North Carolina State University
Department of Chemical and Biomolecular Engineering

CHE 205: Chemical Process Principles – Fall 2016

Section 001 (Hsiao) TH 8:30 – 9:45AM, 1231 EB2
Section 002 (Bullard) MWF 8:30 – 9:20AM, 1011 EB1
Section 003 (Beisel) TH 10:15 – 11:30AM, 1007 EB1
Section 004 (Abolhasani) TH 8:30 – 9:45AM, 1010 EB1

Instructor (001): Dr. Lilian Hsiao (lilian_hsiao@ncsu.edu) 2088D EB1, (919) 515-8057
Office Hours: Monday and Wednesday, 1 – 2:30pm

Instructor (002): Dr. Lisa Bullard (lgbullar@ncsu.edu), 2012 EB1, (919) 515-7455
Office Hours: Monday and Wednesday, 10 – 11:30am

Instructor (003): Dr. Chase Beisel (cbeisel@ncsu.edu), 2026 EB1, (919) 513-2429
Office Hours: Tuesday and Thursday, 12-1:30pm

Instructor (004): Dr. Milad Abolhasani (mabolha@ncsu.edu), 2086A EB1, (919) 515-8935
Office Hours: Tuesday and Thursday, 3:30 – 5pm

Problem Sessions:

- Monday, 3:00 – 4:50pm, 1011 EB1 (Centennial campus) (2nd hour is office hours open to all)
- Tuesday, 1:55 – 3:45pm, 2211 Gardner (main campus) (2nd hour is office hours open to all)
- Wednesday, 1:55 – 3:45pm, 2010 Biltmore (main campus) (2nd hour is office hours open to all)

Teaching Assistants, Volunteer TA's, and Graders: (display of all office hours on the course web site)

	Role	E-mail	Office Hours	Problem session
Ishan Joshipura	Lead TA	idjoship@ncsu.edu	T and H, 11-noon	T (lead),W
Hannah Reese	TA	hrreese@ncsu.edu	T and H, 5-6 pm	M (lead), T
Ryan Dudek	TA	rbdudek@ncsu.edu	M 5-6 pm, W 4-5 pm	W (lead), M
Ethan Hicks	Lead Grader	echicks@ncsu.edu	N/A	N/A
Melissa Lieb	Grader	mmleib@ncsu.edu	N/A	N/A
Carrie Wright	Grader	cwright3@ncsu.edu	N/A	N/A

TA's and Graders: You can consult with any faculty member or TA regarding questions on the homework or course material. You can consult with graders on questions about the grading of a homework assignment or exam.

Course Text: R.M Felder, R.W. Rousseau, and L.G. Bullard, *Elementary Principles of Chemical Processes*, 4th Edition ($206.25 in hardcover, $183.75 binder-ready version (loose leaf) in the NCSU bookstore already bundled with the WileyPLUS code). We believe you'll decide that this is a book you want to have in your professional library, but if you decide to rent, you may decide to purchase it at the end of the semester. While the binder-ready version is cheaper, if you are a chemical engineer, you will likely want to have the hardcover version for use in future courses and in your career. This is the first semester in which this book will be used, so if you find a mistake, email it to lisa_bullard@ncsu.edu, and if you are the first person to find that mistake, she will give you $1! This applies to the on-line WileyPLUS content (reading questions, autogradable questions) as well.

C**oursepack:** course notes that will be sold during the first week of class by AIChE at a cost of $20. This is an essential part of the course. You should bring your coursepack to class every day.

Clickers: Clickers/on-line response will be an integral part of lecture and problem session, and thus are a required resource for this class. You can use the same Turning Tech NXT clicker that you used in PY 205 or other courses, or you may purchase a new clicker in the bookstore. (Note, the clicker can be sold to another student at the end of the semester if you don't anticipate using it again). The clicker costs approximately $50. Class and problem session attendance will be recorded using in-class clicker responses during lecture and problem session.

WileyPLUS: A portion of the homework problems will be completed on-line using WileyPLUS. This is included in your purchase of a new textbook from the NCSU bookstore or can be purchased separately. You must first register as a student in your particular section at www.WileyPLUS.com using the following course ID numbers:

Course ID = 524826 - Abolhasani section
Course ID = 524825 - Beisel section
Course ID = 524824 - Bullard section
Course ID = 524823 - Hsaio section

Here is a link to a video that walks students through signing up on WileyPLUS.com:
https://www.youtube.com/watch?v=wx_dOIc2Gr8

We encourage you to complete the **Practice Reading Questions** as a self-check for key concepts in the chapter (answers provided on-line) as well as the **Test Yourself** questions found in the textbook (answer provided in the back of the book). While these questions will not be assigned/required for a grade, *we will include one on each exam* so they are a good exercise for your exam review.

