ECH 3023 Material & Energy Balances
Fall Semester 2014

Lecture: Tuesday & Thursday EDU 115 9:30-10:45AM

Instructor: Vinay K. Gupta vkgupta@eng.usf.edu 974-0851 ENC 3200
Office Hours TR 11:15AM-12Noon in ENC3200 W 12–2PM in ENC 3407

TA: Chris connersc@mail.usf.edu TR 3-5PM in ENC 3202

Descriptive Course Content: Introduction to basic calculations in chemical engineering involving material and energy balances, thermodynamic properties of pure substances, and chemical reactions. The course represents the foundation for subsequent courses in the program. Additionally, problem-solving methodologies will be emphasized including computational approaches and students will be exposed to realistic chemical engineering applications.

Grading Policy & Assessment: Course assessment will be as follows

- Homework 10% Random
- Quizzes 20% Random
- Test 1 10% 1 hour
- Test 2 15% 1 hour
- Other Formative Assessment 10% Random
- Final Exam 35% 2 hours

Rather than grading on a curve wherein students are screened in a competitive environment and their performance is evaluated relative to peers in the class, in this course a fixed scale will be used. The aim is to evaluate the extent of a student's mastery of topics and his/her ability to work consistently throughout the semester. Grades will be based on cumulative weighted performance as listed above. The following scheme will be used:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Cumulative Score</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>75% and above</td>
</tr>
<tr>
<td>B</td>
<td>60-74%</td>
</tr>
<tr>
<td>C</td>
<td>50-59%</td>
</tr>
<tr>
<td>C-</td>
<td>45-49%</td>
</tr>
<tr>
<td>D</td>
<td>35-44%</td>
</tr>
<tr>
<td>F</td>
<td>&lt;35%</td>
</tr>
</tbody>
</table>

☐ Scores near A/B or B/C boundaries may be eligible for +/- grades at the instructor’s discretion.
☐ For other special grades such as WC or I consult policies in the undergraduate catalog.

FYI: Departmental policy on undergraduate courses: Many courses required for the BS degree in chemical engineering have other pre-requisite courses. The pre-requisite courses must be completed with a grade of C- or better before students will be allowed to take a course. This applies to pre-requisite courses taken in other departments as well. This policy took effect for all courses taken starting Jan 01, 2009.

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Canvas, Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It’s the responsibility of the student to monitor Canvas site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.
Use of cell phones **IS NOT** permitted in the classroom. Please turn ringers to vibrate or silent.

Students are expected to have ethical behavior and professional decorum in the classroom. This expectation of professional behavior includes appearance, promptness, honesty, professional language, and consideration/respect of others in the classroom.

Please be in classroom within 5 minutes of the start time and do not leave until the class is over (Inform the instructor if special accommodation is required).

College of Engineering requires you to own a laptop. Bring it to class (ensure beforehand that it is charged). During the class, and especially in the lab session, do not use computers/laptops/tablets for web surfing, email, messaging or other activities that are not part of the classroom instruction.

Students must obtain advance written permission from the instructor for audio or video recording of a lecture or discussion with the instructor. Suitable reasons may include an accommodation for a disability.

While studying together is acceptable, the following behaviors are **NOT acceptable:** unauthorized granting or receiving of aid, cheating on exams, copying work/data from a resource without appropriate referencing, plagiarism, submitting the work of another person, and/or otherwise being dishonest. Copying from or reproducing from the solution manual of a textbook is considered dishonest. These behaviors will result in: 1) an FF grade in the overall course and 2) further disciplinary action by the University. Students need to read University policies on Academic Dishonesty and Plagiarism ([http://www.ugs.usf.edu/catalogs.htm](http://www.ugs.usf.edu/catalogs.htm))

Students are prohibited from selling notes to or being paid for taking notes by any person.

Students will be asked to leave the classroom if they do not follow the course policies.

**Special Accommodations**

- The student must identify herself/himself as a person with a disability to the instructor and provide a memorandum from the Office of Academic Support and Accommodations for Students with Disabilities (ASASD). **This needs to be done within the first week of classes.**

- The student is responsible for providing documentation of the disability to ASASD, and it typically takes 5 working days for ASASD to review it.

- Students who anticipate being absent from class due to religious observance should inform the instructor by the second class meeting (University Policy 10-045).

- To audit the course, a student must register using the appropriate form with the registrar.

