Course Outline - Summer Session I 2014

MAE 110A - Thermodynamics

MTuWTh 9:30 AM - 10:50 AM (WLH 2111)

Instructor:

Mr. Patrick Folz
email: pfolz@ucsd.edu

Office Hrs: Tuesday and Wednesday 12:30-1:30 PM EBU2 Room 105 (or by appointment)

Teaching Assistant:

Cassie Lee
email: chl351@eng.ucsd.edu

Discussion Session and Office Hrs: Thursday 3:00-4:00 PM (Discussion SessioN) and Friday 11:00AM-12:00 (office hour)

Course Materials:

Fundamentals of Engineering Thermodynamics
M. J. Moran, H. N. Shapiro, D. D. Boettner, M. B. Bailey
John Wiley & Sons, Inc., Eighth Edition (2014)

*iClicker*2 or compatible device

Website:

ted.ucsd.edu, MAE 110A - Folz[S114]
Anouncements, Homework assignments and solutions.

Discussion Session:

There will be TA weekly discussion sessions.
Location: EBU2 Room 105
Day/Time: Thursday/3:00-4:00 PM

Grading:

Daily Pre-Class Reading & TED Tests (online) - 6%
Daily In-Class Participation (Clicker responses) - 6%
Weekly Problem Sets - 16%
Quizzes (best 2 scores of 3) - 22% each
Design Project - 6%
Final Exam - 22%

Tentative grading scale: $> 90\%$ A, $> 75\%$ B, $> 60\%$ C. These thresholds may be lowered later at the instructor's discretion, but will not be raised. No "D" grades will be given.

Re-grade requests must be made in a **written statement** detailing the justification for the re-grade (be sure to indicate: **name, date, email address**). Re-grades of problem sets will **not** be accepted beyond 1 week after return of homework. Daily TED and Clicker scores will **not** be re-graded.

Learning Objectives for MAE 110A
This course covers introductory classical thermodynamics. By the end of this course, you should be able to...

- ...understand and explain qualitatively to an undergraduate engineering student the these basic physical laws: Conservation of Mass; 0th, 1st, and 2nd Laws of Thermodynamics
- ...use these Laws, in conjunction with property data and relations, to solve for engineering quantities of interest, such as Temperature, pressure, rate of heat exchange, etc.
- ...evaluate the performance of basic thermodynamic cycles and identify ways to improve a given cycle design.
- ...appreciate engineering trade-offs and non-thermodynamic considerations.

For a full list of topics please consult the Course Decription in the UCSD student handbook.

Description of Course Structure and Philosophy
Instruction for this class takes several forms, including daily reading assignments to be done before each class, interactive lectures with participation via Clickers, in-class discussions with classmates, in-class practice problems, and so on. **The idea is to maximize the learning that occurs during each class**, as opposed to the instructor lecturing the material for 80 minutes and then afterwards you have to go home and practice it completely by yourself. "Learning Objectives" for each class period will be provided to help you see what the major ideas were and focus your study. The Teaching Assistant will also hold Discussion Session and office hours if further assistance is desired; sometimes it is beneficial to hear from a different voice. **Thermodynamics material builds sequentially** - you cannot do the second-week material without knowing the first-week material, etc. - so it is vitally important that you attend the lectures and do the daily assignments. They are a significant part of the learning process.

Points are given for the daily assignments and in-class participation to encourage you to do them. Reading some material ahead of class allows more class time to be devoted to difficult and/or higher-level topics (as such, **lengthy in-class reviews of the assigned reading material will usually not occur**). Clicker participation and and the other **in-class activities are intended to be low-consequence opportunities for you to practice what you've learned, receive feedback, and identify areas of your knowledge and skills that are particularly strong or weak**. From time to time I need to assess how well you are learning, which will be done in the form of weekly problem sets, in-class quizzes, and the Final. **Each component of the overall course grade is intentionally kept to a relatively small percentage so that the stakes of any one thing are relatively low**: an ill-timed abnormally-subpar performance will not wreck your grade, and you can improve your learning habits (and scores) if early results are not to your liking. In this way, I hope you can focus on learning the material without worrying about grades.

