CHBE 6500 Syllabus

Mathematical Modeling – Chemical Processes, Section A, 4 credit hours

Fall 2026

Instructor Information

Instructor: Anant Paravastu

General Course Information

Description

Formulation and solution of mathematical models of a range of chemical processes with an emphasis on differential balances and incorporation of uncertainty.

Course Learning Outcomes

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

1) Formulate a chemical engineering problem as a mathematical model and select an appropriate solution method to solve the problem.

2) Assess the accuracy of a numerical solution method and identify alternate strategies and methods to achieve greater accuracy when it is needed.

3) Identify the computational requirements of various solution options.

4) Justify the selection of a given solution approach for a given problem.

5) Construct MATLAB code to represent the mathematical model of a chemical process, implement basic numerical solution approaches, and use built-in advanced numerical solution approaches.

6) Identify and explain relationships between different classes of mathematical modeling problems.

7) Apply these techniques to problems encountered in chemical engineering research settings.

Required Course Materials

Beers KJ. *Numerical Methods for Chemical Engineering*, Cambridge University Press, 2007.

Grading Policy:

In this course the following graded assessments and assignments are used to determine the course grade:
Letter grades for this course will correspond to the following general guidelines:
Students receiving A grades will have demonstrated, *by the end of the semester*, understanding and exceptional ability in every topic covered in this course.
Students receiving B grades will have demonstrated understanding of every topic covered in the course.
Students receiving C grades or lower will have exhibited deficiencies in an unacceptable portion of the topics covered in this course.

At the end of the semester, Dr. Paravastu will first calculate an overall weighted score using the following weights for the different components of this course:
Exam 1: 5%
Exam 2: 15%
Exam 3: 15%
Project: 15%
Homework: 15%
Quizzes: 10%
Final Exam: 25%

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

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.