



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Simulation Techniques for Dynamic Systems

MECHENG 5339

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Lab

Course Description:

Introduction and use of software tools for dynamic system modeling, control system analysis, and design. Application to real world dynamic systems, with emphasis on model development and validation, parameter identification, and results presentation.

Prerequisites and Co-requisites:

Prereq: 3360 (571) or equiv, and enrollment in MechEng; or Graduate standing in MechEng; or permission of instructor.

Course Goals / Objectives:

- Develop competence in use of current-generation dynamic system simulation software and physical simulation software for analysis/design tasks for dynamic systems
 - Develop familiarity with use of simulation software for modeling complex multi-domain physical systems
 - Develop system-level analysis and design skills, including system deconstruction for model development
 - Develop competence in performance evaluation of real-world dynamic systems
 - Deepen understanding of the relationships among physical systems, system models and control-oriented models
 - Understand procedures for model validation and parameter identification
 - Develop competence in compilation and presentation of simulation studies
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Course Topics:

- Review of simulation software basics – MATLAB/Simulink or equivalent
 - Introduction to physical system simulation using commercial software
 - System model development (two or three real-world systems)
 - Procedures for model validation and parameter identification
 - Transient response analysis
 - Frequency response analysis
 - System actuation/configuration design
 - Control algorithm design
 - Parameter/sensitivity analysis and optimization
 - Project introduction and discussion, followed by presentation and report
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Designation:

Elective