

ARCE 665 -- Solar Energy Systems Design

Fall Semester 2017

Meeting Time & Place:

TR 8:00 to 9:15 a.m., 2410 LEEP2 = ARCE BMES Laboratory

Instructor:

Brian A. Rock, Ph.D., P.E., Fellow ASHRAE
2134-D Learned Hall, Voice: 785-864-3603, Email: docrock@ku.edu

Office Hours:

By appt., or whenever I'm in my office and the door is open! ☺

Catalog Description:

A quantitative and qualitative study of active, passive, wind, and photovoltaic energy conversion systems for buildings. Solar radiation and system performance prediction.

Prerequisites:

ME 312 or C&PE 221, or consent of instructor.

Required Readings:

A Golden Thread, Ken Butti and John Perlin
From Space to Earth, John Perlin.

References:

Many class handouts! (Why??? ☺)
2013/17 Fundamentals volume of the ASHRAE Handbook, I-P ed.
Many solar energy books (some via Spahr Engineering Library).

Grading:

Homework/Projects	80%	Final Grades:		
Book Reports (2)	<u>20%</u>	90% to 100%	=	"A"
Total =	100%	80% to 89.9%	=	"B"
		70% to 79.9%	=	"C"
		60% to 69.9%	=	"D"
		Less than 60%	=	"F"

Plus/minus (+/-) grading not utilized. Individual homework sets are due one week after assignment unless otherwise stated in class by the instructor. Late homework may lose 10% per calendar day or fraction thereof. Computer programming (in Basic, Fortran, C++, ?) likely required for doing some homework assignments; special, separate non-credit session(s) to learn BASIC, offered to all ARCEs, may be offered by Prof. Rock. All work submitted for grading must be completed independently unless specifically assigned as team-based. Students assume the liability for personal injury during any potential laboratory work or tours; do not perform lab work without proper training, safety precautions, and/or supervision.

Final Exam: No written final exam. However, the project/last assignment/book report will likely be due by the end of the scheduled final exam period which is Thursday, December 14th, 7:30 - 10:00 a.m., and may include you doing individually or as a team a brief presentation.

Other: 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 exam to dismissal from the School or KU.

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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).

A Blackboard website (courseware.ku.edu) is or will be available for this course. Some handouts may be posted there, but hardcopies will likely be handed out in class including this syllabus.

Fundamentals of Engineering Exam:

All KU CEAE undergraduates are required by the department, and graduate students are encouraged to take the Fundamentals of Engineering (F.E.) exam soon after you are eligible. Be sure to schedule plenty of exam preparation time if you plan to take it this semester. Most undergraduate KU ARCEs take the "Other Disciplines" version of the exam. The F.E. Exam has specific registration deadlines so you are strongly encouraged to investigate its requirements as soon as possible. Visit www.ksbtp.ks.gov and www.ncees.org for details. Taking the F.E. Exam is not a requirement of this course.

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COURSE OBJECTIVES

Methods of teaching: lectures, demos, assignments, etc.

- ☞ To begin learning the language, philosophies, *arts*, and *sciences* which form the field of solar energy engineering for buildings
- ☞ To understand solar geometry, economics, and their effects on solar energy collection systems
- ☞ To introduce photovoltaic and, if time allows, other electrical energy collection and storage systems
- ☞ To investigate active and passive solar-thermal energy design
- ☞ To examine some physical materials for solar-utilization attributes and liabilities
- ☞ To evaluate a building for its solar-utilization potential, and to design solar energy systems for it

HOMEWORK / PROJECT REPORTS

- √ Be neat. Rewrite if needed. See the example handout.
- √ Use engineering paper (front side only) for hand calculations, graph or computer paper for graphs, and appropriate paper for drawings and computer output.
- √ Show all calculations, units, conversions, and references. Show one complete sample calculation for repetitive calculations, but show all the results.
- √ Box the *final* answer (only!) for each problem. Provide a cover page with a summary or table of results for lengthy assignments.
- √ Staple pages together in the upper left-hand corner. Write your name, course number (ARCE 665), date, and assignment number on the outside and on the inside.
- √ If less than 12 pages or so, fold lengthwise. If thicker, leave unfolded (flat).
- √ For assignments that require computer programming, turn in hardcopies (printouts) of your source code, input, and output files. Don't turn in a disc/USB drive/etc., or email attached files, for grading unless specifically requested.