

**ChEE 301B**  
**Chemical Engineering Lab II (aka Unit Ops Lab II)**  
**Spring 20XX**  
**University of Arizona**

**Instructor:** Dr. Adrianna Brush [adriannabrush@email.arizona.edu](mailto:adriannabrush@email.arizona.edu)  
Harshbarger 134B 520-626-5259  
Office Hours: Monday 1:30-2:30, and by appointment (schedule 24 hours in advance)

**Lab Coordinator:** Dr. Greg Ogden [gogden@email.arizona.edu](mailto:gogden@email.arizona.edu)  
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**TA's:** Distillation ----- [-----@email.arizona.edu](mailto:-----@email.arizona.edu)  
VLE, SSHT ----- [-----@email.arizona.edu](mailto:-----@email.arizona.edu)

**Course Website:** All content, assignments, and most communication will occur through the D2L website for Spring 20XX 301B course: <https://d2l.arizona.edu>

### Course Structure

This class consists of weekly Thursday lectures and three laboratory experiments that will be conducted by groups of 3 to 4 students. The lectures will start with concepts and equations relevant to the laboratory experiments, then will go into a combination of communication skills, industrial safety and group dynamics in work groups and organizations. The laboratory experiments will occur over a total of four weeks, broken into two sets of two weeks, possibly with a break in between. The distillation lab will take two consecutive lab periods, and the remaining two labs will each take one week, occurring consecutively. The details about the due dates for the reports can be found further down in the syllabus.

### Grading

- Distillation lab and long-form report 30%
- VLE lab and oral presentation to management 20%
- SSHT lab and executive memo 20%
- Team peer evaluations 10%
- Final Exam 15%
- Participation in Lecture 5%

The criteria for letter grades will be determined at the end of the semester. It will not be more stringent than the typical criteria of 90%+ for A, 80-89.99% for B, 70-79.99% for C, and 60-69.99% for D. I have high standards for my students (but also give lots of support), and will grade the reports accordingly. Do not expect a curve for individual assignments, however there may be an overall course “curve” when I determine the letter grade criteria.

## **Course Summary and Objectives**

In this course, the primary experience you will have is to work in a team to successfully execute a hands-on lab experiment, use chemical engineering concepts to answer a question or empirically verify a design or theoretical principle, and effectively communicate these results.

In this course, you are not really going to be learning any new theoretical concepts. Rather this is a practice and application course, applying the theoretical concepts you've already learned to a real-world situation. As a result, many of the skills you will further develop this semester are ones you may not be used to practicing. However, since this course is, in many ways, closer to what you will be experiencing in your future career paths, these are important skills for you to have, no matter what career path you take. These include:

- Safely following procedures and instructions to learn the basic operation of commonplace chemical engineering equipment and processes.
- Connecting the hands-on operation of the equipment to equation variables and concepts later used to analyze results.
- Analyzing raw data from the experiments using chemical engineering concepts to draw meaning conclusions.
- Effectively communicating your experiment and results in a variety of formats, both oral and written, and to a variety of audiences.
- Gaining experience using computational tools and engineering design software to model and evaluate chemical engineering unit operations
- Cooperating and collaborating with a group of peers to successfully accomplish all of the tasks laid out above
- To learn the history of industrial accidents, their impacts, and what human and technical errors contributed the occurrence of these accidents.

## **Lecture**

You must have Turning Point ResponseWare or a clicker in order to participate in the in-class exercises and feedback. These are valuable to you as a student for increasing your understanding in class, and for me as an instructor to gauge the understanding of the class. You will not be assessed on whether your responses are correct, just whether or not you participated in class that day. You can receive participation credit with an excused absence by watching the full Panopto of the class for that day, plus any additional exercises I may require. See "Absences" for further information.

Electronic devices are allowed during lecture only if they are being used for notes, looking up information relevant to the lecture, or otherwise assisting you with lecture. Studies have shown that multitasking doesn't actually exist, that it's very easy to be distracted by electronic devices and that it's very difficult to pay attention while distracted by devices. There are many tools and software out there that you can use to keep yourself from being distracted during class (like simply putting your phone in your backpack). I will call you out if you are using your devices for things not related to class, and reserve the right to give you a 0 for participation that day.

