COURSE CONTRACT

CATALOG DESCRIPTION:

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ME 462  Thermal Design  4R-0L-4C  S  Pre: ES202 and ME302
Applications of thermodynamic, heat transfer, and fluid flow principles to the modeling and design of thermal systems. These systems include pumps, fans, and heat and mass exchangers. A project which includes designing, constructing, and testing a heat exchanger provides the focus for the course.

INSTRUCTOR:

INSTRUCTOR:
• D. E. Richards  Moen Hall C101  877-8477 (office);  232-0006  (home)
  email: donald.e.richards@rose-hulman.edu  homepage: www.rose-hulman.edu/~richards
You are encouraged to stop by at any time and see if I am available. I can also be reached at home up until 10:00 pm. Should you have difficulty finding me, please call and set up an appointment.

COURSE WEBPAGE:

COURSE WEBPAGE:
http://www.rose-hulman.edu/~richards/courses/me462/

TEXT & SOFTWARE:

TEXT & SOFTWARE:
• No required text. (Last year’s textbook was William S. Janna, Design of Fluid Thermal System, 2nd Ed., PWS Publishing, Boston, 1998.)
• Engineering Equation Solver (EES), F-Chart, Inc. --- To download this software, log on to the Rose-Hulman network and use the “Run” command to access the following site:: \tibia\public\Course Software\EES. Read the file “Readme.txt” first and then follow the instructions. Additional information about this program is available at www.fchart.com.
• I lieu of using a required textbook, you will need to consult your textbooks for ES201, ES202, ME301, and ME302. Recommended readings in these textbooks will be assigned throughout the quarter.
• Suggested reference books:
  --- a fluid mechanics textbook (such as Munson, Young, and Okiishi)
  --- a heat transfer textbook (like Cengel) or a heat/mass transfer textbook (like Cengel)
  --- a thermodynamics book (like Moran & Shapiro)
  --- a thermal-fluids book (like Cengel & Turner)
  --- a general reference book like Mark’s Handbook of Mechanical Engineering or the ASHRAE Handbooks.

COURSE ACTIVITIES & PHILOSOPHY:

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In this course, as is true with most design courses, we will emphasize the application and synthesis of material from previous courses (fluid mechanics, thermodynamics, heat transfer) and its use to analyze and design new systems. We will review fundamentals from time to time, but you should expect to spend time reviewing material as necessary so that we can spend time discussing methodology for problem solving and design. Assigned tasks may be ambiguous, and you may be required to make reasonable assumptions before you can proceed. Because all real-world problems involve ambiguity and uncertainty, tolerance for both and the ability to make assumptions using engineering judgment are important traits for design engineers.

This course consists of three components design projects, development activities, and evaluation activities. Development activities take place all quarter long and provide you an opportunity to practice and master the course material. These include homework assignments and in-class active learning exercises. Development activities may be assigned for individuals or groups. Evaluation activities will be completed individually.

There will be two design projects in the course. The first design project will focus on the design, construction, and testing of a heat exchanger. The second design project will focus on the paper design of a thermal/fluid system using off-the-shelf components. You will complete each design project as a member of a design team. The instructor will assign teams prior to starting the design projects. Team members are equally responsible for the completion of the project as well as the quality of the final deliverable.
COURSE EXPECTATIONS:

Reading Assignments: Reading assignments will be given from the reference texts and should be completed before coming to class. You are encouraged to review your undergraduate texts to gain a more thorough understanding of the fundamentals of thermal-thermal sciences.

Homework Guidelines: Homework problems will be assigned daily, e.g. homework assigned on day 2 is Set 2. Homework is typically due at the beginning of class period on the assigned due date. Late homework will not be accepted except for medical reasons or prior arrangements with the instructor. Should you have trouble solving a problem, you should at least submit an acceptable partial solution. You are encouraged to attempt to solve every problem assigned. Numerical answers submitted with a problem must be supported by the complete problem solution. Submitting “correct” numerical answers without doing and understanding the work that produces the answer is dishonest and unethical. Occasionally only one homework will be collected and graded per design team. The team member to turn in the homework will be selected at random and everyone in the team will earn the same grade on that assignment.

Getting Help on Homework: If you need help on the homework (and we all do at one time or another), get help from classmates, most notably your team members. In any design class, as well as the work place, the ability to work well with others is not only encouraged but essential. The only condition placed on working with others is that you acknowledge the help by indicating who helped you and how. Get help from me too. Stop by my office. Take moment after class to talk with me.

Active Learning Exercises (ALE): In-class active learning exercises will facilitate your understanding of the material. During these exercises, you will work in pairs or a group on a problem solution. Occasionally your work will be collected for grading. Some ALE’s will emphasize discovery of new ideas; others will be review. The emphasis in ALE’s is effort.

Attendance: Excused absences must be discussed in advance with the instructor. Your final course grade may be reduced one letter grade when you accumulate four unexcused absences. Students whose absences, excused or unexcused, equal eight or more, will typically be awarded a failing grade for this course. If you miss class, you are responsible for obtaining notes and assignments from other students in the class. At the very least, students with exceedingly poor class attendance should expect a reduction in their course grades. Such a policy mimics that of a professional work environment in which most students in this class will find themselves in the near future.

GRADING & POINT DISTRIBUTION:

Development Activities:
Homework and Active Learning Exercises .......................................................... 20 %

Evaluation Activities:
Quizzes: 3 or 4 ........................................................................................................... 40 %
Shop Qualification: Must be completed to pass the course .................................. 0 %
Design Projects (including required peer evaluations) ........................................... 40 %
TOTAL .................................................................................................................. 100 %

This course is not graded on a curve. Everyone in the class has an equal opportunity to earn an A or an F. Typically, 90% and above is an A, 80% and above is a B, 70% and above is a C, and 60% and above is a D. Performance levels below 60% are unacceptable and will typically result in a failing grade.

ACADEMIC MISCONDUCT

Any act of academic misconduct is grounds for discipline in accordance with the Rose-Hulman Institute of Technology Academic Rules and Procedures (see Registrar's web page). If you have questions about something you or others are doing ASK first! In general, if in doubt, ASK!