CHEG 2111: Introduction to Chemical Engineering Thermodynamics
Spring 2016

Instructor: Ioulia (Julia) Valla, email: ioulia.valla@uconn.edu

Time & Location of classes: Lecture Sections: MWF - 12:20 – 1:10 am - CHM120
Discussion Section: Thursday - 3:35 – 4:25pm - AUST105

Textbook: Introduction to Chemical Engineering Thermodynamics, 7th edition, by: J. M. Smith, H. C. Van Ness and M. M. Abbott (McGraw-Hills Inc.)

Course Notifications: Most class correspondence will occur via HUSKYCT (http://huskyct.uconn.edu)

Time and Location of Prof Valla's Office Hours: Thursdays - 11:00-12:00 pm – UTEB 284

Undergraduate Teaching Assistants: Paige Orlofsky (paige.orlofsky@uconn.edu); Jonathan Klein (jonathan.klein@uconn.edu); Colin Gerrity (colin.gerrity@uconn.edu); Jacob Struble (jacob.struble@uconn.edu)

Time and Location of TA's office hours:
Tuesdays 7-8 pm – EII 212 & Thursdays 5-7 pm – EII 325

ABET Objectives
In this course, student progress towards the following ABET Engineering Objectives will be assessed:
(a) An ability to apply knowledge of math, science and engineering in the general field of chemical engineering
(e) An ability to identify, formulate and solve chemical engineering problems
(g) An ability to communicate effectively
(j) A knowledge of contemporary issues

Student Outcomes
By the end of CHEG 2111, students will be able to:
1) Calculate physical properties (P, V, T, C_p, C_v, etc) of a system or energy (work and heat) of a process. (ABET a, e, j)
2) Demonstrate the knowledge of the first law of thermodynamic, state functions, equilibrium, four energies and phase behaviors through application of fundamental equations. (ABET a, e)
3) Show an understanding of the second law of thermodynamics, entropy, ideal work through the calculation of processes in close or flow systems (ABET a, e, j)

4) Estimate residual properties through applications of virial coefficient, EOS, generalized correlation. (ABET e, k)
5) Understand the function of thermodynamic components (engine, boiler, compressor, pump…) and calculate their energy (output or consumption) and efficiency of the processes (steam plane, refrigerator, liquefaction) (ABET e, j)
6) Present oral and written final report classic thermodynamic papers as a team to demonstrate their understandings about fundamental thermodynamics (ABET g)

Grading

During the semester, students will be challenged in five areas that are designed to help them to achieve proficiency in the student outcomes: These five areas include: Homework, Quizzes, Mid Exams and Final Exams. The final course grade will be based on the following percentages:

Standard Grading

Participation:	5%
Homework Assignments:	10%
Quiz #1:	5%
Quiz #2:	5%
Mid Term Exam #1:	15%
Quiz #3:	5%
Quiz #4:	5%
Mid Term Exam #2:	20%
Final Exam:	30 %

Grading Details

Percentage	Letter Grade
93-100	A
90-93	A-
85-89	B+
80-84	B
75-79	B-
70-74	C+
60-69	C
50-59	D
<49	F

Homework Assignments (HA)

The best way to understand Thermodynamics is though problems solving. Take the time to work on your Homework. Homework Assignments will be posted on the Husky CT site every Friday before 5:00pm. They will be due at the beginning of the class (***12:20SHARP***) the following Friday. NO late homework will be accepted. Homework Solutions (HS) will be posted on Husky CT on the due Friday of each Homework Assignment before 5:00pm. Grades Homework Assignments can be picked up from the CHEG Main Office. Work turned in must be yours and only yours. You are encouraged to work as groups to gain a clearer understanding of the concepts, but no copying is allowed. Not all the Homework Assignment problems will be graded. Generally, 4-5 problems will be given and 2 (selected by the instructor) will be graded. You need to print clearly and legibly. If what you have written is not understood, you will not receive any credit. Clearly identify all intermediate and final answers by drawing a box around the numerical solution with associated units and representing appropriate significant figures. Answers with missing or incorrect units are wrong. Honors Students will have given a project mid semester, and it will be due end of the semester.

Quizzes

Four Quizzes will be given during the class. They will be both 20-30min long. NO open books are allowed. Phones are prohibited!

Mid Term and Final Exams

Two Mid-term Exam and a Final Exam will be given during class time. During the Mid Term Exams you are allowed to have 1-page hand written notes ONLY with equations and your calculator. During the Final Exam you are allowed to have 2-pages of hand written notes ONLY with equations and your calculator. NO open books are allowed. Phones are prohibited!

Participation

Participation will be reflected through your answers to multiple-choice questions during each class. An incorrect answer will receive 1 point total. Those who answer correctly will receive 2 points total. Clickers will be used for the answers. All clickers need to be registered; otherwise you will not be graded.

Other Policies

Student Conduct: http://www.dosa.uconn.edu/student_code.html. Students are responsible for adherence to the University of Connecticut student code of conduct. Perhaps the most important policy to pay attention to is the section on Student Academic Misconduct. "Academic misconduct is dishonest or unethical academic behavior that includes, but is not limited, to misrepresenting mastery in an academic area (e.g., cheating), intentionally or knowingly failing to properly credit information, research or ideas to their rightful originators or representing such information, research or ideas as your own (e.g., plagiarism)." Examples of academic misconduct in this class include, but are not limited to: copying solutions from the solutions manual, using solutions from students who have taken this course in previous years, copying your friends' homework, looking at another student's paper during an exam, lying to the professor or TA and incorrectly filling out the student workbook.

