ENGG*1500 Engineering Analysis
Winter 2015

UNIVERSITY of GUELPH

School of Engineering

(Revision 0: January 5, 2015)

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1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Anthony Vannelli, Ph.D., P.Eng.
Professor and Dean, College of Physical and Engineering Science
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Science Complex Room 1314
(Student Office Hours: Fridays 3-4 PM, Science Complex, Deans' Suite 1314)
519-824-4120 ext. 53125
Esther Codner (assistant to Dean) ecodner@uoguelph.ca or ext. 56430

1.2 Teaching Assistants

1. Paul Dimaria (pdimaria@uoguelph.ca) Office Hours: TBD
2. Shannon Glassford (sglassfo@uoguelph.ca) Office Hours: TBD
3. Carolina Klabunde (cklabund@uoguelph.ca) Office Hours: TBD
4. Nishima Mehindru (nmehindr@uoguelph.ca) Office Hours: TBD
5. Adam Moore (amoore03@uoguelph.ca) Office Hours: TBD
6. David Rogala (drogala@uoguelph.ca) Office Hours: TBD
7. Matthew Veres (mveres@uoguelph.ca) Office Hours: TBD
8. Amatulraheen Al-Abassi (aalaba01@uoguelph.ca) Office Hours: TBD

2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*1500 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

Introduction to Linear Algebra for Science and Engineering, 2rd Edition, by Daniel Norman and Dan Wolczuk, Pearson.

2.3 Additional Resources

Lecture Information: In general, the lectures will follow the text. Example problems will be different and some additional material will be presented in class that you will need to know. Lecturing will be done by writing on overhead transparencies that will be made available after each lecture (on **Courselink**). Note, however, that **the lecture notes do not serve as a substitute for reading the text!** Students are responsible for reading and understanding the relevant sections of the text also.

Assignments: Ten weekly assignments, will be critical for developing a solid understanding of the course material. Although there is no way to ensure that you work independently on the assignments, there will be virtually no benefit unless you do them yourself. This will pay off when it comes to quizzes, midterm and final exam. **All quizzes, midterm, and Final will have many DIRECT questions from assignments. DO YOUR ASSIGNMENTS EACH WEEK AND MAKE SURE YOU CAN DO THEM BY YOURSELF!**

Communication & Email Policy

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

3 ASSESSMENT

3.1 Dates and Distribution

Scheme 1
4 Quizzes (Best out of 4), 15%
Midterm Exam, 35%
Final Exam, 50%

Scheme 2
4 Quizzes (you do well in all 4), 20%
Midterm Exam, 30% (if you did worse in Midterm than Final); Final 50%
OR
4 Quizzes (you do well in all 4), 20%
Midterm Exam, 35%; Final 45% (if you did worse in Final than Midterm)

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. Please see below for specific details and consult 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 Accommodation of Religious Obligations:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Passing grade: In order to pass the course, students must obtain a final grade of 50%.

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

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

This course deals with engineering applications of matrix algebra, vector spaces and computer techniques to solve linear systems. Topics include linear transformations, eigenvalues and

eigenvectors, diagonalization and their applications. Additional topics include complex variable algebra, multi-variable functions, partial derivatives, maxima and minima.

Prerequisite(s): MATH*1200

4.2 Course Aims

This is an introductory course in linear algebra. Linear, algebra is one of the most important subjects that you will study in Engineering, as it is used in many courses and design projects. Topics to be covered include linear systems, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality, and least squares. The main goal of the course is to give you a solid foundation in the elementary concepts of linear algebra and to give you exposure to real problems that you will use throughout your engineering career.

4.3 Learning Objectives

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

1. Describe and evaluate the properties of vectors and basic vector spaces and subspaces.
2. Set up, manipulate and solve systems of linear equations for a variety of engineering applications.
3. Describe and evaluate the properties of matrices including inverse matrices, identity matrices and transpose matrices.
4. Calculate, comprehend and apply determinants and their applications.
5. Calculate, comprehend and apply eigenvalues and eigenvectors and their applications.
6. Problem solve with academic integrity, preparing for a professional career with honesty and ethics at the forefront of engineering analysis.

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, 4, 5	Quizzes, Exams
2. Problem Analysis	-	-
3. Investigation	-	-
4. Design	-	-
5. Use of Engineering Tools	2, 3, 4	-
6. Individual and Teamwork	3, 4, 5	-
7. Communication	-	-
8. Professionalism	-	-
9. Impact of Engineering on Society and	-	-

the Environment		
10. Ethics and Equity	6	-
11. Economics & Project Management	-	-
12. Life-Long Learning	6	-

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/D2L 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 project.

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:

MATH*1200 Calculus

Follow-on Courses:

ENGG*2400: Engineering Systems Analysis – many applications of linear algebra

ENGG*2160: Engineering Mechanics II – solving linear systems of equations involving deformable solids

ENGG*4460 : Robotic Systems – solving kinematic equations for robotic systems.

5 TEACHING AND LEARNING ACTIVITIES

5.1 Lecture Schedule

Lectures		Tuesday and Thursday	10:00-11:20 am	Alex 200
		Monday, Wednesday, Friday	1:30-2:20 pm	ROZH 103
Tutorials	SO1	Monday	8:30-9:20 am	MCKN 306
	SO2	Monday	9:30-10:20 am	MCKN 306
	S03	Wednesday	12:30-1:20 am	MCKN 316
	SO4	Thursday	2:30-3:20 pm	MCKN 318
	S05	Thursday	12:30-1:20 pm	MCKN 318
	S06	Friday	9:30-10:20 am	MCKN 314
	S07	Friday	4:30-5:20 pm	MCKN 314
	S08	Thursday	11:30-12:20 pm	MCKN 316
	S09	Wednesday	8:30-9:20 am	MACK 316
	S10	Wednesday	4:30-5:20pm	MCKN 316
	S11	Friday	10:30-11:20 am	MCKN 316
	S12	Monday	12:30-1:20 pm	MCKN 316
	S13	Monday	4:30-5:20pm	MCKN 316
Midterm Exam		**TBA (2nd or 3rd week of Feb.)**	**TBA**	**TBA**
Final Exam		**Monday, April 6, 2015**	**11:30-1:30pm**	**TBA**
4 Quizzes		**To be held in class.**	**20 min-30 min**	**ROZN 101**
		Announced in class/Courselink	**duration**	

5.2 Other Important Dates

Monday, January 5, 2015: First day of class
Monday, February 16, -Friday February 20, 2015 Reading week: no classes scheduled
Friday, March 6, 2015: 40th class day, last day to drop
Thursday, April 2, 2015: Last day of class

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

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/

8 RECORDING OF MATERIALS

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

9 RESOURCES

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs: http://www.uoguelph.ca/registrar/calendars/index.cfm?index