

ME 3017 Syllabus

System Dynamics

Section B

3 Credit Hours

Fall 2026

Instructor Information

Instructor: Shreyas Kousik

Email: shreyas.kousik@me.gatech.edu

General Course Information

Description

Dynamic modeling and simulation of systems with mechanical, hydraulic, thermal and/or electrical elements. Frequency response analysis, stability, and feedback control design of dynamic systems. Students cannot receive credit for ME 3017 and AE 3530.

Course Learning Outcomes

Outcome 1: To introduce students to mathematical modeling of dynamic systems in various engineering disciplines.

1.1 Students will demonstrate understanding of various mathematical models such as differential equation and

transfer function models for dynamic systems.

1.2 The students will demonstrate the ability to formulate mathematical models for mechanical, electrical,

fluid, and thermal systems.

1.3 The students will demonstrate the ability to model mixed systems such as electro-mechanical and hydro-

mechanical systems.

Outcome 2: To develop students' skills in analyzing, simulating, and identifying dynamic systems based upon their input-output responses.

2.1 Students will demonstrate that they can derive and analyze time response (transient and steady-state) of linear dynamic systems.

2.2 Students will demonstrate the ability to formulate the frequency response of linear dynamic systems.

2.3 Students will demonstrate understanding of free vibrations of multi degree of freedom systems.

2.4 Students will demonstrate the ability to perform computer simulation of various dynamic system responses.

2.5 Students will demonstrate that they can apply time and frequency response analyses to system identification and design modification.

Outcome 3: To introduce students to design and analysis of basic feedback control systems.

3.1 Students will demonstrate understanding of dynamic system stability and transient response specifications.

3.2 Students will demonstrate understanding of block diagrams and how to reduce them.

3.3 Students will be able to design and analyze basic automatic controllers using algebraic techniques in the transfer domain.

3.4 Students will demonstrate the ability to apply feedback control to real-world engineering systems.

Required Course Materials

None

Grading Policy:

(Out of 1000 points total, equaling 100%)

Homework: 300 points (30%)

Exams: 2x 250 points (50% total)

Course Project: 200 points (20%)

Grades are assigned out of the total percentage earned by a student as

≥ 90% = A

≥ 80% = B

≥ 70% = C

≥ 60% = D

< 60% = F

Description of Graded Components

There are 5 homework assignments each worth 60 points. Each homework covers the course material taught in lecture up to the due date of the homework.

There are two in-person exams, covering roughly the first half and last half of the course material.

The course project is a team assignment, split into a proposal (25 points), midterm report (75 points), and final report (100 points). You will work in teams of 3 (self-assigned), and all students on each team receive the same grade.

Course Policies

Attendance and/or Participation

Lecture attendance is expected but not required. Exams are in-person and attendance is required. General policies are here: <https://catalog.gatech.edu/rules/4/>

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.