4900/4903.xx
Emily Nutwell
Research Specialist
nutwell.1@osu.edu
Overview

- Simulation and modeling skills are in high-demand for engineers.
- Simulation driven design enables engineers to evaluate designs in detail before production or prototyping.
- Use modeling and simulation methods to explore a design concept.
- Final capstone product may be virtual: the project will focus around integrating simulation and modeling into the design process.
- This offering, including funding, is made possible with a partnership from Honda, OSU SIMCenter, and Department of Mechanical and Aerospace Engineering.
Projects

- Student design projects
  - https://engineering.osu.edu/studentorgs

- Students who are involved in these activities can propose simulation-based capstone ideas. Simulation and modeling must be a central focus of the project.

- Students who are not directly involved in these activities but interested in simulation and modeling are also eligible to enroll.

- There must be correlation with the student organization team to clarify objectives of the simulation-based design project, and the project must be approved by the course instructor.
Student Teams and Enrollment

• Enrollment is limited to 12 students

• MECHENG 5139 (Applied Finite Element Method) MECHENG 5339 (Simulation Techniques for Dynamic Systems) or MECHENG 5539 (Applied CFD and Heat Transfer) are pre-req or concur.

• Student teams will consist of 3-4 seniors

• Permission from instructor is required for enrollment

• Teams will need to find a technical advisor (either the instructor or work with the instructor to find an appropriate advisor).
Simulation Driven Design

Plan → Design → Build Prototype → Test

Simulate → Design & Iterate → Validate thru Test

Shortens the iterative phase of the design process by using virtual methods.
Don’t’ most capstone teams use simulation and modeling into their projects?

Absolutely. Simulation and modeling is everywhere, and many capstone teams integrate simulation and modeling into their projects at some level.

This capstone experience will not only use simulation and modeling for a project, we will focus on the virtual design process:

- How to select virtual methods for a given design problem.
- Understanding assumptions and limitations of modeling and simulation.
- Use the model to gain insight and explore the design problem.
- Acquiring necessary data (possibly through testing) for model inputs.
- Tap into extensive software supplier resources for training and education.
Simulation Driven Design: Key Factors

- Connect simulation models with test data
  - Interactively improve simulation models based on data
  - This test data may already exist or may need to be acquired as part of the project (model validation testing).
- Scrutinize and upgrade simulation models in a controlled manner and report results.
- Extend and adapt models to new situations to further explore design concepts.
- Comprehend and draw conclusions from physical and virtual data.
How to Enroll

• This section is by permission of instructor only

• Send emails to nutwell.1@osu.edu
  • Attach your resume
  • In your email, write a statement of interest in simulation and modeling including any past experiences including coursework
  • Also include if you are already involved with a design team or student organization which may be a source for a project

• Include “ME4903” in subject line of your email, or it will not be processed!
Questions?

Emily Nutwell
Research Specialist
College of Engineering SIMCenter
nutwell.1@osu.edu
go.osu.edu/SIMCenter