ENGG*2400 Engineering Systems Analysis
Fall 2013

UNIVERSITY *of* GUELPH
School of Engineering

(Revision 0: September 4, 2013)

1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor:	Bob Dony, Ph.D., P.Eng.
Office:	THRN 2341, ext. 53458
Email:	rdony@uoguelph.ca
Office hours:	TBA on Courselink or by appointment

1.2 Teaching Assistants

GTA	Email	Office Hours
Harshpreet Nanda	hnanda@uoguelph.ca	TBA on Courselink
Neha Saroja Rajkumar	nsarojar@uoguelph.ca	TBA on Courselink
Michael Stachowsky	mstachow@uoguelph.ca	TBA on Courselink
Muhammad Uzair	muzair@uoguelph.ca	TBA on Courselink
Lihui Wang	lihui@uoguelph.ca	TBA on Courselink
Yi Wang	ywang09@uoguelph.ca	TBA on Courselink
Han Zhao	hzhao03@uoguelph.ca	TBA on Courselink

2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*2400 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

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

2.3 Communication & Email Policy

Please use lectures and tutorials as your main opportunity to ask questions about the course. Major announcements will be posted to the Courselink site. **It is your responsibility to check the course website regularly.** As per university regulations, all students are required to check their `uoguelph.ca` e-mail account regularly: e-mail is the official route of communication between the University and its student.

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3 ASSESSMENT

3.1 Dates and Distribution

i>clicker Quizzes: 10% or 0%* (best 6 out of 9)
>
> Thurs Sept 12, in class
> Thurs Sept 19, in class
> Thurs Sept 26, in class
> Thurs Oct 3, in class
> Thurs Oct 17, in class
> Thurs Oct 24, in class
> Thurs Oct 31, in class
> Thurs Nov 14, in class
> Thurs Nov 21, in class

Midterm test 1: 20%
>
> Tues Oct 8, 10:00-11:30 in class

Midterm test 2: 20%
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> Tues Nov 5, 10:00-11:30 in class

Final Exam: 50% or 60%*
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> Fri Dec 13, 19:00-21:00, Room TBA on Webadvisor

*The 10% weighting of the quiz grades will be moved to the final exam weighting if it is to the student's favour.

3.2 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:
> http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester

to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Consideration of Religious Obligations:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Missed midterm tests: If you miss a test due to grounds for granting academic consideration or religious accommodation, the weight of any missed test will be added to the final exam weight. There will be no makeup midterm tests.

Quizzes: The quizzes will use i>clickers. You are responsible for purchasing and registering your own i>clicker. More information on i>clickers can be found at:
http://www.uoguelph.ca/tss/ltci/clickers/index.cfm
Student i>clicker registration is at:
http://www.uoguelph.ca/courselink/widgets/clickers/index.cfm

Because the quiz grade is calculated using the best 6 out of 9 quizzes, academic consideration will only be granted if you have grounds for missing *4 or more quizzes*.

Passing Grade: As per University policy, the minimum passing grade is 50%

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4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

Analytical description and modeling of engineering systems such as mechanical, electrical, thermal, hydraulic biological and environmental systems. Applications of multivariable calculus, linear algebra and differential equations to simulate and analyse such systems.
Prerequisite(s): ENGG*1210, ENGG*1500, MATH*1200, MATH*1210, PHYS*1130
Corequisite(s): MATH*2270

4.2 Course Aims

This course aims to provide the student with the analytical skills required to model and analyze engineering systems across a range of disciplines. 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. The modelling and solution techniques form the foundations of analysis techniques in later, more discipline-specific advanced courses.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. Identify and defend assumptions and simplifications in constructing an engineering model

2. Identify suitable elements to represent physical devices

3. Identify appropriate through and across variables for a system model

4. Construct graphs or free body diagrams as graphical representations of a system model

5. Create a mathematical model through node or loop analysis

6. Formulate time domain, computer methods, and Laplace domain mathematical models of a system

7. Solve system responses for first order and second order models

8. Solve for step, impulse, and frequency response

9. Assess the entire solution in the context of the problem domain

4.4 Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

Graduate Attribute	Learning Objectives	Assessment
1. Knowledge Base for Engineering	1, 2, 3	Quizzes, Exams
2. Problem Analysis	1-9	Quizzes, Exams
3. Investigation	-	-
4. Design	-	-
5. Use of Engineering Tools	6, 7	Quizzes, Exams
6. Communication	-	-
7. Individual and Teamwork	-	-
8. Professionalism	-	-
9. Impact of Engineering on Society and the Environment	-	-
10. Ethics and Equity	-	-
11. Environment, Society, Business, & Project Management	-	-
12. Life-Long Learning	-	-

4.5 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and other assessments.

4.6 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

4.7   Relationships with other Courses & Labs

Previous Courses:

ENGG*1210: Mechanical system fundamentals such as force, torques, friction, moments, free body diagrams

ENGG*1500: Solving systems of linear equations, matrix algebra, complex numbers

MATH*1200 & MATH*1210: Limits, differentiation, integration, series expansion

PHYS*1130: Harmonic motion, electric potential, DC circuits

Concurrent Courses:

MATH*2270: Differential equations, solving linear ODEs, Laplace transform

Follow-on Courses:

ENGG*2450: Foundations of RLC circuit analysis, ideal operational amplifiers

ENGG*2660: Foundations of heat and mass balance, energy flows

ENGG*3260: Foundations of energy balances, thermal flow, thermal properties

ENGG*3280: Foundations of dynamical mechanical systems

ENGG*3390: Foundations of systems analysis, frequency response

ENGG*3410: Foundations of systems analysis, frequency response

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5   TEACHING AND LEARNING ACTIVITIES

5.1   Timetable

Lectures:

Tues		10:00-11:20	ROZH 101
Thur		10:00-11:20	ROZH 101

Tutorials:

Mon	Sec 01	13:30 - 14:20	ROZH 105
Tues	Sec 02	14:30 - 15:20	GRHM 2310
Wed	Sec 03	09:30 - 10:20	MACK 223
Wed	Sec 04	11:30 - 12:20	MACK 225
Wed	Sec 05	13:30 - 14:20	MACK 226
Wed	Sec 06	16:30 - 17:20	ROZH 105
Thur	Sec 07	11:30 - 12:20	MINS 106

5.2   Lecture Schedule

Week	Lecture Topics	References	Learning Objectives
1	Introduction to Systems Modelling	Chapter 1,2	1-9
3	Hydraulic and Thermal Systems	Chapter 5,6	1-3
4	Electrical Systems	Chapter 4	1-3
5	Mechanical Systems	Chapter 3	1-3
6	Graphs, Loops & Nodes	n/a	4,5
7	Dynamic Systems, Differential Equations	Chapter 1,2	6
8	First Order Systems	Chapter 9, Appendix E,F	6-9
9	Second Order Systems	Chapter 9, Appendix E,F	6-9
10	Transfer Function and the Complete Response	n/a	6
11,12	Frequency Response	Chapter 8	6-9

5.3   Other Important Dates

Fortieth class date: Thursday October 31 – Last day to drop one semester courses

Last Lecture: Tuesday November 26

6   ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

6.1   Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:
http://www.academicintegrity.uoguelph.ca/

Please also review the section on Academic Misconduct in your Engineering Program Guide.

The School of Engineering has adopted a Code of Ethics that can be found at:
http://www.uoguelph.ca/engineering/undergrad-counselling-ethics

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7 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website:
http://www.uoguelph.ca/csd/