## Labs

The group assignments and the schedule for each lab group are posted on the D2L site. If you know you will have an excused absence occurring during your group's assigned lab or presentation periods, please let me know ASAP. Information about each lab and data sheets for recording data are also posted on the D2L site. All students should read this information prior to their lab session and bring printed copies of the lab instructions and data sheets to their lab session. Students should gather outside the cage in the basement of the Harshbarger building at the scheduled time (2pm) for their lab session. SSHT lab starts at 2:30pm.

**Spring Break** will be treated like a "pause button." Any reports that would be due during the break or is part of the two weeks for the distillation lab report time, will be due one week later.

The only "**homework**" you will have is in relation to the lab experiments. In addition to the final lab reports/presentation, you have a few more assignments:

- There is a General Laboratory Chemical Safety Training course that must be completed prior to your first lab session. This is accessed through D2L homepage > Self Registration > General Laboratory Chemical Safety Training. Most of you completed this during ChEE 301A in the fall. Failure to complete this training before your first lab session means you **will not be allowed to participate in the lab session, forcing you to take an unexcused absence for the lab period.**
- You will need to complete an online pre-quiz prior to each laboratory session. Any late submissions will **not** be accepted, and you will receive a 0 for the prequiz.
- For each lab, you will need to write your own 1 page summary of the procedure that you must bring with you to the lab period. Any late submissions will **not** be accepted and you will receive a 1 for the procedure grade.
- You will have an assignment where you must view a recording of your group's VLE presentation and critique it.

### **Behavior and attire for lab sessions:**

- What to wear to lab session: Long pants and closed toed shoes are required. In addition, you should have no exposed skin below your waist, **including ankles!** You will not be allowed in to your lab session without appropriate attire, and will be forced to take an unexcused absence from your lab period if so.
- Required PPE: Lab coats, safety glasses with side-shields, and hard hats (only if in the "pit") are required at all times during the lab. This equipment will be provided, but you may bring your own if it meets the required safety standards.
- Behavior in lab: You must act safely and professionally during lab, including following the written procedures and any instructions given to you by instructors or TA's. Failure to do this, especially if any behavior is unsafe, can result in reprimands, penalization of your grade, or ejection from the lab session which will result in an unexcused absence.
- **An unexcused absence for a lab session will result in an individual (i.e. not applied to the rest of the group) penalization of 50% of that lab's report grade for VLE and SSHT labs, or 25% for each lab session for the distillation lab. Being late to lab can result in a penalization up to that of an unexcused absence, depending on severity.**

## Lab Reports:

- Late policy for lab reports: The written reports for the distillation and SSHT labs will be **penalized by 10% for every 24-hour period it is late**. For example, a report 1 minute to 24 hours late will have 10% deducted from the score, 20% for 24 hours 1 minute to 48 hours, etc. The oral presentation cannot be late. Any student who has an unexcused absence for their oral presentation will be penalized 50% from the VLE report grade for that individual.
- Writing/presentation requirements, guides and rubrics for each of the reports/presentation are available on D2L.
- The distillation lab communication will be a long-form report, due by 11:59pm two weeks and one day after your second lab period (i.e. Wednesday or Thursday, depending on your lab day).
- The SSHT lab communication will be an executive memo, due by 11:59pm one week after the lab session (11:59pm on same day as you'll be doing the VLE experiment)
- The VLE lab communication will be an oral presentation to management. It will occur at 3pm one week after your VLE experiment to Dr. Adrianna Brush in CHEE 118B. All required supporting material is due at 11:59pm the night before your presentation.

## Peer Evaluations

Peer evaluations will occur late in the semester, after all of the group's assignments and reports have been turned in. They are to incentivize students to contribute equally to their group work, to offset possibly lower report scores due to unreliable group members, and to give you experience in giving and receiving constructive feedback.

