MECH 32, Thermodynamics, Section 01, Spring 2015

Instructor: Assistant Professor David G. Alexander
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Office hours: M 2:00 to 4:00 PM and Tu 1:00 to 2:00 PM or by appointment

Class days and times: Lecture: MWF 12:00 AM – 12:50 AM
Classroom: Lecture: Plumas 102
Prerequisites: PHYS 204A (indirectly, MATH 121 & MATH 120)

Course Usage of Blackboard Learn
Copies of the course syllabus and major assignments may be found on Blackboard Learn. You are responsible for regularly checking the online resources, which is accessed through the Chico State Portal at http://portal.csuchico.edu.

Some assignments will be administered online through Blackboard Learn. Deadlines for the last date and time to take and submit the assignment will be provided in Blackboard Learn. Once the deadline is reached the assignment will no longer be available. All assignment grades are final after the deadline.

Course Description and Goals
Catalog Description
Properties of substances, ideal gas equation of state, heat and work, first and second laws of thermodynamics, steady-state analysis of closed and open systems, entropy, gas and vapor power cycles, introduction to renewable energy sources. 3 hours discussion.

Course Goals
Understand and apply principles from physics, thermodynamics, and other engineering disciplines to analyze properties and states of substances, processes, and the performance of systems that store and transform energy.
Student Learning Outcomes

1. Be able to identify kinetic, potential, and internal energy of a system at rest or undergoing a transformative energy process.
2. Describe a phase diagram and its significance to the substance and to the process in which the substance is used.
3. Use the ideal gas law to determine the state of a gas before or after a process.
4. Understand the difference between enthalpy and internal energy and know when to apply either one.
5. Be able to identify an open and a closed system.
6. State the first law of thermodynamics and its significance.
7. Describe the second law of thermodynamics and its significance.
8. Be able to identify a system and define its boundary for the purposes of applying the first law and second law of thermodynamics.
9. Be able to apply engineering principles to analyze various energy systems for performance and efficiency. Principles include:
   a. The First Law of Thermodynamics
   b. The Second Law of Thermodynamics
   c. Ideal gas law
10. Follow a professional decision making process to clearly, neatly, and effectively communicate engineering analyses.
11. Use a review step effectively to self-assess and self-evaluate ones engineering analyses and solutions.

Required Textbook

Recommended:

Permissible: 7th Edition (hardcover or ring-binder ready) or Intl. 7th Edition
Permissible: 6th Editions

Classroom Protocol

Learning Environment
This is an upper division engineering course, and I have high expectations of all students. Come to class prepared and ready to engage in discussion and exploration in various topics most of which will be about engineering.

I treat all students with fairness and respect, and I expect the same treatment. I also want to help all students develop into outstanding, productive engineers where one’s sense of curiosity is supported and celebrated. My teaching style is very casual and informal. Do not confuse this with being irresponsible or disrespectful. I want my classroom to be dynamic, contributory, inquisitive, and fun. I will not have all your answers, however I will help you to develop skills and knowledge that will enable you to solve your own problems.
Upon graduation and as a professional, you will be asked to solve problems for which there will be no known answer. This is okay, and in fact, it is part of the definition of engineering, i.e. to solve problems. I want you to readily embrace the challenges of being an engineer and to broaden your perspective and contribute to the solution of some of the many difficult problems that face our planet.

**Homework**

Homework assignments will be due throughout the semester. These assignments require short answers, short essays, and/or engineering calculations. The lowest two grades of all the homework assignments turned in throughout the semester will not be included in one’s final grade.

All assignments will follow an organized problem solving process that uses the following headings:

- Situation
- Goal
- Generate Ideas
- Solution
- Review

In all cases, assignments that are turned in must include your name, course title and number, date, and homework assignment title or number. All answers will be clearly marked with a box. Units will be used and carried throughout. More discussion about the process will be included in class.

See the course rubric for additional help on how assignments will be evaluated and graded. The rubric is provided on the course Bblearn site. Homework assignments will be returned with a zero grade if there is no organization, they are not legible, portions are missing or they are late. **Late homework is not accepted.**

If you have a foreseeable problem that prevents you from completing your work on time, please make arrangements with me at least 24 hours in advance. If you have an emergency that prevents you from attending class or completing an assignment, please notify me as soon as possible.

**Exams**

There will be three exams given throughout the semester and one final exam. Each exam and final will cover approximately ¼ of the entire course material. Approximately, half of the final exam will be material from the last ¼ of the course and the other half will be cumulative. The final exam will be worth the equivalent of two exams. At the end of the term, the lowest test grade from a total of five equivalent exams will be dropped from a student’s final grade. Make-up exams will only be available to students that notify me 24 hours in advance of the exam and have a medical reason or job/internship or academic schedule conflict. Otherwise, **no make-up exams will be given.**
Dropping and Adding
You are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. found [http://www.csuchico.edu/catalog/](http://www.csuchico.edu/catalog/). You should be aware of the new deadlines and penalties for adding and dropping classes.

Assignments and Grading Policy

<table>
<thead>
<tr>
<th>Assessment Category</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Assessments</td>
<td>35%</td>
</tr>
<tr>
<td>In Class Examinations (5)</td>
<td>55%</td>
</tr>
<tr>
<td>Participation</td>
<td>10%</td>
</tr>
</tbody>
</table>

**TOTAL 100.00%**

University Policies and Campus Resources

**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](http://www.csuchico.edu/sjd/integrity.shtml).

**IT Support Services**
Computer labs for student use are located on the first and fourth floor of the Meriam Library, Room 116 and 450, Tehama Hall Room 131, and the Bell Memorial Union (BMU) basement. You can get help using your computer from IT Support Services; contact them through their website, [http://www.csuchico.edu/itss](http://www.csuchico.edu/itss). Additional labs may be available to students in your department or college.

**Student Services**
Student services are designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. Students can find support for services such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. Student services information can be found at: [http://www.csuchico.edu/current-students](http://www.csuchico.edu/current-students).

**Americans with Disabilities Act**
If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) 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.

**Accessibility Resource Center**
http://www.csuchico.edu/arc
530-898-5959
Student Services Center 170
arcdept@csuchico.edu

**Student Learning Center**
The mission of the Student Learning Center (SLC) is to provide services that will assist CSU, Chico students to become independent learners. The SLC prepares and supports students in their college course work by offering a variety of programs and resources to meet student needs. The SLC facilitates the academic transition and retention of students from high schools and community colleges by providing study strategy information, content subject tutoring, and supplemental instruction. The SLC is online at http://www.csuchico.edu/slc. The University Writing Center has been combined with the Student Learning Center.