Description of Grading Components

In-Class: Participation

Clicker quesitons will be asked during each lecture.
Grading : Scores are based on **participation only**, there is no penalty for answering incorrectly. Grading is based on **cumulative performance for the whole course**: answering 80% or more of the total questions asked will earn the full participation point. Scores lower than 80% will receive proportional partial credit as though 0.8 were the max, so e.g. answering 60/100 questions by the end of the course would earn 0.6/0.8 = 0.75 pts.

Homework:

There are two kinds of homework for this class: **daily readings and an associated test** to be done online at the course TED site, and **weekly problem sets** due at the beginning of the designated class. **Late homework will not be accepted under any circumstances**.

Daily reading assignments and associated test on TED are to be done **before** the start of class. They will be posted the afternoon before and must be done by 8:00am of the day of the corresponding class time.
Grading : scoring 80% or higher on **each test** will earn a full reading point for the day. Scores lower than 80% will receive proportional partial credit as though 0.8 were the max, so e.g. a score of 3/5 would earn 0.6/0.8 = 0.75 pts. Final score for this component of the overall will be computed as (sum of TED test points)/18 with a maximum score of 18/18, i.e. the lowest 2 scores are dropped.

Problem sets will be assigned each week and collected on specified due date/time. The submitted homework must follow specific requirements. See attached sheet - **Homework Assignment Requirements**. Solutions will be available on TED.
Grading : some problems in each set will be graded in detail and will earn partial credit, others problems will receive full credit for what the grader judges to be an "honest attempt" to complete the problem, regardless of accuracy of final answers. We will **not** disclose which problems are which ahead of time. If 90% of students fill out a CAPE evaluation for this course, the lowest problem set score will be dropped. Following the specified homework format may account for up to 5% of a given problem set score.

Quizzes: **Three quizzes**, each approximately 45 minutes long, will be given. Students registered with **OSD** requiring alternate/additional accommodations should **contact the instructor** at least 72 hours before the start of each quis to make arrangements. Though they will each focus on the material since the previous quiz, due to the nature of this course all material learned prior to the quiz may be included. Each quiz will have two distinct-but-equivalent versions; in the unlikely event that scores on one version are significantly higher than on the other, scores on the lower-average version will be adjusted to bring it in line with the higher.
Grading : in computing the final overall score, **only the top two quiz scores will be used**. Requests for make-up quizzes may or may not be given, at the discretion of the instructor.

Final: **the Final** will be given on **Friday, August 1 at 8:00am-10:59am location TBA** It will be approximately the same length as a quiz and will focus on material from the prior week, though as with the quizzes anything covered prior (i.e. anything from the course) may be included.
Grading : all students must take the Final, and the score will not be dropped under any circumstances.

Design Project: the **design project** is intended to be a more open-ended opportunity to demonstrate your skills. It will be done during the fifth week of the Session; more information will be given closer to that time.

Academic Policy: All students are expected to know their responsibilities and uphold the standards of academic integrity and engineering professionalism. Students are encouraged to discuss course topics and homework with each other to promote learning. However **each student must do and submit their own work** on all homework assignments and exams. Submitted work that is copied or taken from an unauthorized source (e.g., another student's work) or performed using unauthorized resources (e.g., calculator programs or notes during exams) is considered cheating. Academic misconduct will have serious penalties and be reported to university administration. Refer also to class website for further information and **UCSD Policy on Integrity of Scholarship**.

MAE 110A Tentative Class Schedule - Summer 2014

Week	Topic	Reading
6/30	Course Information, Introduction, Basic concepts	Ch 1
	Energy, Work, Heat First Law - closed system	Ch 2
	Properties of pure substances Ideal Gas, Incompressible substance	Ch 3
7/6	First Law - control volume QUIZ 1	Ch 4
7/14	Introduction to Second Law Carnot Cycle, Temperature Scale	Ch 5
	Entropy Second Law - closed system Second Law - control volume QUIZ 2	Ch 6
7/21	Cycle Analysis - Vapor Power Cycles	Ch 8
	Cycle Analysis - Refrigeration Cycle	Ch 10
	Gas Power Cycles QUIZ 3	Ch 9
7/28	DESIGN PROJECT	
	Ideal Gas Mixtures	Ch 12
	Combustion	Ch 13
8/1	**FINAL EXAM** (Friday 8:00am - 10:59am, Location: TBA)	