

# ME 3017 System Dynamics

## Fall Semester 2023

### Course Objective

Introduction to dynamic modeling and simulation of systems including mechanical, electrical, electromechanical, fluid and thermal systems. Topics include time and frequency response analysis, stability and feedback control design of dynamic systems.

### Course Outline

- Differential Equations & Laplace Transform
- Modeling of Mechanical Systems
- Transfer Function Models & Input-Output Stability
- Computer Simulation of Dynamic Systems
- Modeling of Electrical & Electromechanical Systems
- Time Response Analysis of Linear Dynamic Systems
- Modeling of Fluid & Thermal Systems
- Frequency Response Analysis of Linear Dynamic Systems
- Introduction to Feedback Control Systems

### Class Meeting Times

3 hours of class time per week. Times are decided upon by Georgia Tech Lorraine administration and are subject to change.

### Instructor

Dr. Thiebaud Richeton

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### Course Prerequisite

ME 2016 Computing Techniques

ME 2202 Dynamics of Rigid Bodies

MATH 2403 Differential Equations

ECE 3710 Circuits and Electronics

## Course Materials

Textbook: William J. Palm III, *System Dynamics*, 4th Edition, McGraw-Hill College, 2021

Other Reference: K. Ogata, *System Dynamics*, 4th Edition, Prentice-Hall, 2004

## Grading

Your grade will be determined using the following weighting:

Homework	10%
Exam 1	20%
Quiz	10%
Exam 2	20%
Final Exam	40%

Dates of exams and quiz and materials allowed will be confirmed 2 weeks in advance. Grades will be based on the rightness of the solutions, but also upon how well the solutions are explained and neatness. Your final grade will be assigned a letter grade according to the following scale:

A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

The final grade will be curved based on your attendance, punctuality, performance to homeworks and participation in class.

## Attendance Policy

You better have to be present to the course considering the curving of your final grade. Attendance will be taken at the beginning of each class. For more information about class attendance at Georgia Tech, you may go to <http://www.catalog.gatech.edu/rules/4/>.

## Assignments

Homework assignments will be graded and the solutions will be handed out. Homeworks can be worked in group, but each homework should reflect your own work. Homeworks will be turned-in in class on due date. No late assignment will be accepted except in case of acceptable and justified reason.

## Honor Code

GT Academic Honor Code is strictly enforced at GT Lorraine. Adherence to the Georgia Tech Honor Code is expected and all suspected instances of academic misconduct will be reported to the Dean of Students. It is your responsibility to ask for clarification if collaboration guidelines, test-taking policies, etc. are not clear. You will find detailed information at <http://osi.gatech.edu/content/honor-code>.

## **Student-Faculty Expectations Agreement**

At Georgia Tech we believe that is important to strive for an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have for 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 the class.

## **Major Emergencies**

If you have some sort of major life emergency - serious illness or injury, death in the family, etc. - that impedes your progress in the class, please let me know as soon as possible so we can work something out. Don't disappear with no warning half way through, making me think that you dropped the class, and then reappear out of nowhere the week before finals asking what you can do to make things up.

## **Re-scheduled/Missed Exams**

In case of illness, the re-scheduled of exams will be accepted only if you provide the Dean of Students a dated documentation from a medical doctor.

## **Disabilities**

Georgia Tech offers accommodation to students with disabilities. This policy is also enforced at GT Lorraine, if you need any accommodation let Dr. Bertrand Boussert and Corinne Guyot know.

## **Miscellaneous**

No cellphone use, no food and no drink in classroom. Cellphones must be turned off or in Do Not Disturbed mode. You can use your laptop to take notes but not for gaming or surfing on the internet.

## **Important Dates**

A tentative calendar is proposed below, the dates of exams and quiz will be confirmed 2 weeks in advance. Exceptions from students requesting special treatment will be not be accepted.

First Day of Class	end of Aug
Exam 1	end of Sept
Quiz	mid-Oct
Exam 2	beginning of Nov
Last Day of Class	beginning of Dec
Final Exam	mid-Dec