

## CHBE 2100 Syllabus

Chemical Process Principles, Section A, 3 credit hours

Fall 2026

### Instructor Information

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**Instructor:** Solomon Oyakhire

### General Course Information

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#### Description

Material and energy balances for single-phase and multiphase process common to chemical engineering. Phase equilibrium and analysis of reacting systems.

#### Course Learning Outcomes

By the end of this course, a student should be able to:

- 1) Identify and understand the unit operations involved in a process, draw flowcharts, and develop relationships between process variables.
- 2) Perform simple degree-of-freedom analysis to identify the number of unknowns relating to mass, mass flow rate, composition and energy, and develop the linearly independent mass and energy balances needed to determine unknown quantities.
- 3) Solve for the unknown variables using fundamental laws, empirical relationships, and available data.
- 4) Write simple phase equilibrium relationships (e.g. Raoult's and Henry's Laws) and use phase diagrams.
- 5) Extract data for pure compounds and mixtures from tables, charts, graphs, or phase diagrams and estimate these through theoretical or empirical equations.
- 6) Apply ideal gas rule and equations of state for real gases.
- 7) Use solubility data, miscibility charts, and phase relationships to calculate equilibrium composition of multiphase multi-component systems.
- 8) Apply the First Law of Thermodynamics to perform energy balances on steady-state non-reactive and reactive processes.
- 9) Determine enthalpy and internal energy changes associated with changes in

temperature, pressure, mixing, phase change, and chemical reaction from appropriate heat capacities, heats of solution, latent heats, and heats of formation or combustion.

- 10) Solve materials and energy balances simultaneously on chemical process systems.
- 11) Extract thermodynamic information from Steam Tables.
- 12) Illustrate application of mass and energy balances to biological system.

### **Required Course Materials**

Elementary Principles of Chemical Processes; Felder, Rousseau and Bullard; 4th ed.; John Wiley & Sons; 2016.

### **Grading Policy:**

In this course the following graded assessments and assignments are used to determine the course grade:

<b>Homework</b>	20%
<b>Exam 1</b>	15%
<b>Exam 2</b>	15%
<b>Exam 3</b>	15%
<b>Final Exam</b>	35%

The letter grade cutoffs in this class are 90%+ for A, 80%+ for B, 70%+ for C, 60%+ for D, for your overall score based on the relative weights above. These cutoff points may be lowered (resulting in a higher grade for some students) but will never be increased.

## **Course Policies**

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### **Attendance and/or Participation**

Your academic success will depend strongly on the level of engagement with the course material. Actively participating in all lectures and taking advantage of other learning opportunities offered (e.g. assignments, office hours) is critical for successful attainment of the learning outcomes. The Georgia Tech Catalog describes policies around “approved Institute activities” (e.g., field trips and athletic events) and accommodations around religious observances.

### **Academic Integrity**

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review [Georgia Tech’s Honor Code](#) and the student [Code of Conduct](#).

Cases of suspected cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

### **Core IMPACTS**

Not applicable for this course.

### **Accommodations for Students with Disabilities**

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

### **Student-Faculty Expectations Agreement**

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.