Attendance: Attendance and participation is mandatory and will be graded via in-class quizzes and multi-choice questions.

Absences: Make-up of ANY missed exams requires permission from the Dean of Students; see "Academic Regulations." Midterm-exams are treated the same as Final Examinations. Students involved in official University activities that conflict with class time must inform the instructor in writing prior to the anticipated absence and take the initiative to make up missed work in a timely fashion. In addition, students who will miss class for a religious observance must "inform their instructor in writing within the first three weeks of the semester, and prior to the anticipated absence, and should take the initiative to work out with the instructor a schedule for making up missed work."

Tentative Schedule

Week		Day	Date	Topic	Chapters	Read Pages	HA #
1	M		-				
	W	1	20-Jan	Syllabus & Introduction	**Chapter 1**		
	F	2	22-Jan	Introduction & Problems		1-15	1
2	M	3	25-Jan	First Law of Thermodynamics	**Chapter 2**	22-31	
	W	4	27-Jan	Reversible Processes and Heat Capacity		31-44	
	F	5	29-Jan	Energy Balance in open Systems		44-54	2
3	M	6	1-Feb	**Quizz #1 & Introduction to Virial equations**	**Chapter 3**	64-72	
	W	7	3-Feb	Ideal Gas Releations		73-86	
	F	8	5-Feb	Applications of virial equations & Cubic Equations		87-99	3
4	M	9	8-Feb	Generalized Equations for gases		99-108	
	T	10	11-Feb	**Problems and Generalized Equations for liquids**		**109-111**	
	F	11	12-Feb	**Review of Chapter 3**		**64-111**	4
5	M	12	15-Feb	**Quizz #2 & Introduction to Heat Effects**	**Chapter 4**	125-132	
	W	13	17-Feb	Latent Heats & Standard Heat of reactions		133-139	
	F	14	19-Feb	Heat of combustion		139-143	5
6	M	15	22-Feb	Problems on Heat Effects		143-150	
	W	16	24-Feb	**Review of Chapters 1, 2, 3 and 4**		**125-150**	
	F	17	26-Feb	**Mid Term #1: Chapters 1, 2, 3 and 4**			6
7	M	18	29-Feb	Second Law of Thermodynamics and Heat Engines	**Chapter 5**	159-166	
	W	19	2-Mar	Entropy & Entropy for Ideal gases		167-173	
	F	20	4-Mar	Entropy Balances		176-180	7
8	M	21	7-Mar	Ideal and Lost Work		181-190	
	W	22	9-Mar	**Review of Chapter 5**		**159-190**	
	F	23	11-Mar	**Quizz #3 & Thermodynamic Properties of Fluids**	**Chapter 6**	199-201	8
Spring Break							
9	M	24	21-Mar	Property Relations		202-215	
	W	25	23-Mar	Residual Properties & Residual Properties by EOS		215-220	
	F	26	25-Mar	Two phase Systems & Thermodynamic Diagrams		220-230	9
10	M	27	28-Mar	Generalized property correlations for gases		230-240	
	W	28	30-Mar	**Review of Chapter 6**		**199-240**	
	F	29	1-Apr	**Quizz #4 & Applications of Thermodynamic processes**	**Chapter 7**	254-259	10
11	M	30	4-Apr	Duct Flow, Pipes and Nozzles		260-272	
	W	31	6-Apr	Turbines, Compressors and Ejectors		272-280	
	F	32	8-Apr	**Review of Chapter 7**		**254-280**	11
12	M	33	11-Apr	**Mid Term #2: Chapters 5, 6 and 7**	**Chapter 8**		
	W	34	13-Apr	Production of Power from Heat		296-302	
	F	35	15-Apr	Production of Power from Heat		302-312	12
13	M	36	18-Apr	Production of Power and Heat		302-312	
	W	37	20-Apr	**Review of Chapter 8**		**296-312**	
	F	38	22-Apr	Refrigeration and Liquifaction	**Chapter 9**		13
14	M	39	25-Apr	Refrigeration and Liquifaction			
	W	40	27-Apr	**Review of Chapter 9**			
	F	41	29-Apr	Review of Thermo I			
15	MWF	Finals		Final Exams (all chapters)			

Requirements for homework submission

1. Each submission should have a cover page with the following

Full name
Homework #
CHEG2111
Due date
Worked with: list of students (if applicable)

2. **Homework that is not stapled will not be graded**

3. Start every problem on a new piece of paper. Number your pages.

4. **Box in your final answer.**

5. Writing out your method will help with partial credit in the event that a math error is made.

6. For problems completed in Excel, select "**show formulas**." Print out and attach Excel spreadsheets, do not submit electronically. If you use Solver, identify constraints and variable cells.

7. Include all units, necessary steps, diagrams (if needed), and **be neat**.

8. Homework is designed to help understand concepts for quizzes and exams, and future CHEG courses. **There is no benefit to cheating or copying**.

9. If you have questions, come to office hours. We will try to answer emails in a timely manner, but at office hours you can get immediate feedback.