

ENGG*2400 Engineering Systems Analysis

School of Engineering, University of Guelph
Fall 2009

(August, 2009 version)

Instructor:

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Prerequisites:

Prerequisites: ENGG*1210, ENGG*1500, MATH*1210
Corequisite: MATH*2270

NOTE: You may be removed from this course if you do not have the correct prerequisites.

Schedule:

Class times: MWF 08:30 to 09:20 (LA 205)

Tutorial times:

Mon	16:30 - 17:20	MACK 234
Wed	16:30 - 17:20	MACK 234
Thu	16:30 - 17:20	MACK 234

Course Description:

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 analyse such systems. Solution techniques covered include mathematical and computer-aided approaches.

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 Text:

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

Major Topics:

Static systems analysis. Introduction to dynamic systems. Hydraulic, electrical, thermal and mechanical system examples. Analytical solution techniques in time and transform domains. Simulations. Frequency response.

Evaluation:

In Class Quizzes:	Sept 25 Oct 7 Oct 26 Nov 6 Nov 27	In class	10% (best 4 of 5)
Computer Project:	Due Nov 16	In class	10%
Midterm Test:	Mon. Oct. 19, 17:30-18:30 Mon. Nov. 16, 17:30-18:30	Room TBD	20%
Final Exam:	Fri. Dec. 18, 08:30-10:30	Room TBD	40%

Academic Misconduct:

Please familiarize yourself with your Academic Responsibilities, and the Regulations and Procedures as outlined in the Undergraduate Calendar. Another informative site is the tutorial on Academic Integrity. Please also note the School of Engineering site on Academic Misconduct and the School of Engineering Code of Ethics

Tentative Schedule:

Week	Topics	Chapters
1-3	Hydraulic, electrical, thermal, mechanical	3,4,5,6
2-4	Graphs, nodes & loops	n/a
5	Model forms	1,2
6	State space	G
7	Numerical solution	9,H
8	Review of diff. equ.	9,E
9-11	Laplace solution	F
12	Frequency response	8