CHE 210: INTRODUCTION TO COMPUTING

University of Texas at Austin, McKetta Department of Chemical Engineering
Unique Number: 16995

Changes to the schedule and syllabus may be made at the instructor's discretion. Information posted on Announcements in Canvas supersedes that in this syllabus. It is your responsibility to read and note any changes in the Announcements.

Instructor:
Dr. Wennie Wang
Office: CPE 4.450
Office Hours: Mondays 10am – 11am (CPE 4.450), Wednesdays 10:15 –11:15 am (CPE 4.446)

Teaching Assistant:
Jing Lian Ng
jinglian@utexas.edu
Office hours: Tuesdays 3:30pm – 4:30pm (CPE 4.446), Wednesday 3:30 – 4:30pm (CPE 4.446)

Tutor:
Jijun Xiang
jijunxiang33@utexas.edu
Office Hours: TBD

Lectures:
MWF 9 – 10 AM
CPE 2.216

Please be punctual (lectures start at 9 AM PROMPTLY). Lectures will typically consist of completing note handouts or working through example problems. Most Fridays will be used as an "Excel and Computational Clinic" with in class, hands-on examples. You will need your personal laptop for these sessions. Recorded lectures will be available upon request. Written notes will also be uploaded to Canvas.

Course Goals and Overview:

Overall, this course will introduce the principles and calculation techniques used in the field of chemical engineering. By providing specific examples, this course will also introduce the various areas and facets of current chemical engineering research. An emphasis of this course is setting up problems and defining spreadsheet-based calculations for problem solving. Specific course goals are the following:

- Provide you with the fundamentals of material balances as applied to chemical engineering to enable the analysis of a chemical process.
  - *Specific Emphasis:* development of familiarity with process flow diagrams
  - *Specific Emphasis:* introduction to setting up mathematical relationships for chemical engineering problems
  - *Specific Emphasis:* introduction to use of software and linear algebra in solving mathematical calculations for chemical engineering problems
- Provide you with a basic foundation for computing and calculation techniques to solve problems
  - *Specific Emphasis:* knowledge of computing for solving systems of equations
- Offer practice in defining engineering problems and analyzing data.
- Help you decide if you have chosen the right field.

Student Outcomes

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Specific Knowledge, Abilities, and Skills Students Should Gain From this Course:

- Ability to construct basic excel spreadsheets for manipulating, plotting, and fitting data
- Familiarity with excel Solver module and built-in functions (i.e. Solver and Linear Regressions)
- Understanding extrapolation
- Intuition about guesstimation and orders of magnitude
- Exposure to process flow sheets
- Exposure to systems analysis and concepts of unit operations
- Exposure to concepts of computing, including scientific computing and AI
- Ability to convert between different sets of units
- Ability to define steady state and distinguish between open and closed systems
- Ability to solve material balances for systems with or without a chemical reaction;
- Ability to apply spreadsheet calculations to mass balance problems
- Exposure to library and reference data sources
- Ability to work in groups

Course Prerequisites:

- Chemical Engineering Major
- Chemistry (stoichiometry, concept of mole, molecular weight, concentration, molarity, molality, etc.; enthalpy of reaction, ideal gas law, pressure, absolute temperature) – High School Chemistry

Course Textbooks:

Course material is primarily derived from two textbooks. You are not required to purchase these textbooks, but they may have example problems and additional discussions that you may find helpful. Electronic versions are also available.

- Felder & Rousseau (3dr or 4th edition) *Elementary Principles of Chemical Processes*
- Ronald W. Larsen (5th Edition), *Engineering with Excel*. Person, 2017.

Generative AI use in this course:

Generative AI use shall be permitted on a partial basis. In this course, you will be exposed to various forms of computing software relevant to chemical engineering applications, including the use of generative AI (especially Large Language Models or LLMs, for example ChatGPT) and Excel. A large emphasis in this course is for you to develop a physical intuition for processes in chemical engineering and learn how to leverage computation as a tool for solving complex problems. To support this goal, some portions of homework assignments will explicitly allow for use of AI. Outside of in-class examples and assignments permitting AI use, the use of generative AI is permitted with prior approval, EXCEPT for exams and quizzes where the use of generative AI is not allowed.