Course prerequisites: C or better in MA 241, PY 205, and C- or better in (CH 201 or CH 221) or the transfer equivalent. This requirement is strictly enforced. If you have questions, see Dr. Bullard.

Course purpose: CHE 205 prepares you to formulate and solve material and energy balances on chemical process systems and lays the foundation for subsequent courses in thermodynamics, unit operations, kinetics, and process dynamics and control. More fundamentally, it introduces the engineering approach to problem solving: breaking a process down into its components, establishing the relations between known and unknown process variables, assembling the information needed to solve for the unknowns, and finally obtaining the solution using appropriate computational methods.

Course Objectives: By the end of the course, you should be able to do the following things:

- **Basic engineering calculations.** Convert quantities from one set of units to another quickly and accurately; define, calculate, and estimate properties of process materials including fluid density, flow rate, chemical composition variables (mass and mole fractions, concentrations), fluid pressure, and temperature.
- **Material and energy balance calculations**. Draw and label process flowcharts from verbal process descriptions; carry out degree-of-freedom analyses; write and solve material and energy balance equations for single-unit and multiple-unit processes, processes with recycle and bypass, and reactive processes.
- **Applied physical chemistry**. Perform pressure-volume-temperature calculations for ideal and non-ideal gases. Perform vapor-liquid equilibrium calculations for systems containing one condensable component and for ideal multi-component solutions. Calculate internal energy and enthalpy changes for process fluids undergoing specified changes in temperature, pressure, phase, and chemical composition. Incorporate the results of these calculations into process material and energy calculations.
- **Computation**. Use spreadsheets (EXCEL) to solve material and energy balance problems.
- **Safety** - Evaluate potential safety hazards in processes, in particular, chemical processes.

POLICIES AND PROCEDURES

- **Classroom capture:** Please be advised that this course is being recorded for current and potential future educational purposes. By your continued participation in this recorded course, you are providing your permission to be recorded. Note that the recording is audio only and picked up by the instructor's microphone. The recorded class sessions will be available through Moodle for your viewing and review. *They are not a replacement for classroom attendance.*

- **Academic integrity.** Students should refer to the University policy on academic integrity found in the Code of Student Conduct (found at http://policies.ncsu.edu/policy/pol-11-35-01). It is the instructor's understanding and expectation that the student's signature on any test or assignment means that the student contributed to the assignment in question (if a group assignment) and that they neither gave nor received unauthorized aid. Authorized aid on an individual assignment includes discussing the interpretation of the problem statement, sharing ideas or approaches for solving the problem, and explaining concepts involved in the problem. Any other aid would be unauthorized and a violation of the academic integrity policy. Unauthorized aid additionally includes accessing

on-line solutions, whether that be posted copies of textbook problem solutions or paying someone to complete your homework. The course web site contains videos which specifically address what is, and is not, allowed in the context of CHE 205. In addition, a*ny computer work submitted must be completed on your own personal computer or from your own eos account to avoid confusion about the origin of the file, and no sharing of files in any way is allowed.*

The documents – both electronic and hard copies of lecture notes, lecture videos, homework assignments and solutions, exams and solutions, or handouts --made available to you for this course are intended only for your personal use. You are not allowed to share any content of the class with any person not signed up for the course this semester; a personal, public, or commercial website; or any other news or advertising media.

All cases of academic misconduct will be submitted to the Office of Student Conduct. Students found guilty of academic misconduct will be subject to, at a minimum, a zero on the assignment in question, up to a zero for that course component (e.g. a zero for the homework portion of the final grade), or a failing grade in the course, depending on the nature of the violation. In addition, if you are found guilty of academic misconduct in the course, you will be on academic integrity probation for the remainder of your years at NCSU, may be required to report your violation on future professional school applications, and could have further implications for ROTC positions and/or employment on campus, including University Housing. It's not worth it!

- **Homework.** Students will submit homework individually for the first few homework assignments. Midway through the semester, the instructors will designate teams of 3-4 individuals, and all subsequent assignments should be submitted by those teams unless otherwise specified. The assignment schedule will be posted on the course web site.

