

# ChE 210

## Material and Energy Balances

**Text:** *Elementary Principles of Chemical Processes*, 3<sup>rd</sup> ed., 2005 Edition with Integrated Media and Study Tools, by Felder and Rousseau, Wiley, 3<sup>rd</sup> ed., 2000, ISBN: 0-471-68757-X

**Instructor:** Derrick K. Rollins  
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**Office Hours:** MWF 11:00-11:50

**Recitation:** TBA

**Grader** TBA

**Course Description:** This course will discuss the physical behavior of gases, liquids and solids. Material and energy balance equations will be introduced and applied to chemical engineering equipment and processes.

*The basic objective of this course is to teach you fundamental concepts and principles for applying material and energy balances to steady state and transient processes.*

**Goals:** Students will develop an understanding of the principles outlined above by achieving the following goals by the end of the semester:

1. You will develop an understanding about what chemical engineering is, what chemical engineers do, and whether or not this appeals to you.
2. You will be able to explain in your own words the meaning batch, semi-batch, continuous, transient and steady state in reference to types of processes.
3. You will be able to convert a quantity expressed in one set of units into its equivalent in any other dimensionally consistent units using conversion factor tables.
4. You will be able to formulate mass and energy balance equations for steady state and transient processes.
5. You will be able to solve mass and energy balance equations with many different types of information provided to you.

### Course Requirements:

1. Homework will be given on a weekly basis. You may choose to work with your classmates on homework assignments, but each student must hand in his or her own paper. Homework is due at the beginning of the period on its due date. It may be handed in late with prior permission with acceptable excuses.

2. Three exams will be given during the semester. Dates of the exams are noted on the course schedule and are five weeks apart. There will not be a final exam in this course. Instead, a final comprehensive problem will be assigned which you will work on in groups. This will be due at the time scheduled for the final exam.
3. The academic honesty policy of the university is a guideline for this course. Students are expected to follow this policy. Any student who violates this policy will be subject to disciplinary action, as specified in the ISU student handbook. Refer to the handbook for further information. (The handbook is available on the web at [http://www.public.iastate.edu/~deanstdt\\_info/handbook.html](http://www.public.iastate.edu/~deanstdt_info/handbook.html))

**Grading Scale:**

90-100	A
87-89	A-
83-86	B+
80-82	B
77-79	B-
73-76	C+
70-72	C
67-69	C-
63-66	D+
60-62	D
58-59	D-
Below 58	F

**Grading System:**

HW/CW	20%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Final Project	20%

**Additional Information:**

1. Any student with a disability is encouraged to speak with the instructor who will make every reasonable effort to accommodate their needs.
2. Solutions to homework problems will be posted on the course bulletin board after the due date. You are encouraged to attend homework help sessions or visit during office hours if you need assistance with homework assignments.
3. If at the end of the semester your grade is bordering between two of the points noted above, your homework grade will be the determining factor. (i.e., if you have a total homework grade of > 85%, you will be given the higher of the two grades. If < 85%, you will receive the lower of the two grades.)

## Tentative Course Outline

<u>Week of</u>	<u>Chapters</u>	<u>Notes:</u>
8/22	1, 2	
8/29	3	
9/5	4	No Class Monday (Labor Day)
9/12	4	
9/19	4	<b>Exam 1, Friday:</b> Chapters 1-4
9/26	5	
10/3	6	
10/10	6	
10/17	7	
10/24	7	<b>Exam 2, Friday:</b> Chapters 5-7
10/31	8	Final project assigned
11/7	8	
11/14	9	
11/21	***Thanksgiving Break***	
11/28	11	
12/5		<b>Exam 3, Monday:</b> Chapters 7-9, 11
12/15	***Final Exam Week***	<b>Final project due by 11:45 a.m.</b>