COURSE SYLLABUS

Section	ME360-001	ME360-002
Time and Place	Tu & Th 10:30 am-12:30 pm 2211 GG Brown	Tu & Th 12:30-2:30 pm 2211 GG Brown
Instructor, Contact Information and Office Hours	A. Galip Ulsoy Professor Dept. of Mechanical Engineering 2266 G.G. Brown Bldg. ulsoy@umich.edu 936-0407 Office Hours: M 1:30-3:30 pm & W 1-3 pm or by appointment	Sun Yi Lecturer Dept. of Mechanical Engineering 2277 GG Brown syjo@umich.edu 763-2227 Office Hours: Tu 2:30-4 pm (1012 EECS) & W 3-5 pm (2281B GGB) or by appointment
GSI, Contact Information and Office Hours	Shiming Duan duansm@umich.edu Office Hours: M 3:30-5:00 pm (2281A GGB) & Tu 4:00-5:30 pm (2281A GGB) & W 11:00 am -1:00 pm (3433 EECS)	Steven Vozar svozar@umich.edu Office Hours: M 11:00 am-12:30 pm (2281C GGB) & W 5:00-6:30 pm (2281B GGB)

Objectives and Outcomes:

Introduction to the modeling and analysis of dynamic systems, and to feedback control. The course has three major parts: (1) Mathematical Modeling, (2) Analysis, and (3) Control. At the completion of this course, you will be able to construct dynamical models of physical systems, use these models to analyze and simulate system behavior and to design and analyze simple feedback controllers. Specifically, the following topics are covered:

1. Modeling of mechanical, electrical, thermo-fluidic and interconnected systems
2. Criteria for simple models that adequately represent relevant behavior
3. Linearity: scaling, superposition and linearization of nonlinear processes
4. Laplace transforms, transfer functions, and frequency response analysis
5. Behavior (forced and unforced time and frequency domain responses) of linear time-invariant (LTI) ordinary differential equations (ODEs)
6. Stability and the use of feedback control to actively improve system behavior
7. Examples of real-world systems to which modeling and dynamical analysis tools are applied (e.g., automotive suspension) for the purpose of design
8. Numerical integration and computer simulation of mathematical models

Textbook:

William J. Palm III, *System Dynamics*, McGraw-Hill, 2nd Edition, 2010. There will be occasional handouts to supplement the textbook (these will also be available through the ME360 course web site on CTools; see http://ctools.umich.edu). See the Course Schedule for specific reading assignments from the textbook. Additional books (i.e., Cannon, Close & Frederick, Ogata, Messner & Tilbury) are on reserve in the Engineering Library.

Homework:
See the Course Schedule for due dates for the 11 Homework Sets. A handout is provided each week for the upcoming homework assignment. Homework Sets are due (turn in to either instructor or the GSI) no later than the start of class on Thursdays, and late homework will not be accepted. The lowest homework score for the term will be dropped. Homework solutions will be available Thursdays, after lectures are over, through the course web site. Please feel free to discuss homework with other students in the class, however, the homework you turn in must be your own work (i.e., write your own solutions to the homework that reflect your own understanding of the material).

Project:
An individual course "project" is integrated into the homework sets, and represents a series of closely related and open-ended homework assignments, the results and interpretation of which are then written up as a project report at the end of the term. Please see the separate handouts describing the course project.

Matlab and Simulink:
The course extensively utilizes the Matlab and Simulink software, available by site license to UM students through the CAEN computing environment. The software is introduced in the textbook, as well as through on-line tutorials available at http://www.engin.umich.edu/class/ctms/. The Matlab and Simulink software is used extensively in your homework assignments, as well as for your projects.

Exams:
One midterm examination (2 hour, in class) and one comprehensive final exam (2 hour) will be given on the dates indicated on the course schedule, at a time and location to be announced. Failure to take any exam as scheduled will result in a grade of zero for that exam. Make up exams will not be given, except for cases of documented emergencies.

Grading:		
	Homework	20%
	Project Report	15%
	Midterm Exam	30%
	Final Exam	35%

Handouts:
All handouts for the class (e.g., syllabus, homework assignments, project information, solutions, etc.) will be available on the CTools web site for ME360 Winter 2010. Log in to CTools at http://ctools.umich.edu

Coordination:
The two sections of ME360 taught during the Winter 2010 term will be closely coordinated, to the extent possible, in terms of not only the syllabus and textbook, but also the lectures, assignments, examinations, etc. There will be common homework assignments and examinations for the two sections. This will enable students to attend either lecture, as convenient and as space allows, and to consult with any of the course instructors for help with assignments.