

# MECH 3345 – System Dynamics

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<b>Instructor</b>	Dr. Louis J. Everett
<b>Office</b>	Annex 115, 747-7987
<b>Office hrs</b>	TR 11- noon except for “chemo” weeks that will be announced as they arise MW noon – 1:30.
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<b>Text</b>	No required text but <i>System Dynamics for Mechanical Engineers</i> by Davies and Schmitz from Springer is not bad.

**Course description:** System modeling; system stability; time-domain performance analysis; root-locus technique; frequency-domain analysis; control system design, and electronic control of a Mechanical System

## Grading:

Four exams - 75% (4 x 25%, 1 is dropped)

Project(s) with Team Assessment  
- 15%

In class quizzes using Learning Catalytics  
- 10%

The final is comprehensive. I will drop the lowest exam score, including the final.

## Course outcomes:

This course covers kinematics of single and multiple degree of freedom systems; vibrations, dynamic simulation software, and an introduction to control systems.

At the end of this class the typical students should be able to do the following for dynamic systems:

- 1) Given a description of the system, construct a simplified version using idealized elements and define a suitable set of variables.
- 2) Use the appropriate laws to obtain a mathematical model of the system.
- 3) For linear systems, solve the mathematical models to find the time response of the system.
- 4) Analyze stability of linear systems and where appropriate, evaluate time constants, damping ratios, and undamped natural frequencies
- 5) Use computer tools to obtain the response of a system, and to study the influence of changing system parameters on the system response.

**Homework:** Handouts will be given.

**Exams:** There will be 4 examinations, three during the semester (mid-terms) and one final. The final will be comprehensive. **I will not give make up exams. If you miss an exam due to a UTEP approved reason (see the catalog) I will count the final as the final and as the grade on the missed exam.**

**The projects:** The projects will be group. I reserve the right to orally examine all group members to ensure everyone did something on the project. All team members will receive the same grade from me but the team members will evaluate each other using the CATME web tools to assign a weight to be given to the individual lowest weight can be 50%, highest 100%.

**Announcement:** *If you feel you may have a disability which will make it difficult for you to carry out the work as I have outlined and/or if you need special accommodations/assistance due to a disability, please contact the Disabled Student Services Office at 747-5148, go to Room 106E Union, or email [dss@utep.edu](mailto:dss@utep.edu).*

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The Department of Mechanical Engineering at the University of Texas at El Paso is committed to a model of excellence in education that includes providing a safe and healthy environment for its students, staff, faculty, and the general public. Our goal is to maximize education and research training that can only occur if you, the individual, minimize hazards and risks. This can be done by:

- providing adequate control of the health and safety risks arising from any and all activities;
- consulting with employees on matters affecting their health and safety;
- providing and maintaining safe laboratories and equipment;
- ensuring safe handling and use of substances;
- ensuring all employees are competent to do their tasks and have adequate training; and
- maintaining clean, safe and healthy working conditions;

The principal investigator or individual in charge of each laboratory is ultimately responsible for safety in that respective lab. This includes training and ultimate release of the laboratory. Within the Department, we hold every employee (staff, faculty, student) responsible for implementing our safety practices and our departmental safety policy. We hold every employee (staff, faculty, student) responsible for providing leadership within our department to establish effective environmental, safety and occupational health standards.