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Applied Mathematics 2814G
Numerical Analysis

Undergraduate Course Outline Winter 2017
Department of Applied Mathematics
Western University

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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

MWF 8:30 - 9:30 AM, MC-105B

Tutorials

Tuesday 8:30 - 9:30 AM, HSB-16

Thursday 8:30 - 9:30 AM, HSB-13

Thursday 9:30 - 10:30 AM, HSB-13

Requirements

Prerequisites: Math 1600A with a minimum mark of 55%

Antirequisites: AM2413 or the former AM2813B

Pre-or Corequisites: Calculus 2302A/B, 2402A/B or 2502A/B

Instructor

Prof. David Jeffrey
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Teaching Assistant

Steven Thornton
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Textbook

- *Numerical Computing with MATLAB* by Cleve Moler, ISBN: 978-0-898716-60-3:

    - Free PDF available for individual use: www.mathworks.com/moler/chapters.html
    - A physical copy may be purchased (optionally) by joining SIAM as a student member and ordering at siam.org

Supplementary Material (optional)

- *Learning Matlab* by Tobin A. Driscoll, ISBN: 978-0-898716-83-2

- *Matlab Guide (Third Edition)* by D. J. Higham and N. J. Higham, ISBN: 978-0-898715-78-1

- *A Graduate Introduction to Numerical Analysis* by Corless and Fillion (eBook available for free through UWO library)

Recommended Software

Matlab will be used for all labs as well as for the midterm. Instructions on how to obtain a **free** copy of Matlab through the university will be given in the tutorials.

Course Content

- Review of Taylor series and polynomials.
- Solutions of equations in one variable
- Interpolation
- Numerical differentiation and integration.
- Numerical methods for solving linear systems.
- Initial value problem for ordinary differential equations

Evaluation

Your grade will be the better of:

I: 40% Labs, 25% Midterm Exam, 35% Final Exam; **OR**
II: 40% Labs, 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 Dean's office (see below).

The midterm exam will be computer-based and assess proficiency in Matlab.

Schedule (tentative)

Name	Dates Held	Date Due
Lab 0 (not marked)	Jan. 10 & 12	Not marked
Lab 1A	Jan. 17 & 19	Jan. 20 at Noon
Lab 1B	Jan. 24 & 26	Jan. 29 at 11:59 PM
Lab 2A	Jan. 31 & Feb. 2	Feb. 3 at Noon
Lab 2B	Feb. 7 & 9	Feb. 12 at 11:59 PM
Lab 3A	Feb. 14 & 16	Feb. 17 at Noon
Reading Week	Feb. 20 – Feb. 25	—
Midterm Prep	Feb. 28 & Mar. 2	—
Midterm	Mar. 3	—
Last day to drop course	Mar. 7	—
Lab 3B	Mar. 7 & 9	Mar. 12 at 11:59 PM
Lab 4A	Mar. 14 & 16	Mar. 17 at Noon
Lab 4B	Mar. 21 & 23	Mar. 26 at 11:59 PM
Lab 5B	Mar. 28 & 30	Apr. 2 at 11:59 PM
Final Prep	Apr. 4 & 6	—

Lab Instructions

Each lab is broken into two parts for a total of 100 marks (8% or your final grade for each lab). Part A is worth 20 marks and part B is worth 80 marks.

Submission Instructions

Part A

No written report is required for this part of the lab. Any code written along with any figures should be submitted on OWL. Further submission instructions will be given in the tutorials.

Part B

IMPORTANT! READ THIS CAREFULLY.

Each part B of a lab will require a full written report explaining what you did in the lab as well as the results you obtained. You do not need to write anything about what was done in part A of the lab. Because this is an essay course you **will** be graded on code style, writing style, grammar, spelling, etc.

When submitting your part B write up along with the code from part B you will be required to:

- Submit a digital copy of your write up **and** code on OWL
- Submit a printed copy of your write up **and** code to a physical dropbox (**locker 5 across from MC 204**)
- Attach the marking outline that will be provided with the assignment to your printed copy

Grades will be deducted if the above instructions are not followed. If either the digital copy or the printed copy of the assignment is not submitted you will receive a grade of 0. Only one of the

printed or digital copy needs to be submitted before the due date to not receive late marks.

Further instructions will be covered in the tutorials.

Late Marks

Late marks for part A labs:

- 20% deducted for up to **one** day late
- 40% deducted for up to **two** days late
- 60% deducted for up to **three** days late
- 100% if not submitted within 3 days

Late marks for part B labs:

- 20% deducted for up to **one** day late
- 40% deducted for up to **two** days late
- 60% deducted for up to **thee** days late
- 80% deducted for up to **four** days late
- 100% if not submitted within 4 days

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.sdc.uwo.ca/ssd/academic_accommodation/index.html`.

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.