

The University of Western Ontario
London **Ontario**
Applied Mathematics 2413
2014-2015
Course Outline

Instructor: Khoa Nguyen
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Lecture: Mon, Wed & Fri: 10:30 am - 11:30 am 3M-3250.

Lab section: 002 Tue 5:30 pm - 7:00 pm SSC-1032

003 Tue 7:00 pm - 8:30 pm SSC-1032

004 Thu 6:30 pm - 8:00 pm SSC-1032

Textbooks:

1. **Advanced Engineering Mathematics** by Dennis G. Zill / Warren S. Wright, 5th Edition 2011, Jones & Bartlett, ISBN 1-4496-7977-3 or 978-1-4496-7977-4.
2. **An Introduction to Numerical Analysis using MATLAB** by Khoa Nguyen/ Matt Davison, 2013, the Bookstore at Western, M10474.

Course Content:

This is a special course designed for mechanical engineers that combines traditional topics of ordinary differential equations, vector analysis and numerical methods using MATLAB as a programming language. The topics to be covered are

1. Introduction to MATLAB (will be covered in lab sessions)
2. Nonlinear Algebraic Equations (numerical solutions)
3. Review of basic techniques of integration
4. First Order Differential Equations, Dimensional Analysis and Applications
5. Higher Order Differential Equations and Applications
6. Green's functions for Initial Value Problems
7. Systems of ODEs: Method of Elimination, Method of Eigenvalues
8. Numerical Solutions of Ordinary Differential Equations
9. Series Solutions of Linear Differential Equations, the method of Frobenius.
10. Numerical Integration
11. Multiple Integrals: double integrals, triple integrals, Jacobian transformations
12. Scalar and Vector Fields, Gradients, Divergence and Curl
13. Vector Identities and introduction to Partial Differential Equations
14. Line integrals and surface integrals
15. Green's Theorem, Divergence Theorem, Stokes' theorem

Homework:

Students are encouraged to do the assigned problems. These problem sets are designed to enhance understanding of the lecture and to develop problem solving skills. In addition, these assigned problems may be asked on quizzes or on the midyear and final exams.

Attendance:

Attendance at tutorials is mandatory.

Grading:

Lab projects and quizzes: 20%

2 term tests (5% each): 10%

Midyear exam: 30% or 20%

Final Exam: 40% or 50% (whichever scheme is in your favour)

Examinations, Tests and Quizzes:

All material in the lecture up to the end of the course can be considered testable. In addition, extra material is covered in lectures which may be asked in quizzes, tests or exams. For this reason, students are strongly advised not to miss class and NEVER miss two or more classes in a row. Dates for quizzes or labs will be announced in class. Absence from class on the day of an announcement is not a valid excuse for missing those dates.

Laboratories:

Attendance at laboratory is mandatory. If a student has his or her lab mark less than 50%, it will negatively affect his or her final performance evaluation. A laboratory consists of an experiment or collection of procedures using MATLAB, leading to a report to be submitted and graded.

Quizzes will take place during the tutorials.

Term Tests: There are two term tests (in class) and the tentative dates are as follows:

October 15, 2014 and **March 18, 2015.**

Midyear Exam will be scheduled during the December Examination period.

Addendum to all Applied Mathematics Course Outlines

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your faculty's Dean's Office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from your faculty's Dean's Office immediately. For further information please see: <http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: https://studentservices.uwo.ca/secure/medical_document.pdf

Accessibility Statement: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Mental Health Statement: Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.