ENGG*2400 Engineering Systems Analysis

Winter 2019
Section(s): C01

School of Engineering
Credit Weight: 0.50
Version 1.00 - January 03, 2019

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1 Course Details

1.1 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.

Pre-Requisite(s):	ENGG*1210, ENGG*1500, MATH*1200, MATH*1210, PHYS*1130
Co-Requisite(s):	MATH*2270

1.2 Timetable

Lectures:
Tue, Thur 02:30-03:50 PM MCKN 031

Tutorials:
Mon Sec 01 07:00 - 07:50 PM MCKN 308
Wed Sec 02 01:30 - 02:20 PM MCKN 308

1.3 Final Exam

Tue, 11:30AM - 01:30PM (2019/04/16)

Room TBA

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2 Instructional Support

2.1 Instructional Support Team

Instructor: Cam Farrow Ph.D
Email: cfarrow@uoguelph.ca
Telephone: +1-519-824-4120 x53838
Office: 1515
Office Hours: Open door policy and by appointment.

2.2 Teaching Assistant(s)

Teaching Assistant: Sandra Dusolt
Email: sdusolt@uoguelph.ca
Office Hours: TBA

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3 Learning Resources

3.1 Required Resource(s)

Textbook (Textbook)
Close, Frederick & Newell, *Modeling and Analysis of Dynamic Systems*, Third Edition, Wiley, 2002

Course Website (Website)
https://courselink.uoguelph.ca
Course material, news, announcements, and grades will be regularly posted to the ENGG*2400 Courselink site. You are responsible for checking the site regularly

3.2 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 mail.uoguelph.ca email account regularly: e-mail is the official route of communication between the University and students.

Please abide by the following guidelines for all email correspondence:

- Include the course code “ENGG*2400” in the subject line of all emails.
- Use a professional tone and appropriate etiquette in all your correspondence.

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4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able 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 and 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

4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome(s)
1	Knowledge Base	1, 2, 3, 4, 5, 6, 7, 8, 9
1.3	Recall, describe and apply fundamental engineering principles and concepts	1, 2, 3, 4, 5, 6, 7, 8, 9
2	Problem Analysis	1, 2, 3, 4, 5, 6, 7, 8, 9
2.1	Formulate a problem statement in engineering and non-engineering terminology	1, 2, 3, 4, 5, 6, 7, 8
2.2	Identify, organize and justify appropriate information, including assumptions	1, 2, 3, 4, 5, 6, 7, 8
2.3	Construct a conceptual framework and select an appropriate solution approach	1, 2, 3, 4, 5, 6, 7, 8
2.4	Execute an engineering solution	1, 2, 4, 5, 6, 7, 8
2.5	Critique and appraise solution approach and results	7, 8, 9

5 Teaching and Learning Activities

5.1 Lecture

Topic(s): Fluid Systems

Reference(s): Chapter 12

Learning Outcome(s): 1,2,3,4,9

Topic(s): Thermal Systems

Reference(s): Chapter 11

Learning Outcome(s): 1,2,3,4,5,9

Topic(s): System Representations/Responses

Reference(s): Chapter 3
Learning Outcome(s): 1,2,3,4,5,8,9

Topic(s): Electrical Systems
Reference(s): Chapter 6
Learning Outcome(s): 1,2,3,4,5,8,9

Topic(s): Frequency Response

Reference(s): Chapter 8.4 & 6.5

Learning Outcome(s): 5,6,7,8

Topic(s): Mechanical Systems
Reference(s): Chapter 2
Learning Outcome(s): 1,2,3,4,5,9

Topic(s): Energy Exchange, Resonance and Inertiance

Reference(s): Chapter 2

Learning Outcome(s): 6,7,8

Topic(s): Transfer Functions

Reference(s): Chapter 8
Learning Outcome(s): 1,2,3,4,5,6,7,8,9

5.2 Other Important Dates

Monday, January 7, 2019: First day of classes

Monday, February 18 - Friday, February 22, 2019: Winter Break
Friday, March 8, 2019: drop date - 40th class
Friday, April 5, 2019: last day of classes

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6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)	Scheme B (%)
Tutorial Assignments	10	0
Midterm Exam 1	20	20
Midterm Exam 2	20	20
Final Exam	50	60
Total	100	100

6.2 Assessment Details

Tutorial Assignments (10%)
Date: Mon, Jan 7
Learning Outcome(s): 1,2,3,4,5,7,9
Weighting of the the tutorial assignments will be moved to the final exam weighting if it is to the student's favour.

Midterm Exam 1 (20%)
Date: Tue, Feb 12, In Lecture
Learning Outcome(s): 1,2,3,4,5,7,9

Midterm Exam II (20%)
Date: Tue, Mar 12, In Lecture
Learning Outcome(s): 1,2,3,4,5,6,7,8,9

Final Exam (50%)
Date: , TBA
Learning Outcome(s): 1,2,3,4,5,6,7,8,9
The 10% weighting of the the tutorial assignments will be moved to the final exam weighting if it is to the student's favour.

6.3 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
Because the tutorial assignment grade is calculated using the best 8 out of 11 quizzes,

academic consideration will only be considered if you have grounds for missing 4 or more tutorial assignments.

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 2

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.

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

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7 School of Engineering Statements

7.1 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. Some written lecture notes will be presented only in class. 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 labs.

7.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. 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.

7.3 Lab Safety

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

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8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

8.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website
https://www.uoguelph.ca/sas

8.6 Academic Integrity

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 encourages academic integrity. 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 or faculty advisor.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph’s procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars