

APPLIED MATHEMATICS 2814G  
NUMERICAL ANALYSIS

UNDERGRADUATE COURSE OUTLINE WINTER 2015  
DEPARTMENT OF APPLIED MATHEMATICS  
WESTERN UNIVERSITY

COURSE DESCRIPTION

Introduction to numerical analysis; polynomial interpolation, numerical integration, matrix computations, linear systems, nonlinear equations and optimization, the initial value problem. Assignments using a computer and the software package, Matlab, are an important component of this course.

LECTURES

Mon/Wed/Fri, 8:30-9:30, MC-105B

LABS

- Section 002: Thu, 9:30-10:30, HSB-13
- Section 003: Tue, 8:30-9:30, HSB-13
- Section 004: Thu, 8:30-9:30, HSB-13

Attendance at lab sections is **mandatory**. Labs will have work that will have to be handed in at the end of the lab session. If you need extra help or lab time, you can attend any of the labs. Labs start the **FIRST** week of classes.

INSTRUCTOR

Prof. Robert Corless  
**Email:** rcorless@uwo.ca

**Office:** MC 272 x88785  
**Web:** [www.apmaths.uwo.ca/~rcorless](http://www.apmaths.uwo.ca/~rcorless)

LAB TA

Ganna Piatkovska  
**Email:** gpiatkov@uwo.ca

**Office:** MC 275C

ADMINISTRATIVE TA

Yang Wang  
**Email:** ywan342@uwo.ca

**Office:** MC 275B

COURSE WEBSITE

This course will use OWL: <https://owl.uwo.ca>. All homework, lab directions, *etc.*, will be posted on OWL. You are responsible for checking on upcoming assignments and their due date.

**Problems with OWL should be directed to ITS:** <http://www.uwo.ca/its/helpdesk/>.

## TEXT

- *Numerical Computing with MATLAB* by Cleve Moler, ISBN: 978-0-898716-60-3:
  - Order Online from SIAM: <http://bookstore.siam.org/ot87/> (receive a 20% discount by entering the coupon code: BKMLAD when checking out). Note that SIAM members receive 30% discount on all book orders. To become a SIAM member for free, join Western SIAM Chapter online at <http://www.siamwestern.com> and follow instructions at <http://www.siam.org/membership/individual/free.php>.
  - Also available free in PDF for individual use: [www.mathworks.com/moler/chapters.html](http://www.mathworks.com/moler/chapters.html)

## RECOMMENDED SOFTWARE

If you have a laptop it is recommended that you purchase a student version of Matlab from the Campus Computer store and bring your laptop to your lab session.

## COURSE CONTENT

0. Review of Taylor series and polynomials.
1. Solutions of equations in one variable.
2. Numerical methods for solving linear systems.
3. Interpolation.
4. Least Squares.
5. Numerical differentiation and integration.
6. Initial value problem for ordinary differential equations.

## ASSIGNMENTS

- Every other week there will be a lab assignment due using a computer.
- These assignments will need to be written in a report format and you will be required to introduce the problem you are solving, specify how you solved the problem, logically present your results, discuss your results, and summarize your findings.
- These assignments are an integral component of this course and will require a substantial amount of work. They also compromise a substantial fraction of the course grade. Skipping one of these assignments will cost you approximately 7% of your final grade.
- To help you get started on each assignment, there will be a lab session where you will build a program to use in the assignment that you will hand in at the end of lab, two weeks prior to the week the assignment is due.
- No assignments will be dropped from your grade for any reason (If you are sick, as determined by the Faculty of Science Deans office (see below), a pro-rated mark will be assigned).
- Students are free to use MATLAB, MAPLE, MATHEMATICA, C, C++, or Fortran to complete the assignments; however instruction and computing resources will only be provided for MATLAB.

## EVALUATION

Your grade will be the better of:

- I: 40% Assignments, 25% Midterm Exam, 35% Final Exam; **OR**
- II: 40% Assignments, 60% Final Exam.

Option II is only available if you show up and take the Midterm Exam or have a valid reason for missing it, as determined by the Faculty of Science Deans office (see below).

The midterm exam will be computer-based and require proficiency in MATLAB.

ADDENDUM TO ALL APPLIED MATHEMATICS COURSE OUTLINES

**Accessibility Statement:** Please contact the course instructor if you require material in an alternative 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.

**Academic Accommodation:** 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](https://studentservices.uwo.ca/secure/medical_document.pdf).