ECHE 260 – Introduction to Chemical Systems
Case Western Reserve University, Fall 2024

Instructor: Dr. Christine Duval
Email: ced84@case.edu
Office: A.W. Smith Building – 147
Office Hours: TBD based on the when2meet poll results (respond by Wed. Aug 30 in HW 0)

Class Meeting Time: 2:15PM – 3:05PM
Class Meeting Place: A.W. Smith Building—329
Final Exam: December 18th 8AM – 11AM

Teaching Personnel:

Graduate Student TA, Shruti Krishna R.	Email:
(Undergraduate Student) TA	Email:
(Undergraduate Student) TA	Email:

TA Office: AW Smith 152 or 105
TA Office Hours: TBD based on the when2meet poll

Office Hours: There will be 4 office hours for this course (2 with Prof. Duval and 2 with TAs). The office hours scheduled will be determined based on the availability of the students (complete HW 0 on Canvas). Additional meetings can be requested with Prof. Duval or the TAs via email.

General Course Description: This course covers material and energy balances; conservation principles and the elementary laws of physical chemistry applied to chemical processes. The course will focus on developing skills in quantitative formulation and mathematical solutions of word problems.

Learning Outcomes:
Upon successful completion of this course students should be able to:

- Translate chemical engineering word problems into process flow diagrams
- Identify and apply the proper equations to solve mass balances around steady state, non-reactive and reactive chemical systems
- Derive energy balance equations for both closed and open systems with components that are nonreactive or reactive
- Use Excel to solve chemical engineering problems and present data in graphical form

Website: Course documents (notes, assignments, practice problems and solutions) will be posted to Canvas.

Recommended Textbook: Elementary Principles of Chemical Processes - 3rd Edition (2004) by Richard M. Felder and Ronald W. Rousseau. The main text is optional; however, students are required to have access to the appendices of the book.

Grading: HW = 20%; Material Balance Exam = 20%; Quizzes = 40%; Final exam = 20%. Grades will not be curved. The assessments are designed to be fair and reflect students' mastery of the content.

Dropped HW and dropped quiz: The lowest homework assignment and lowest quiz score will be dropped. This policy is meant to account for any unexpected illness or other reasons that students may miss an assessment. There will be no make-up homework or quizzes.

Homework Submission: All homework is due online via Canvas as a single file before 2:15PM (class time) on the day it is due. No late assignments will be accepted because solutions to homework assignments will be posted in Canvas immediately at the end of the class on the due date.

Regrade Requests: After 24 hours and within one week of receiving a graded assessment (homework, quiz, or exam) students may submit requests for a regrade. The 24-hour waiting period is to ensure students take sufficient time to review solutions or closely examine their assignment. Submissions to Canvas will include a written paragraph describing the perceived grading error. If a regrade is granted, then the entire assessment will be regraded. Total points may increase or decrease as a result.

Missed assignments, quizzes or midterms: Make-up assignments for missed homework, quizzes or exams will only be granted for students who have university approved excuses. Personal travel (for holidays, etc.) is not considered a university-approved excuse for missing a quiz or exam. University-approved circumstances must be reported and documented with the university. Students may ask their CWRU Navigators (4-year advisors) to alert their professors that they are missing class/quizzes/exams for a medical reason. After doing so, it is the student's responsibility to coordinate with the Prof. Duval to arrange an alternate evaluation.

Final Exam: The final exam is scheduled by the registrar during the university's week of final exams. Our scheduled exam time is December 18, 8AM – 11AM. Personal travel is not considered a university-approved excuse for missing the final exam. The final exam is administered in person in AW Smith 349.

Missed Final Exam: In the event of a missed final exam, students must follow the university policy (see here) and immediately contact their 4-year advisor. Decisions on whether the exam can be re-administered is at the discretion of the Undergraduate Dean of Students.

Academic Integrity Policy: All students in this course are expected to adhere to university standards of academic integrity. Cheating, plagiarism, misrepresentation, and other forms of academic dishonesty will not be tolerated. This includes, but is not limited to, consulting with another person during an exam, turning in written work that was prepared by someone other than you, making minor modifications to the work of someone else and turning it in as your own, or engaging in misrepresentation in seeking a postponement or extension. Ignorance will not be accepted as an excuse. If you are not sure whether something you plan to submit would be considered either cheating or plagiarism, it is your responsibility to ask for clarification. For complete information, please go to
http://bulletin.case.edu/undergraduatestudies/academicintegrity/

Disability Resources: ESS Disability Resources is committed to assisting all CWRU students with disabilities by creating opportunities to take full advantage of the University's educational, academic, and residential programs. For further information, please go to https://students.case.edu/academic/disability/

Semester Outline:
****Quiz and Exam dates are subject to change based on the progression of the class schedule.****

Unit 0: Syllabus and introduction to ECHE 260

Unit 1: Units, process variables and dimensional analysis

Unit 2: Fundamentals of material balances on non-reactive systems

Quiz: Units 1 & 2 (September 27)

Unit 3: Material balances on systems with chemical reactions

Unit 4: Equations of state and non-reactive gas-phase processes

Unit 5: Materials balances on systems with phase change

Quiz: Units 4 & 5 (October 30)

"Midterm": Units 1 - 5 (November 8)

Unit 6: Energy balances on non-reactive systems

Unit 7: Energy balances on reactive systems

Unit 8: Combined material and energy balances

Quiz: Units 6 & 7 (December 6)

Final Exam: Units 1 - 8 (December 18: 8AM – 11AM)