- **Homework format**:
  - Print and attach the cover sheet as the first page of each homework set.
  - Use green engineering paper (available in the Student Supply Store or office supply store)
  - Write on one side of each page (clear side, not grid side)
  - Begin each problem on a new page
  - Box all final numerical answers
  - Each completed assignment should be in one person's handwriting (the recorder's for group assignments)
  - The problems should be submitted in the same order as in the homework assignment
  - Staple all the pages with the cover sheet on top.
  - *If a student's name appears on a solution set, it certifies that he/she has participated in solving the problems.*
  - In order to encourage you to follow the instructions given above, standard point deductions (-5 per error above) will be assigned for not stapling, not starting problems on a new page, not boxing final numerical answers, etc.

- **Late homework**. Completed assignments should be turned in at the **beginning** of the class period. If you're in a group and it's your job to turn in the homework and you're late, so is the homework. Late assignments will receive a 20-point deduction. Late homework will be accepted no later than the Monday following the due date and should be given directly to the instructor at the beginning of class (Dr. Bullard's class) or put into the red metal box in the CBE lounge on Monday by 8:30am. *However, once an individual or a group hands in two late assignments, late homework will no longer be accepted.*

- **Posted solutions.** *Complete problem set solutions will not be posted, but the final numerical solution to each problem will be posted on Moodle.* It is your responsibility to make sure you find out how to solve the problems by asking about them in class, during office hours, or in the problem session after they have been handed in. You may also consult classmates to compare solutions after the graded homework has been returned.

- **Individual effort assessments for team homework**. Teams will periodically be asked to submit individual effort assessments with completed assignments. These assessments will be incorporated into the assignment of homework grades. *If repeated efforts to improve team functioning (including faculty intervention) fail, a non-participant may be fired by unanimous consent of the rest of the team, or a team member doing essentially all the work may quit*. (Details of the required procedures are given in the handout on team policies and expectations.) Individuals who quit or are fired must find a team unanimously willing to accept them; otherwise they will receive zeros for the remainder of the homework.

- **Exams**. There will be three exams during the semester and a comprehensive final exam. *All tests will be closed-book, closed-notes.* However, you are allowed to bring a "torpedo sheet," a piece of 8-1/2 x 11 paper with anything you want written or typed on both sides of the sheet. You could write formulas, example problems, or definitions—anything that will help on the exam. You are only allowed to use your own torpedo sheet, and the "torpedo" sheet must be stapled to the front of your completed exam prior to handing it in. Note that all required data will be provided as part of the exam. The lowest test grade will count half as much as each of the other two. Tests will be given as a common exam on scheduled Fridays from 3-5PM (see detailed course schedule for dates and locations). Students who know in advance that they are unable to take a test during the common time period (with a documented excuse by the Monday before the test — not just that you don't want to) will be offered an alternate time to take the exam.

- **Test and homework re-grades**. If you believe that an error was made in grading the homework or test, you should write a short justification of your claim and attach it to the original homework/test in question. Put the justification and homework/test (stapled together) in the red box in the CBE lounge. Put the name of the TA or instructor who graded the problem(s) in question (their initials should be written on the graded HW or test). The TA or one of the instructors will review your concern and respond to you as soon as possible. Typically the "re-grades" will be done during the next cycle of grading on Friday, so you should get a response by the following week. The "statute of limitations" for submitting such claims is one week after the homework/test is returned.

- **Missed tests**. If you miss a test without either a certified medical excuse or prior instructor approval, you may take a makeup test at a designated time during the last week of the semester. The makeup exam will be fair but comprehensive (covering all the course material) and challenging. Tests missed with certified medical excuses or prior instructor approval will be dealt with individually (see above "Exam" section). Only one missed test can be made up. *Note: if you show up to take a test, you must take the grade – you cannot decide mid-way through to walk out and take the makeup exam later.*

- **Problem session.** *All 205 students must be registered for one of the weekly problem sessions* (205P). Several computer applications will be taught during the problem sessions. 10% of your grade is based on participation, including problem session. Attendance is expected and is a major determinant of your problem session grade (this will be recorded via clicker, so bring your clicker to each problem session). You should not float between problem sessions; stay in the one in which you are registered. However, if it is necessary to miss a problem session, you may attend another session that week to make up the time as long as you notify your problem session TA and the TA of the problem session you're attending via email ahead of time so that your attendance can be properly recorded.

- **Laptop and cell phone use:** Although technology opens up new learning possibilities for students, sometimes students utilize it in ways that are inappropriate. Please refrain from texting, Facebook, instant messaging, e-mailing, surfing the Internet, playing games, etc. during class time since that distracts others and prevents your active participation in the class. Acceptable uses of laptops include taking notes as well as working on assigned in-class activities that require laptop use (most often this will be during problem session). It is easy for your laptop or cell phone to become a distraction to you and to those around you. Please put cell phones on silent when you are in the classroom. *Cell phones must be turned off and put away during exams*.

