



## Department of Mechanical Engineering

### MCE 503/403 Modeling and Simulation of Mechatronic Systems

Instructor: Hanz Richter, Assistant Professor.

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Office Hours: Monday, Tuesday and Friday, 10:00-11:30

Text: *System Dynamics* by Karnopp, Margolis and Rosenberg, (4th or 3rd ed.), Wiley

Reference: *Mechatronics Handbook*, R. Bishop, editor, CRC Press 2002

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**Objectives** Introduce students to modern approaches to modeling and simulation of engineering dynamic systems. Provide skills enabling students to carry the modeling-simulation-model validation cycle required in mechatronic system design. Introduce students to automated modeling through the use of bond graph-based software for automatic equation generation. Upon completion of this course, students should be able to:

1. Identify the most appropriate route to model generation.
2. Construct dynamic models of electrical, mechanical and mixed models
3. Perform computer simulations for model validation.
4. Use a validated model as a tool for design.

**Grading** There will be homework assignments, two midterm exams and a final project. The relative weights for arriving to the final numerical grade are given below:

$$GR = 0.4H + 0.35E + 0.25P$$

where  $H$  is the average of the homework grades excluding the lowest one,  $E$  is the average of the exams and  $P$  is the project. Cutoff numerical grades for conversion to letter grades will be as follows:

Range	Letter
88 – 100	A
75 – 87	B
65 – 74	C
50 – 64	D
0 – 49	F

Late homework will be rejected and receive a grade of zero. The project will be composed of a laboratory activity grade and a report grade. Make-up examinations will be arranged only due to extenuating circumstances, after proper justification is submitted.

#### Course website

[http://academic.csuohio.edu/richter\\_h/courses/mce503](http://academic.csuohio.edu/richter_h/courses/mce503)

Class notes, announcements, homework and exam solutions will be posted. The site will also contain interesting links and Matlab program downloads.

**Academic Integrity** Academic dishonesty will not be tolerated and will be handled according to University policy: <http://www.csuohio.edu/studentlife/StudentCodeOfConduct.pdf>