Responsible use of AI requires awareness of its limitations and of relevant university policies including transparent disclosure of its use, verification of its output, and protection of data privacy. We will discuss some of these limitations in class, but the university resources linked below provide more detail.

You are highly encouraged to take the time to understand and critically evaluate the output of AI. For example, large language models (LLMs) such as ChatGPT, Gemini, and Claude are known to not always produce reliable or truthful statements, so it would behoove you to not become overly reliant on AI and

develop a healthy skepticism towards it. Any work submitted must reflect your individual effort and understanding and must include one of the disclosure statements below. We will also provide guidelines for appropriate citation of AI usage.

AI disclosure statement
I used [AI tool] to [describe specific use - for example, brainstorm ideas, revise language, generate code, or provide feedback]. I reviewed and verified all technical information, calculations, and references provided by the tool and remain responsible for the accuracy and integrity of my work.

OR

I did not use AI tools in this assignment. This submission reflects my personal effort, and I remain responsible for the accuracy and integrity of my work.

Links

UT guidance for acceptable use of AI	https://security.utexas.edu/ai-tools
UT framework for responsible adoption of AI	https://provost.utexas.edu/the-office/academic-affairs/office-of-academic-technology/responsible-adoption-of-ai-tools/
Limitations for Generative AI in learning	https://provost.utexas.edu/the-office/academic-affairs/office-of-academic-technology/limitations/
Available AI tools and services with your UT EID	https://utexas.sharepoint.com/sites/AIStudio/SitePages/AI-Tools-and-Services.aspx

Additional Resource Requirements:
You are required to have a laptop computer with Microsoft Office as per latest UT Engineering standards http://che.utexas.edu/current-students/undergraduate-students/undergraduate-office/laptop-requirements/

The UT Instapoll app will be used for in class participation questions. You will need an electronic device (phone, laptop, iPad) with access to Canvas to complete these questions.

Course Website:
A course page will be maintained on Canvas—Please check it regularly!

Impact on Subsequent Courses in Curriculum:
Virtually every subsequent ChE course requires material balance concepts as well as computational skills.

Grading

Course Grades will be based on the following grading scheme:

Grade Scheme	
Participation	5%
Project	10%
Quizzes (best 9 of 10)	25%
Exams (best 2 of 3)	60%

The following grade cutoffs will be used: A = >93; A– = 90-93; B+ = 87-90; B = 83-87; B– = 80-83; C+ = 77-80; C = 73-77; C– = 70-73; D = <70; F = <60. Grades will be curved as necessary and plus/minus grading will be used in this course.

Participation: Attending class, asking questions, attending office hours, etc. is highly encouraged. Class participation will be facilitated using very short (< 3 min) quizzes administered using **UT Instapoll**, which can be accessed through Canvas. At the end of the semester, some of these Instapoll quizzes will be dropped from your participation grade.

Homework: Homework will be assigned weekly via Canvas. Homeworks will not be collected for a grade, but a quiz containing problems similar to one or two questions from the homework will be given the following Thursday. To encourage you to attend office hours and work through the homework on your own or in teams, solutions to the homework will not be provided until after the quiz.

Quizzes: Quizzes will be administered remotely through **Gradescope** and therefore will require scanning and uploading written solutions. Quizzes will have a time limit (usually 45-60 min) and can be taken anytime within an ~12 hour window. For example, you can start the quiz at 10 pm and turn it in by 10:45 pm or start it at 7:30 pm and turn it in by 8:15 pm. You are strongly recommended to work in small groups to complete the homework, but quizzes must be completed individually. Your lowest quiz grade will be dropped.