- **Attendance.** Students who miss class due to an excused absence should work with the instructor or problem session TA to make up any missed homework or tests. Documented medical excuses should be presented to the instructor. For a full statement of the university attendance policy, see the following link: *www.ncsu.edu/provost/academic_regulations/attend/reg.htm*. Examples of anticipated situations where a student would qualify for an excused absence are:
  - The student is away from campus representing an official university function, e.g., participating in a professional meeting, as part of a judging team, or athletic team. These students would typically be accompanied by a University faculty or staff member.
  - Required court attendance as certified by the Clerk of Court.
  - Religious observances as verified by Parents & Constituent Services (515-2441). For more information about a variety of religious observances, visit the Diversity Calendar.
  - Required military duty as certified by the student's commanding officer

- **Calculation of course grade.** A weighted average grade will be calculated as follows:
  - Exams (3) = 50%
  - Final examination = 30%
  - Homework = 10% (1% for each of the 10 homework sets)

- Participation (Autobiography, academic integrity reflection, problem session attendance, and in-class exercises/clicker responses) = 10%

Extra credit of up to 10 points on the lowest homework grade may be awarded for performance in problem session activities and/or a creative project. More detail will be provided during the semester.

The lowest exam grade counts half as much as the other two (lowest exam counts 10%, other two count 20%). ***The homework grades will only count if the average grade on class exams and the final exam is 60 or above—in other words, if you can't pass the individual tests, then you can't pass the course.***

Note: We do not curve grades in this course. It is theoretically possible for everyone in the class to get an A (or an F). Your performance depends only on how you do, not on how everyone else in the class does. It is therefore in your best interests to help your classmates, while acting within the bounds of the stated academic integrity policy.

Score	**>97**	**93-96**	**90–92**	**87 – 89**	**83 – 86**	**80 – 82**	**77 – 79**	**73-76**	**70 – 72**	**67 – 69**	**63 – 66**	**60 – 62**	**< 60**
Grade	**A+**	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**D-**	**F**

- **Taking the course for Honors credit:** If you would like to take the course for Honors credit (to meet the requirements of the University Honors Program or the University Scholars Program), please see your instructor to complete the honors contract paperwork. In order to receive Honors credit, you must complete a credible attempt at 8 of the 10 challenge problems included in each homework assignment.

- **Instructors' commitment**. You can expect your instructors to be courteous, punctual, well organized, and prepared for lecture and other class activities; to answer questions clearly and in a non-negative fashion; to be available during office hours or to notify you beforehand if they are unable to keep them; to provide a suitable guest lecturer when they are traveling; and to grade uniformly and consistently according to the posted guidelines.

- **Consulting with faculty**. We strongly encourage you to discuss academic or personal questions with any of the CHE 205 course instructors during their office hours or by email.

- **Students with disabilities.** North Carolina State is subject to the Department of Health, Education, and Welfare regulations implementing Section 504 of the Rehabilitation Act of 1973. Section 504 provides that: "No otherwise qualified handicapped individual in the United States…shall, solely by reason of his handicap be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." This regulation includes students with hearing, visual, motor, or learning disabilities and states that colleges and universities must make "reasonable adjustments" to ensure that academic requirements are not discriminatory. Modifications may require rescheduling classes from inaccessible to accessible buildings, providing access to auxiliary aids such as tape recorders, special lab equipment, or other services such as readers, note takers, or interpreters. It further requires that exams actually evaluate students' progress and achievement rather than reflect their impaired skills. This may require oral or taped tests, readers, scribes, separate testing rooms, or extension of time limits. *Students requiring testing accommodations must make arrangements with the DSO to take the exam; note that the DSO web site advises students to make reservations more than 3 days before the test date. We advise that students go ahead and make these reservations <u>at the beginning of the semester</u> since the test and exam dates are already fixed. The department does not have the facilities to accommodate special testing needs, which the DSO is set up to do.*

- **Supporting Fellow Students in Distress:** As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remains a safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you. When this is the case, I would encourage you to report this behavior to the NC State Students of Concern website: <u>http://studentsofconcern.ncsu.edu/</u>. Although you can report anonymously, it is preferred that you share your contact information so they can follow-up with you personally.

- **ClassEval:** Course and instructor evaluations: Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructors.

- Evaluation website: https://classeval.ncsu.edu
- Student help desk: classeval@ncsu.edu
- More information about ClassEval: http://www2.acs.ncsu.edu/UPA/classeval/index.htm
- Schedule: Online class evaluations will be available for students to complete during the last 2 weeks of fall and become unavailable before finals begin. A reminder will be posted on the class website.