Students will distribute a theoretical bonus to each member of the group (including themselves). The bonus distributions will be the main basis for each student's "Peer Evaluation" grade. The formula used to calculate a grade from this distribution will not be disclosed, and may be changed at the instructor's discretion. The instructor retains the right to assign any student any score they choose. These will only be invoked to correct a large disparity between how much a student thinks they contributed versus how much the rest of their team thinks they contributed. Any attempt to intentionally manipulate or game this feedback system could result in a 0%.

In addition, each student is required to give constructive feedback for each member and the group as a whole. Providing quality feedback will constitute a portion of the Peer Evaluation grade. Each student's feedback will be anonymized and given to them **verbatim**.

To give you an idea of how these evaluations will work, here are the two hypothetical scenarios:

1. If all members of a group contribute equally and provide good feedback, then each member of the group will receive 100% for the peer evaluation grade.
2. If one (or more) members of a group contributes less to the report, they will receive less than 100%. The member(s) of the group that pick up the slack can receive higher than 100% for their peer evaluation.

## **Final Exam**

The final exam will be on -----, ----- . It will be an individual assessment of the concepts used in the lab experiments, plus any additional topics covered in lecture.

## **Peer Behavior Policy**

In any job you take, especially one in engineering, being able to effectively work with others in a team is crucial to your success. Developing these skills is a crucial objective of this course, and much of your grade ultimately depends on your ability to cooperate and collaborate with your team members. You will be expected to respectfully work with all teammates and to be supportive of each other as you work through your team's projects. Harassment and behavior that is disrespectful, threatening, or discriminatory will **not** be tolerated. If you feel as if any of your team members or classmates has directed any of that behavior towards you or a fellow student, please contact Dr. Brush or the University resources listed in the policies below.

## **Threatening Behavior Policy**

The general policies against threatening behavior by students will be followed:

<http://policy.web.arizona.edu/education-and-student-affairs/threatening-behavior-students>

## **Nondiscriminatory and Anti-harassment Policy**

UA policies, including a list prohibited behaviors and resources for reporting, are here:

<http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

## **Academic Integrity Policy**

Plagiarism in any form, including copying the work of another student, will not be accepted.

The plagiarism policies within the Student Code of Academic Integrity will be strictly followed:

<https://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity>. Note that plagiarism policies also pertain to any student who allows another student to copy their work.

Some examples of plagiarism most relevant for this course include:

- Copying written text or diagrams without proper citation, especially if it's presented as original work.
- Copying equations from someone else or using their Excel (or other software) files perform calculations. The exception to this you may freely copy and collaborate with your group members for group assignments only (you may not copy from a group member or use their Excel files for prelabs or other individual assignments). The fine line: I encourage you to work with other students to understand how to use equations and to debug your calculations, but you must ultimately do all your own work.
- Clicking in for another person during lecture.

## **Absence Policy**

Please inform me of any excused absence as soon as you know it will occur. This is especially crucial for lab sessions, so that we can arrange accommodations in a timely manner, if possible.

Excused absences are defined as:

- A medical issue accompanied by a health care provider's note.
- Any sincerely held religious belief, observance or practice will be accommodated where reasonable: <http://policy.arizona.edu/human-resources/religious-accommodation-policy>
- Absences pre-approved by the UA Dean of Students (or Dean's designee).
- Absences may be excused on a case by case basis at the discretion of the instructor.

## **Accommodations for Students with Disabilities**

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

## **Course Prerequisites:**

You must have taken ChEE 303 prior to this course. ChEE 305 and ChEE 326 are co-requisites for this course. It is strongly recommended that you have taken ChEE 301A prior to this course. If you have not completed the co- or prerequisite courses, including 301A, you may be dropped from the course at the instructor's discretion.

## **Important Dates to Keep in Mind:**

All spring registration dates are available here for 20XX: <https://registrar.arizona.edu/dates-and-deadlines/>

**Changes to the Syllabus:** The information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advanced notice as deemed appropriate by the instructor.