Exams: Two exams are scheduled on **October 14, 2026,** and on **December 2, 2026. There will be no make-up exams offered! Exams will take place in-person from 6-8 pm CST**. Please double check for potential conflicts with exams in other classes and let the instructor know as soon as possible. Optional review sessions (outside of class time) may be held before each of the exams and will be announced through Canvas. The final exam for this course is optional and has been set by the registrar's office - **Monday, December 14, from 10:30 AM – 12:30 PM**. The location of the final exam will be announced the last week of class. If you choose to take the Final Exam, the best 2 out of 3 Exam scores will count toward your final grade.

Project: The project is due **November 20, 2026,** and should consist of a process flow diagram and associated description for a complex, real-world process. Please work in a group of 4 students and select your topic from a predetermined list distributed by the instructor. The process for your project must be approved by the instructor in writing (email is fine). If you decide to change your process, the new topic must also be approved. Potential processes to describe are: "N95 Mask Production", "COVID-19 Vaccine

Production", "Local NH_3 (ammonia) Production", "Photovoltaic Production", "Polyethylene Production". Your final project should consist of the following:

- A detailed process flow diagram describing your chosen process (drawn electronically). This should be prepared in Powerpoint or another computer program. All streams should be numbered and stream compositions provided as best as possible. Unit operations should also be clearly labeled. You will likely need to research your process to complete this diagram.
- A written description of your process. This should be 3-4 pages in length and should include assumptions, limitations, and potential improvements to your process flow diagram.
- Mass balance calculations for one of the units in your process with at least 3 streams or components (in other words, a non-trivial balance). You may make educated assumptions as needed to come up with reasonable numbers, as long as they are justified in the written description.
- A paragraph-length description of the contribution of each member in your group. Note that team members may receive different grades if it is clear that the workload was unequal.
- A description of changes made as a result of peer-review and discussions with the TA/instructor.

There will be several smaller, project-related assignments throughout the semester to help you make progress and give you feedback. These are summarized below:

Assignment	Description	Due Date
Topic Selection	One paragraph written description justifying topic selection and listing team members	9/11/26
PFD Draft	Rough draft of process flow diagram	10/9/26
Rough Draft	Rough Draft of Project including process flow diagram, written description, and references	11/6/26
Peer-Review	Provide feedback on projects from other teams	11/13/26
Final Project		11/20/26

Regrade Requests: You have one week after a quiz is returned to you to request a re-grade. Re-grading requests should be submitted in writing via email or Gradescope and should consist of a few sentences that describe your rationale for why a re-grade is necessary. Nothing is to be marked on the original assignment or else the re-grade request will be automatically voided.

Late Work: Assignments must be turned in by the assigned due date. Late work will have 20% deducted for every 24 hours past the original due date. Assignments turned in more than 48 hours past the original due date will not be accepted.

Absence: No excuses for missed exams, or quizzes will be accepted other than written certified medical excuses or written letters on university letterhead for UT-related school activities. By UT Austin policy, you must notify the instructors of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Course Policies

Please include the instructor and TA in all course-related correspondence.

Academic Integrity:

The University has a strict policy on academic integrity. Any form of plagiarism or academic dishonesty will NOT be tolerated in ChE 210. If you have any questions, please consult the websites below:

https://deanofstudents.utexas.edu/conduct/index.php

In particular, students are obliged to follow the Student Honor Code that states "As a student of The University of Texas at Austin, I shall abide by the core values of the University and uphold academic integrity."

Failure to comply with the University's policy will result in a "zero" on the assignment and an "F" for CHE 210.

Q Drop Policy

If you want to drop a class after the 12th class day, you'll need to execute a Q drop before the Q-drop deadline, which typically occurs near the middle of the semester. Under Texas law, you are only allowed six Q drops while you are in college at any public Texas institution. For more information, see: https://onestop.utexas.edu/registration-and-degree-planning/registering-for-classes/add-drop-a-course/academic-q-drops/

Office hours:

Office hours are open-door policy, meaning you are welcome to discuss topics including and beyond the course material (e.g., career advice, doing research). Please come by! Office hours may be in-person or remote, as announced on Canvas.

Sharing of Course Materials is Prohibited:

No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have the instructors explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.

