AE 3530 Syllabus

System Dynamics and Vibration AE3530, Section RIN, 3 Credits
Summer 2026

Instructor Information

Instructor: J. Prasad / C. McColl
Email: jvr.prasad@ae.gatech.edu / chance.mccoll@ae.gatech.edu

General Course Information

Description
Modeling and analysis of lumped- and distributed-parameter systems, free and forced vibration in mechanical systems, free vibration in structural systems.

Course Learning Outcomes
Students will be able to:

- Develop dynamic models of mechanical and structural systems using physical principles and free body diagrams.
- Transform dynamic models from time domain to frequency domain and vice versa.
- Solve for dynamic response of linear systems using Laplace transforms and state space methods.
- Characterize linear system response to initial disturbance using poles or eigenvalues of the system.
- Characterize linear system response to simple inputs such as pulse input, step input, etc.
- Characterize linear system response to sinusoidal inputs.
- Analyze higher order linear system response in terms of combination of first and/or second order system responses using modal decomposition methods.
- Solve example aerospace problems using linear system analysis tools and techniques.

Required Course Materials
Printed class notes and other course materials will be posted periodically on Canvas.

Grading Policy:

- Homework: 40%
- Project: 30%
- Final Exam: 30%

A>90; B>80; C>65; D>50

Assignments:
Homework 1: 10%
Homework 2: 10%
Homework 3: 10%
Homework 4: 10%
MATLAB based project: 30%
Final Exam: 30%

Description of Graded Components
The final exam will be an online exam with all multiple-choice questions, and it will be timed. You will not be allowed to use any resources including Generative AI on the final exam.

Course Policies

Attendance and/or Participation
This is a fully distance learning course with asynchronous video lectures. I will hold regular office hours to provide on-line help with course material and homework. I strongly encourage you to attend all on all on-line office hours.

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

Accommodation for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services 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

AE2220 Dynamics, Math2552 Differential Equations

Collaboration, Group Work, and Use of Generative AI

You are allowed to consult with one another on homework and project. However, you must submit entirely your own work. You are not allowed to talk to anyone on the final exam. Also, you are not allowed to use any resources including Generative AI on the final exam.

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

Late homework and project submissions without prior approval will be penalized accordingly.