R)
Project Report's Second Draft	April 12, 2018 (R)
Final Report (and Model?)	May 3, 2018 (R, LDOC)
Presentation	In the final exam period(s)

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SPRING 2018 COURSE OBJECTIVES

Methods of teaching: *class discussions, lectures, homework, demonstrations, videos, tour(s), student presentations, ASHRAE/ASPE 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 closely-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" meeting of the KC Chapter of ASHRAE is usually planned for a Monday evening (~5:30-8:00 p.m.) during each semester. Visit www.kcashrae.org for details. The KC ASHRAE chapter also usually holds one joint meeting with KC ASPE (kc-aspe.org) each year.

January 9, 2018