Classroom Recording

HOP 2-9970 prohibits students from recording class instruction (audio or video) unless a student obtains the instructor's permission or Disability & Access has approved audio recording as an accommodation.

Instructor-provided class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

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.

Emergency Preparedness and Emergency Plan Instructions

Please take note of all emergency exits, exit procedures, and University Emergency Communications Policies for the lecture and recitation buildings. Students requiring assistance in evacuation should inform the Professor of the course in writing of their needs during the first week of class so that this information is properly transmitted to the Fire Prevention Services office. In the case of a COVID-19 outbreak, the course will transition to a completely remote format for at least 10 days.

Americans with Disabilities Act & Accommodations

The University of Texas at Austin is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at https://sites.utexas.edu/disability/disability-resources/. For exams, you must have authorized documentation on file to use the Campus Testing Center.

If you are already registered with SSD, please discuss with and/or deliver your Accommodation Letter to the instructor at the start of the semester your accommodations and needs in this course.

Counseling and Mental Health Center (CMHC)

If you or anyone you know is experiencing symptoms of stress, anxiety, depression, academic concerns, loneliness, difficulty sleeping, or any other concern impacting your well-being – you are strongly encouraged to connect with CMHC. The Counseling and Mental Health Center provides a wide variety of mental health services to all UT students including crisis services, counseling services with immediate support and well-being resources. Additionally, CARE Counselors are located within the academic schools and colleges. These counselors get to know the concerns that are unique to their college's students. For more information on CMHC, visit https://cmhc.utexas.edu or call 512-471-3515.

Behavioral concerns

If you have concerns about the safety or behavior of fellow students, TAs or professors, contact BCCAL (the Behavior Concerns and COVID-19 Advice Line) at https://safety.utexas.edu/behavior-concerns-advice-line or by calling 512-232-5050. Confidentiality will be maintained as much as possible, however the university may be required to release some information to appropriate parties.

Title IX Reporting

Title IX is a federal law that protects against sex and gender-based discrimination, sexual harassment, sexual assault, sexual misconduct, dating/domestic violence and stalking at federally funded educational institutions. UT Austin is committed to fostering a learning and working environment free from discrimination in all its forms. When sexual misconduct occurs in our community, the university can: 1.Intervene to prevent harmful behavior from continuing or escalating.2.Provide support and remedies to students and employees who have experienced harm or have become involved in a Title IX investigation. 3.Investigate and discipline violations of the university's relevant policies(https://titleix.utexas.edu/relevant-polices/).Beginning January 1, 2020, Texas Senate Bill 212 requires all employees of Texas universities, including faculty, report any information to the Title IX Office regarding sexual harassment, sexual assault, dating violence and stalking that is disclosed to them. Texas law requires that all employees who witness or receive any information of this type (including, but not limited to, writing assignments, class discussions, or one-on-one conversations) must be reported. I am a Responsible Employee and must report any Title IX related incidents that are disclosed in writing, discussion, or one-on-one. Before talking with me, or with any faculty or staff member about a Title IX related incident, be sure to ask whether they are a responsible employee. If you would like to speak with someone who can provide support or remedies without making an official report to the university, please email advocate@austin.utexas.edu. For more information about reporting options and resources, visit http://www.titleix.utexas.edu/, contact the Title IX Office via email at titleix@austin.utexas.edu, or call 512-471-0419.

Although graduate teaching and research assistants are not subject to Texas Senate Bill 212, they are still mandatory reporters under Federal Title IX laws and are required to report a wide range of behaviors we refer to as sexual misconduct, including the types of sexual misconduct covered under Texas Senate Bill 212. The Title IX office has developed supportive ways to respond to a survivor and compiled campus resources to support survivors.

Personal Pronouns

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name, unless they have added a "preferred name" with the Gender and Sexuality Center (http://diversity.utexas.edu/genderandsexuality/publications-and-resources/). I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the gender pronouns you use (she/he/they/ze, etc). Please advise me of any changes early in the semester so that I may make appropriate updates to my records.

