

## CHBE 3215 Syllabus

Heat and Mass Transfer (4 CH)

Summer 2026, CHBE 3215

### Instructor Information

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**Instructor:** Victor Breedveld

### General Course Information

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#### Description

Fundamental principles and applications of heat and mass transfer. The analysis of chemical engineering processes and operations involving heat and mass transfer.

#### Course Learning Outcomes

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

- 1) Apply Fourier's law of heat conduction to homogeneous and heterogeneous objects of various geometries, using analytical and numerical methods.
- 2) Estimate temperature profiles and heat transfer rates inside/from/to objects such as tanks, pipes and buildings for steady-state and transient conductive heat transfer.
- 3) Apply principles of radiative heat transfer to engineering problems.
- 4) Determine concentration profiles and mass transfer rates using Fick's law for diffusive mass transfer at steady state and in transient processes, using analytical and numerical methods.
- 5) Understand the theoretical basis of convective heat and mass transfer, and to use the analogies between momentum, heat, and mass transfer to interrelate rate constants.
- 6) Analyze situations involving convective heat and mass transfer through natural and forced convection (internal and external flow).
- 7) Analyze (incl. through numerical methods) systems that involve multiple individual heat and/or mass transfer processes to obtain overall transfer coefficients and apply these in a

variety of design applications, including heat exchangers and multi-phase mass transfer processes.

### **Required Course Materials**

Fundamentals of Momentum, Heat and Mass Transfer, 7th edition, J.R. Welty, G.L. Rorrer and D.G. Foster, John Wiley & Sons Inc. (2019).

### **Grading Policy:**

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

Homework	10%
Group quizzes	7.5%
Superquizzes	15%
Midterm Exam	25%
Project	7.5%
Final Exam	35%

The letter grade cutoffs in this class are 90%+ for A, 80%+ for B, 70%+ for C, 60%+ for D, based on the 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 (homework, office hours, etc.) 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](#).

Any student suspected of 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.