COURSE SYLLABUS FOR
MECH 338, HEAT TRANSFER - 3 UNITS
California State University, Chico
Spring Semester 2016

Instructor: Dr. G.A. Kallio, OCNL 417, 898-4959
email: gkallio@csuchico.edu

Office hours: MWF 2-2:50pm, T 2-3:50pm

Class hours: MW 9-9:50 am (lecture), OCNL 254
F 8-9:50 pm (activity), OCNL 254

Prerequisites: CIVL 321, Fluid Mechanics; MECH 332, Thermodynamics.

Textbook: *Fundamentals of Heat & Mass Transfer*
Bergman, Lavine, Incropera, and DeWitt,
OR
*Introduction to Heat Transfer*
Bergman, Lavine, Incropera, and DeWitt,

Internet: Lecture slides, text problem homework and solutions, design
problems, and other course material are posted on Blackboard Learn.
Software, selected textbook problem answers, and
supplements can be found at the Wiley Student Companion Site.

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework Problems</td>
<td>20 %</td>
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<tr>
<td>Design Problem</td>
<td>15 %</td>
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<tr>
<td>Class Exercises</td>
<td>5 %</td>
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<tr>
<td>Midterm Exams (2)</td>
<td>40 %</td>
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<tr>
<td>Final Exam</td>
<td>20 %</td>
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Homework: There will be 11 homework problem sets assigned during the
semester. Problem solutions must be neat, legible, numbered,
arranged in assigned order, written on only one side of the paper,
and stapled. Solution analysis must follow a specific methodology,
which is outlined in section 1.4 of the textbook and used for all text
examples.

Homework is due at the beginning of class on the due date. Late
homework is not accepted except for pre-arranged, legitimate
absences.
Design Problem: An extensive design problem will be assigned that addresses a practical heat transfer application. This is an open-ended problem that requires more creative thought than homework problems.

Equation Solving: Equation-solving software such as *Engineering Equation Solver (EES)* or *Interactive Heat Transfer (IHT)* is essential for solving some homework and design problems. Students are expected to learn one of these software programs. Some software instruction will be given during lectures and activities. The setup file for EES can be found on Blackboard Learn. EES is also accessible on VSL and the PCs in OCNL 438. IHT 4.0 can be downloaded from the Wiley Student Companion Site [here](#).

Activity Session: The Friday activity sessions will be used for midterm exams, class exercises, some lecturing, and some demonstrations. Participation in class exercises represents 5% of the course grade. Always bring your textbook and calculator to the activity session and make sure that you have completed the assigned reading for that week.

Examinations: There will be two, 110-min midterm exams and a 110-min final exam. The midterm exams will be given during the activity session on Friday. The Final Exam will have emphasis on those topics covered after the last midterm exam. Use of the textbook and two, 8½” x 11” pages of notes are allowed during the exams. The Final Exam will be given on Monday, May 16, 10-11:50am in OCNL 254.

If you know you are going to miss an exam due to illness or other legitimate reason, you must contact me before the exam. (You can call me at home on such occasions: 342-8640.) Make-up exams are only allowed for pre-arranged, legitimate absences.

Email: If you need to contact me outside of class or office hours, please use email. It is expected that all students will monitor their Wildcat email account as I will use this system to make important announcements from time to time. You can set up automatic forwarding of your Wildcat email to another preferred email provider at [http://www.csuchico.edu/itss/email/students/index.shtml](http://www.csuchico.edu/itss/email/students/index.shtml).

Cell Phones: All alert sounds on your cell phone must be turned off during class. Cell phone use during class will not be tolerated, except for emergency situations (911).

Academic Integrity: Students are expected to be familiar with the University’s Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University’s Academic Integrity Policy requires
you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found at: 
http://www.csuchico.edu/sjd/integrity.shtml. Copying solutions from other sources is a form of plagiarism and punishable in accordance with the University Academic Integrity Policy.

Disability Services: If you need course adaptations or accommodations because of a disability or chronic illness, please see me during office hours as soon as possible. Students with disabilities requesting accommodations must register with the Accessibility Resource Center (ARC) to establish a record of their disability, as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations. Special accommodations for exams must be arranged with ARC well in advance of the exam date. Their email address and website are ardept@csuchico.edu, http://www.csuchico.edu/arc.

Primary Course Objective:

Students will learn to model, analyze, and design heat transfer systems, components and processes by applying the appropriate rate equations (for conduction, convection, and radiation) with the principle of energy conservation.

Specific Course Outcomes - what you should be able to do at the end of this course:

1. Identify the important and/or possible heat transfer modes in any physical system.
2. Write surface and control volume energy balances with the appropriate heat transfer rate equations for any physical system.
3. Simplify the general heat conduction equation and write boundary conditions for any well-posed conduction heat transfer problem.
4. Represent any steady-state, 1-D conduction system as a thermal circuit and solve for unknown heat rates and/or temperatures.
5. Use the lumped capacitance method or appropriate analytical solution to solve transient conduction problems.
6. Calculate a convection heat transfer coefficient \((h)\) from an appropriate empirical correlation and use it to determine a heat transfer for a variety of fluid flow configurations.
7. Design/specify a fin array or heat sink to meet a temperature or heat rate requirement.
8. Calculate pressure drop, fluid outlet temperatures, heat transfer rate, or required surface area for pipe flows and heat exchangers.

9. Determine view factors, compute radiation heat rates and/or temperatures in an $n$-sided enclosure with gray, diffuse surfaces.