ENGG*2400 Engineering Systems Analysis

Fall 2011

Instructor

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Office hours: 10:00-12:00 am, Wednesday

Teaching Assistants

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Textbook

Modeling and Simulation of Dynamic Systems, by Woods & Lawrence, Prentice Hall, 1997

Course Web Page

http://www.uoguelph.ca/~syang/Engg2400

Schedule

Lecture time: MWF 8:30 to 9:20 AM (MACN, Room 105)
Tutorial time: Mon. 1:30AM - 2:20PM (MACK, Room 238)
Mon. 2:30AM - 3:20PM (MACK, Room 238)
Wed. 11:30AM - 12:20PM (MACK, Room 233)
Wed. 4:30PM - 5:20PM (MACK, Room 238)
Fri. 11:30AM - 12:20PM (MACK, Room 238)
Fri. 2:30PM - 3:20AM (MACK, Room 238)

Note: Tutorial starts from Monday September 18.

Course Objective

To provide the student with the analytical skills required to model engineering systems. Students will learn to identify the relevant elements that comprise a system, apply elemental laws and general theorems to derive mathematical models, and then solve the mathematical models using techniques taught in other courses as well as using computer software for system simulation.

Course Descriptions

This course is concerned with the modeling and response analysis of common systems encountered in engineering such as mechanical, electrical, thermal, hydraulic, biological, and environmental systems. Applications of multivariate calculus, linear algebra, and differential equations are made to simulate and analyze such systems. Solution techniques covered include mathematical and computer-aided approaches.

Requisites

Prerequisites	ENGG*1210, ENGG*1500, MATH*1200; MATH*1210, PHYS*1130
Co-requisite	MATH*2270

Note: You will not receive a final grade if you do not have the correct Requisites.

Evaluations

Assignments	15%
Quizzes	15%
Midterm	20%
Final exam	50%

Important Notes:

- The **mid-term test** is scheduled on Friday, Oct. 28, 8:30-9:20 in class.
- The **final exam** is scheduled on Friday, Dec. 16, 8:30-10:30.
- We try to be consistent, fair and impartial in judging students' performance. If you are having difficulty with an assignment or have fallen behind in your work, come and talk to one of us and we will try to work out a mutually acceptable solution. But be warned: we not tolerate (and the university does not allow us to tolerate) any of the following: cheating on exams; copying from published materials without appropriate attribution; presenting someone else's work as your own; making up results (for example, of an experiment or survey); damage to, or theft of, academic materials; and similar wrongdoing. If you need more explanation of what constitutes academic misconduct, or what sanctions may be imposed in the event of such misconduct, consult the undergraduate calendar or speak to the instructor. Don't hesitate to discuss a problem or question with me. The penalties for academic misconduct are severe, and repeat offenders may be expelled from the university. Please familiarize yourself with your Academic Responsibilities and the Regulations and Procedures as Outlined in the Undergraduate Calendar.
- **Major Holy Days:** The student must contact the instructor within the first two weeks of class if academic consideration is to be requested due to religious reasons.
- **Electronic Recording of Classes:** The electronic recording of classes is expressly forbidden without the prior consent of the instructor. This prohibition extends to all components of the course, including, but not limited to, lectures, seminars, and lab instruction, whether conducted by the instructor or a seminar leader or demonstrator, or other designated person. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

Course Topics (tentative)

- Static systems analysis
- Introduction to dynamic systems
- Hydraulic, electrical, thermal and mechanical system examples
- Analytical solution techniques in time and transform domains
- State space modeling
- Numerical solution and simulations
- Laplace solution and frequency response