**Attendance and re-grades**

- Students are expected to complete all homework/quiz/test/exams individually unless otherwise indicated on the assessment.
To be excused from an assessment on medical grounds, a medical certificate is required. Other extenuating circumstances due to a family emergency requires proper paperwork and the instructor should be notified, preferably 24 hrs before the due date of the assessment. Vacation trips or conference attendance are not considered extenuating.

Questions on grading of HWs have to be made to the TA within a week of the return of the HW. No questions will be entertained afterwards. If a TA cannot resolve the request, the instructor will review it.

Requests for re-grading quiz/tests should be made to the instructor within one class-period of the return of the corrected material or online posting of final grade for an online assessment. The request has to be in writing and explain clearly the reasons why a different grade is deserved. The complete assignment will be reviewed and re-graded.

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Fall Semester 2013 Course Policies II
Canvas (https://usflearn.instructure.com)

Course material and assessment will make heavy use of Canvas. Therefore, students must ensure that they know how to access the course website and are responsible for checking announcements and postings on the course website daily. Check at least in the morning and evening.

Homework

Homework will be assigned randomly and must be submitted by the deadline indicated.

Homework has to be submitted by each individual student through Canvas in a PDF format by the due date and time. Late homework will not be accepted.

HW can be handwritten and then scanned (USF Library has scanners next to the Learning Commons Workstations). It is the student’s responsibility to check the legibility of the pdf and ensure pages are in order before submission. In case of multiple files being uploaded, only the last one will be graded.

Each problem will be graded using a rubric for completeness and correctness. Comments on graded HW can be viewed using the preview function available on Canvas for your submission.

Homework solutions will not be posted. It is your responsibility to find out how to solve the problems by consulting the TA and the instructor.

Collaboration on HW: Students can work together to discuss problem solutions but should not share written material. Each student must write and then submit his/her own solution through Canvas. Blind copying of another person’s work is not permitted. Since your submission implicitly indicates that it is your own written solution, it might be prudent to indicate the names of students that have worked together on a cover sheet with the submission (a template is attached). The maximum number of names allowed on a cover sheet is 3 students.

HW Format

All homework problems, unless otherwise directed by the instructor, should follow the following format. This format is used for most professional engineering work. Failure to follow this format will result in your homework not being graded.

1) Complete cover sheet and all pages in submission with a header of page # and name.
2) **Calculations**: All homework calculations should:
   a) include at least one complete sample for every type of calculation presented
   b) include all units for dimensional quantity
   c) clearly indicate the solution (e.g., by boxing it in with a rectangle)

3) **Problem Essentials**: Problem solutions should include the following items:
   a) problem number listed at beginning of problem with a new problem starting on a new page
   b) labeled schematic and simplifying assumptions
   c) the solution of the problem including all required steps and calculations
   d) Any graphs or charts have to be plotted using a graphing software and complete with titles, axes labels, and legends.

4) **Computers**: For homework assignments done using software, clearly show written sample calculations (with units). For example, when using Excel spreadsheet calculation, do not just attach the spreadsheet but show the steps/formulae used with comments and explanation. One or more of the HW problems will show up in a quiz. **Therefore, students should ensure that they understand how to complete all the problems in the HW, especially if they work in a group.** Consult the instructor or TA on a regular basis to understand how to do the solve the problems.

**Other Formative Assessment**
These activities are another component for learning and assessment in the course and will be distributed randomly throughout the semester. This category includes work such as
(a) completion of surveys posted on Canvas or given in class
(b) group/individual problem solving activities in the classroom
(c) Self-study activities posted on Canvas that may include a short quiz

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**Course Outcomes and Objectives**

**Course Outcomes**: At the end of this course, students will -
- Be exposed to engineering methodologies for solving problems and the types of computational tools that can be used.
- Be able to perform material and energy balances on basic chemical process units and multi-unit processes that include physical and chemical transformations.
- Be able to use simple thermodynamic concepts such as equations of state, phase diagrams, property tables.
- Be able to access and apply scientific data that is available in tables, handbooks, charts.
- Be able to use software such as Microsoft Excel to solve chemical engineering problems.

**Course Objectives:**
- Students will develop a fundamental understanding of the basic principles of chemical engineering processes and calculations.
- Students will be able to examine and select pertinent data, and solve material and energy balance problems.
- Students will be able to select and/or evaluate problem solution methods, for
example, between analytic and numerical solution techniques.

- Students will be able to give examples of important applications of material and energy balances in chemical engineering processes.
- Students will be evaluate their own solutions, apply critical thinking, and correct errors.