

**Instructors:** Professor Matthew W. Liberatore Professor Charles Vestal  
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**Office Hours:** TBA (see Blackboard for updates)

**Online Resource:** <http://blackboard.mines.edu>

**Educational Materials:** 1. Sapling Online Homework (\$34.99/student through <http://www.saplinglearning.com>);  
2. M.W. Liberatore "Fundamentals of Material and Energy Balances" Beta Version, Read Swipe Solve LLC, 2014. (\$9.99/student through <http://www.inkling.com>)

**Other Resources:** R.M. Felder and R.W. Rousseau "Elementary Principles of Chemical Processes," 3rd ed., Wiley, 2005. (ebook \$49.95; hard cover >\$150, any 3<sup>rd</sup> ed. is fine)

<http://learncheme.com>

<http://www.engr.sjsu.edu/~bioemb>

<http://catme.org>

**Co-requisites:** CBEN210, MATH213, MATH225, and CBEN202

**Core Objectives:** Upon completion of CBEN201, the successful student should be able to do the following:

1. Demonstrate professional behavior including being punctual and completing problems in a timely manner.
2. Demonstrate a mastery of "chemical engineering vocabulary."
3. Solve material balance problems for processes, which may contain chemical reactions, multiphase equilibria, recycle streams, and/or purge streams.
4. Solve multiphase problems including vapor-liquid systems using Raoult's law.
5. Sketch phase diagrams and process flow diagrams and label appropriate phase boundaries, streams, and process units.
6. Solve combined mass and energy balance problems for processes involving external heat and work in open and closed non-reacting steady-state and transient systems.
7. Solve combined mass and energy balance problems for reacting systems.
8. Calculate thermal properties such as the heat of reaction using heats of formation, phase change data, and heat capacity data.

**Class Attendance and Professional Behavior:** Walking in late and other inconsiderate behavior (e.g., inappropriate use of electronic devices) will not be tolerated; chronic disruptors will be disenrolled from the course. If you miss class, the instructors will not provide copies of notes, handouts, etc. If you miss something, you must get it from another student.

**Getting Help:** Every effort will be made to help you master the course material. Realize however, that if you come to see us outside of office hours or without a special appointment, we will likely be committed to some other activity. Please respect the fact that if our office doors are

closed or if we are meeting with another student or professor, we are not available for help. Also, note that we do not provide assistance with homework problems, etc. on the telephone.

**Grades:** Students must achieve at least a C- grade in this class in order to proceed to the CBEN junior level classes. Grades are weighted as follows:

Homework (paper), Online Homework (Sapling), Blackboard quizzes, YouTube Fridays, writing assignments, etc.	15
Quizzes	10
3 Midterms	45 (15 each)
Final	30
<b>Total</b>	<b>100</b>

Generally, an assignment of some kind will be due before every class period of the semester.

**Homework:** Homework will be posted on Blackboard each week and will be due approximately one week later before the start of class. Late homework will not be accepted. Solutions will be posted on Blackboard after the assignment is due.

**Online Homework:** Online Homework will be posted on the Sapling course site each week and will be due approximately one week later. Late online homework will not be accepted.

**Blackboard Quizzes:** Short quizzes will be posted on Blackboard each week. These questions will serve to keep the student current with the reading assignment. There will be no makeup Blackboard quizzes.

**Other assignments:** All other assignments will be posted to Blackboard with instructions about the assignment and due dates.

**Quizzes:** A short quiz will cover material discussed in the previous lectures and homework assignments. There will be no makeup quizzes (if you miss a quiz you will receive a zero – exceptions will **require** an excused absence as outlined in the Undergraduate Bulletin); however, at the end of the semester, we will "throw out" your lowest (one) quiz score. **You are expected to bring your calculator to every class;** Quiz times may be announced or unannounced.

**Examinations:** Exams will be closed book and notes and will be held in class. Any exceptions to taking the exam at this time will **require** an excused absence as outlined in the Undergraduate Bulletin. The final will cover all of the course material. One make up exam will be offered to students missing a midterm exam due to an excused absence. The make up exam will be cumulative (through the third exam) and is scheduled for 7am Friday April 25, 2014.

**Re-grade Policy:** If you feel your exam, quiz or other assignment has been incorrectly or unfairly graded, submit a request for a re-grade as follows – all requests must be submitted to your instructor in writing during the class period following the exam (e.g., exam returned on Wednesday, re-grade requests accepted on Friday). The re-grade will be based strictly on your written request.

**Class Ethics:** Unless otherwise instructed, all class work that receives a grade is to be done individually. An exception to this rule is homework and online homework, where working

together in small groups is a good opportunity for you to better understand the material. The use of solutions manuals or other online resources to assist in solving homework needs to receive proper citation or will be considered cheating (i.e., representing the work of others as your own). Cheating will not be tolerated in CBEN201 and all incidents will be handled according to the guidelines published in the CSM Undergraduate Bulletin. All students are expected to be familiar with these guidelines.

**Uncollected documents:** All course documents (homework, quizzes, etc.), with the exception of the final exam, will be recycled if not collected by one week following the final exam. Final exams will be held for six months and then recycled.

### Tentative Schedule (subject to change)

Date	Topic	Week	#	Notes
1/8/14	Syllabus, Intro, Ch 2	1	1	Photos
1/10/14		1	2	HW00
1/13/14		2	3	BBQ1
1/15/14		2	4	OHW1 and 2
1/17/14		2	5	HW1
1/20/14	Ch3	3	6	BBQ2
1/22/14		3	7	OHW3
1/24/14		3	8	HW2
1/27/14		4	9	BBQ3
1/29/14		4	10	OHW4
1/31/14	Ch4	4	11	HW3
2/3/14		5	12	BBQ4
2/5/14		5	13	OHW5
2/7/14		5	14	HW4
2/10/14		6	15	BBQ5
2/12/14	<b>Midterm</b>	6	16	
2/14/14		6	17	HW5
2/17/14	<b>Presidents' Day - No Class</b>	7		
2/19/14	Ch5	7	18	OHW6
2/21/14		7	19	HW6
2/24/14	Ch6	8	20	BBQ6
2/26/14		8	21	OHW7
2/28/14		8	22	HW7
3/3/14		9	23	BBQ7
3/5/14		9	24	OHW8
3/7/14		9	25	HW8
3/10/14	<b>Spring Break</b>			
3/12/14	<b>Spring Break</b>			
3/14/14	<b>Spring Break</b>			
3/17/14		10	26	BBQ8
3/19/14	<b>Midterm</b>	10	27	
3/21/14	Ch7	10	28	HW9
3/24/14		11	29	BBQ9, 3/29
3/26/14		11	30	OHW9
3/28/14		11		HW10
3/31/14		12	31	BBQ10
4/2/14		12	32	OHW10
4/4/14	<b>E-days - No Class</b>	12	33	
4/7/14	Ch8	13	34	BBQ11
4/9/14		13	35	OHW11
4/11/14		13	36	HW11
4/14/14		14	37	BBQ12
4/16/14	<b>Midterm</b>	14	38	
4/18/14		14	39	HW12
4/21/14	Ch9	15	40	BBQ13
4/23/14		15	41	OHW12
4/25/14		15	42	HW13, MakeUp Exam
4/28/14		16	43	BBQ14
4/30/14		16	44	OHW13