Instructor
Matthew Ballard
E-mail: mattsballard@gatech.edu
Office location: Rm. 213
Office hours: T – 3:30 – 4:30 pm, Th 9:00 – 10:00 am
   Appointments for meetings outside of the scheduled office hours should be scheduled by e-mailing the instructor.

Class Meeting Times and Location
T 9:35 – 10:55 am, Th 12:35 – 1:55 pm – Brown room
Class times and locations are set by Georgia Tech Lorraine administration, and are subject to change.

Prerequisites
ME 2016 Computing Techniques
ME 2202 Dynamics of Rigid Bodies
MATH 2403/2552 Differential Equations
ECE 3710 Circuits and Electronics

Course Description
This course is an introduction to dynamic modeling and simulation of systems including mechanical, hydraulic, thermal, and/or electrical elements. Topics include frequency response analysis, stability, and feedback control design of dynamic systems.

Course Materials
Required Textbook

Reference

Use of Computers
MATLAB will be used for some homework assignments in this course, but you will not need to use computers in class for quizzes or exams.
Topics Covered

1. Laplace transforms
2. Modeling of mechanical systems
3. Transfer function models
4. Modeling of electrical and electromechanical systems
5. Modeling of fluid and thermal systems
6. Time response analysis of linear dynamic systems
7. Computer simulation of dynamic systems
8. Frequency response of linear dynamic systems
9. Free vibration of multi-degree of freedom systems
10. Input-output stability and transient response analysis
11. Introduction to feedback control systems

Course Requirements and Grading

Grading

Grades will be calculated based on scores earned on quizzes, homework and exams as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes / Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
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</tbody>
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The following grades are guaranteed:

- 90.0% + A
- 80.0% + B
- 70.0% + C
- 60.0% + D
- < 60% F

Course grades may be curved as the instructor deems necessary. Additionally, students that score less than 50% on the final exam will be considered for possible failure in the course, regardless of their average grade in the course.

Exams

There will be two scheduled exams during the semester and a comprehensive final exam. For each exam, each student will be allowed to bring and use a single sheet of A4 or 8.5” x 11” paper, containing equations written in his or her own handwriting. The final exam will be given during a 2 hour, 50 minute time slot as will be assigned by the Institute.
Quizzes

In-class quizzes will be given periodically, so as to ensure that students are mastering course material.

Homework

Homework assignments will be given approximately weekly, with the final homework assignment due on the final day of class. Homework must be complete, correct and neat in order to receive full credit. While students are encouraged to work in small groups to discuss their solutions to assignments, all submitted work must be his or her own. Copying from sources such as other students, solution manuals, and the internet is strictly prohibited. You must list on your assignment all sources used as a reference. In submissions of homework assignments, students are expected to do the following:

1. Label each page in the upper right corner with his or her name, the assignment number, the date, the course number and the instructor’s name. Staple all pages in the upper left corner. Do not fold homework submissions.
2. Using a format similar to that which will be shown in class, indicate the problem to be solved, the solution method, and any assumptions or approximations in your solution (with a brief justification).
3. Include appropriate units on all solutions
4. Identify all answers by enclosing them (including units) within a box.
5. Submit all work required to arrive at the solution, including any code or scripts.

Homework is due at the beginning of class on the due date. Late submissions will be accepted prior to the beginning of the following class meeting period with a 50% point reduction. Homework submissions later than that will not be accepted. Homework will be graded based on correct answers and complete work for all problems. A select set of homework problems will be graded in more detail.

Regrading Policy

Except in the case of obvious grading errors, any request for regrading must be submitted to the instructor in writing. Regrade requests must be filed within one week of return of the assignment, quiz or test in question to the class, and no requests may be submitted after the day prior to the final exam. Include a cover sheet with a clear description of the perceived grading injustice, along with a photocopy of the entire assignment. The entire assignment will be regraded, so it is possible that you will receive a lower grade from this second grading.

Course Policies

Attendance

Students that miss a large number of classes or are habitually late will not receive any kind of class curved grade at the end of the semester. A "large number" of classes is deliberately not
defined and is subject to instructor discretion. Students are responsible for all in class announcements and material covered.

**Make-up Exams and Quizzes**

No make-up exams or quizzes will be given without *prior* instructor approval, which will only be given under extenuating circumstances. As some quizzes may be unannounced, it is recommended that any necessary absences be discussed with the instructor beforehand.

**Disabilities**

If you have a disability that requires special accommodations, you must notify both the instructor and Disability Services.

**Academic Integrity**

All students are expected to adhere to the Georgia Tech academic honor code ([http://osi.gatech.edu/content/honor-code](http://osi.gatech.edu/content/honor-code)) and student code of conduct. Any suspected violations will be handled by the appropriate channels within the Institute.