Approximate Course Outline (subject to change)

Week	Day	Date	Lecture/Excel Clinic	Assignments
1	M	8/24	Course Intro Presentation and Syllabus Overview	
	W	8/26	Lecture 1: Review of Units and Dimensions	Homework 1 Assigned
	F	8/28	Excel Clinic 1: Excel Basics, Functions, etc.	
2	M	8/31	Lecture 2: Guesstimation + Interpolation/Extrapolation	
	W	9/2	Lecture 3: Guesstimation Example Problems	
	R	9/3		Quiz 1, Homework 2 Assigned
	F	9/4	Excel Clinic 2: Conversions	
3	M	9/7	Labor Day (no class)	
	W	9/9	Lecture 4: Everything is a Process	
	R	9/10		Quiz 2, Homework 3 Assigned
	F	9/11	Excel Clinic 3: Advanced Conversions	Project Topic Selection & Groups due
4	M	9/14	Lecture 5A: Reading Process Flow Diagrams	
	W	9/16	Lecture 5B: Reading Process Flow Diagrams	
	R	9/17		Quiz 3, Homework 4 Assigned
	F	9/18	Excel Clinic 4: Linearization of equations and Interpolation/Extrapolation	
5	M	9/21	Lecture 6A: Drawing Process Flow Diagrams	
	W	9/23	Lecture 6B: Process Flow Diagram Problems	
	R	9/24		Quiz 4, Homework 5 Assigned
	F	9/25	Excel Clinic 5: More Linearization	
6	M	9/28	Lecture 7A: Process Flow Variables	
	W	9/30	Lecture 7B: Process Flow Variables (wet v dry basis)	
	R	10/1		Quiz 5, Homework 6 Assigned

	F	10/2	Lecture 8: Process Flow Variable Problems	
7	M	10/5	Lecture 9A: Intro to Material Balances	
	W	10/7	Lecture 9B Intro to Material Balances	
	R	10/8		Quiz 6
	F	10/9	Lecture 10A: Material Balance Example Problems	PFD Draft Due
8	M	10/12	EXAM 1 Review	
	W	10/14	**EXAM 1 (NO CLASS)**	
	F	10/16	Excel Clinic 6: Linear Algebra Review	
9	M	10/19	Lecture 10B: Material Balance Example Problems	
	W	10/21	Lecture 11A: Introduction to Atomic Balances	Homework 7 Assigned
	F	10/23	Excel Clinic 7: Matrix Operations in Excel	
10	M	10/26	Lecture 11B: Atomic Balance practice	
	W	10/28	Lecture 12A: Atomic Balance Examples	
	R	10/29		Quiz 7, Homework 8 Assigned
	F	10/30	Excel Clinic 8: Introduction to Solver	
11	M	11/2	Lecture 12B: Atomic Balance Examples	
	W	11/4	Lecture 13: Comparing Solver and Matrix Solutions	
	R	11/5		Quiz 8, Homework 9 Assigned
	F	11/6	Excel Clinic 9: More Solver	Project Rough Draft due
12	M	11/9	Lecture 14: Single Unit Systems and Solver	
	W	11/11	Lecture 15A: Intro to Multi-Unit Systems	
	R	11/12		Quiz 9, Homework 10 Assigned
	F	11/13	Project Peer Review	Peer Review Rubrics due
13	M	11/16	Lecture 15B: Intro to Multi-Unit Systems	
	W	11/18	Lecture 15C: Multi unit, multi reaction examples	
	R	11/19		Quiz 10
	F	11/20	Excel Clinic 10: Multi-unit problems & Solver	Final Projects due
14	M	11/23	Fall break/Thanksgiving (no class)	
	W	11/25		
	F	11/27		

15	M	11/30	Exam 2 Review	
	W	12/2	**Exam 2 (NO CLASS)**	
	F	12/4	Final exam review	
16	M	12/7	Course Wrap Up, Exam 2 Discussion	
	Mon	12/14	**FINAL EXAM (OPTIONAL), 10:30 AM – 12:30 PM**	