

ME6105 Syllabus

Modeling and Simulation in Design, Section A, 3 Credits

Fall 2026

Instructor Information

Instructor: Seung-Kyum Choi

Email: schoi@me.gatech.edu

General Course Information

Description

Modeling and simulation concepts, algorithms, and methods; modeling of uncertainty, modeling of designer preferences; modeling of design decisions; information modeling and knowledge representation; project.

Course Learning Outcomes

Upon completion of this course, the student should be able to:

- 1) frame decisions: objectives, alternatives, outcomes, preferences.
- 2) evaluate design alternatives by conducting simulation studies
- 3) select the appropriate modeling paradigm to support a design decision
- 4) select a solution algorithm that matches the characteristics of an analysis model
- 5) critically evaluate analysis results in the presence of uncertainty
- 6) model designer preferences -- risk averseness, multi-attribute utilities, robustness
- 7) recognize the trade-offs between the costs and value of different simulation-based design process

Required Course Materials

Textbook: None

References:

- 1) R.T. Clemen, Making Hard Decision: An Introduction to Decision Analysis, Duxbury Press, 1997.
- 2) Choi, Grandhi, and Canfield, Reliability-based Structural Design, Springer, 2007.
- 3) A.P. Sage, J.E. Armstrong Jr., Introduction to Systems Engineering, Wiley & Sons, 2000.
- 4) F. E. Cellier and E. Kofman, Continuous System Simulation, Springer, 2006.
- 5) J.S., Arora, Introduction to Optimum Design, Academic Press, 2016

Grading Policy:

Homework	25%
Midterm Exams	40%
Final Project	35%

Description of Graded Components

The exams are open-book and open-notes.

Course Policies

Attendance and/or Participation

This will be an active classroom, where you will be expected to participate. I have noticed a drastic difference in the exam performance between students who regularly attend class and those who don't. Therefore, I will count attendance in determining your final grade.

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

[Core IMPACTS](#) is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus

statement about the Core area and associated [career competencies](#). [This resource](#) developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your 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.

Pre- &/or Co-Requisites

Graduate standing in engineering or related discipline; Undergraduate seniors with permission of the instructor.

Collaboration, Group Work, and Use of Generative AI

You are allowed to work in groups on all homework and out-of-class assignments (and you may use my solutions), but any work you turn in must be written in your own hand. In-class tests and exams are to be your own work. All in-class tests and exams will be closed book and notes, but I will provide an equation sheet.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Late homework will be penalized accordingly. Make-up exams are given for illness, approved Institute activities or religious observances.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your

courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Graduate Student Academic and Professional Success Resources:

A list of resources for graduate students is given on the [Office of Graduate and Postdoctoral Education](#) website. Specific information for [current graduate students](#) includes

- [Academic Resources](#) such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- [Student Resources](#) such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- [Professional Development](#) such as the programming from the Career Center and other professional development resources and events”

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A [comprehensive list](#) of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being ([student-resource-guide \(gatech.edu\)](https://student-resource-guide.gatech.edu))