Introduction to Numerical Methods
CSC 355/655 and MST 355/655
Course Syllabus

Spring 2018

Professor: Dr. Grey Ballard
Email: ballard@wfu.edu
Office: Manchester 234
Office Hours: 3:30-5 Wed and 12:30-2 Thurs, or by drop-in or appointment
Class: 11–12:15 TR, Manchester 241
Required Text: *Numerical Analysis*, by Burden & Faires (10th Ed[1])
Course website: `http://www.wfu.edu/~ballard/teaching/CSC355`

1 Course Description

Numerical computations on modern computer architectures; floating point arithmetic and round-off error. Programming in a scientific/engineering language such as MATLAB, C, or FORTRAN. Algorithms and computer techniques for the solution of problems such as roots of functions, approximation, integration, systems of linear equations and least squares methods.

This class is cross-listed as a math and a computer science class; thus, there will be both proofs as well as programming in MATLAB. Familiarity with calculus and elementary linear algebra are required for this course; experience with MATLAB is helpful but not required. The graduate version of this class will be more demanding than the undergraduate version, and it will include a project.

2 Learning Outcomes

By the end of this course, students should be able to:

1. write scripts and functions in MATLAB,

2. numerically solve equations of a single variable,

3. use polynomials to approximate and interpolate functions,

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[1] The much cheaper 8th and 9th editions are okay too.

4. numerically differentiate and integrate functions,

5. reason about the accuracy and stability of numerical algorithms, and

6. evaluate the efficiency of numerical algorithms.

3 Quizzes, Problem Sets, Exams, and Projects

There will be four quizzes, four problem sets, a midterm, a final exam, and a project. The project is optional for undergraduates and required for graduate students.

Problem sets can be done collaboratively, but all code and proofs must be written by each individual. This means you can discuss problems with classmates, but you may not copy classmates' work or share code. Include the names of those with whom you've worked on each completed problem set.

The midterm and final exam are both cumulative and are to be done individually. Projects can be done individually or with partners.

4 Assessment and Grading

Course grades are determined using the following weightings. Undergraduates who choose to do a project can use the better of the two weightings.

No project:

- 10% quizzes
- 30% problem sets
- 25% midterm
- 35% final

With project:

- 10% quizzes
- 30% problem sets
- 20% midterm
- 30% final
- 10% project

Letter grades are assigned based on the following categorization:

A	93 or above	**C**	73–76.99
A$^-$	90–92.99	**C**$^-$	70–72.99
B$^+$	87–89.99	**D**$^+$	67–69.99
B	83–86.99	**D**	63–66.99
B$^-$	80–82.99	**D**$^-$	60–62.99
C$^+$	77–79.99	**F**	below 60

5 Contacting Me

In general, email is the best way to reach me, and I'm happy to take questions over email. The easiest way to find me in person is to stop by my office during

office hours, though please feel free to drop by any time. If you want to be sure to find me then you can also email ahead to schedule a time; it helps to propose a few times that work for you so that I can choose one that works for me too.

6   Academic Integrity

All tests and quizzes are to be done independently. Problem sets may be discussed with other students, however the work submitted must be your own work and reflect your understanding of the material. Copying of work from other students or from Internet-based resources is not acceptable and will be dealt with through the Honor System. I recommend that you retain drafts of your homework assignments and programs until the end of the semester in case a question arises as to authorship.

7   Learning Assistance Center

If you have a disability that may require an accommodation for taking this course, then please contact the Learning Assistance Center (758-5929) within the first two weeks of the semester and bring it to my attention as appropriate.

8   Supporting Fellow Students in Distress

As members of the Wake Forest community, we have a personal responsibility to ensure that this classroom and the campus as a whole remains a healthy and safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you, either for the classmate's wellbeing or yours. If this should occur, you are encouraged to send your concern to the Wake Forest CARE Team at `http://careteam.wfu.edu/how-to-make-a-report/`. By utilizing your insights and observations, we can work together to help individuals get connected to appropriate resources and keep our community safe.

9   Emergency Preparedness Policy

In the unlikely event of a major disruption of normal university activities (such as might result from a health emergency or other disaster), a course continuation contingency plan will be enacted in order to allow completion of the course. During this time, students should continue with the reading and other assignments listed on the syllabus and monitor email, Sakai, and the WFU website for information. If students have questions or are in doubt about how to proceed, they should contact the instructor by email if available, otherwise they should contact by phone.