Welcome to Math (CS) 355/655!

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Office hours: Monday 1-3pm, Wednesday 2-3pm, or by appointment.
Lecture: W/F 12:30-1:45 Manchester 245
Webpage: You're here already! [www.wfu.edu/~erwayjb/355fall16/index.html]

COURSE DESCRIPTION: 355/655. Introduction to Numerical Methods (3h)
Algorithms and computer techniques for the solution of problems such as roots of functions, approximation, integration, systems of linear equations, and least squares methods. Programming in MATLAB. Prerequisites: Linear Algebra (Math 121, 205, or equivalent).

COURSE INFORMATION: Many of the advances of modern science have been made possible only through the sophisticated use of computer algorithms. The mathematical foundation of the computer modeling techniques now used in all areas of mathematics, engineering, and science is known as numerical analysis. This class is part of a computational series at WFU that provides an introduction to the exciting field of numerical analysis and numerical methods, which is also sometimes referred to as computational mathematics or scientific computing. Professor Erway has a passion for this particular area of mathematics, and much of her published research is in this area, and in particular in the topics covered in 355/655.

Math (CS) 355/655 deals primarily with the development and analysis of algorithms and methods for solving systems of nonlinear equations and for doing approximation. This class is the foundation for many areas of computational mathematics.

GRADES, HOMEWORKS, EXAMS, AND IMPORTANT INFO: Course information, such as homework assignments, due dates, and exam dates, will be maintained on the class webpage. Note that I sometimes make minor changes to the homework assignments as the quarter progresses, based on how much I am able to cover in the lectures. Therefore, CHECK THE
WEBPAGE FREQUENTLY. The course will be graded on the homework assignments, two midterm examinations and a final examination, according to the following guidelines:

Written and Computer HW: 25% of grade  
Midterm #1 (Friday, September 30): 20% of grade  
Midterm #2 (Friday, November 4): 20% of grade  
Final Exam (Wednesday, December 14 at 2pm) 35% of grade

The following policies regarding homeworks, exams, and the class will be applied:

1. I normally do not accept late homeworks so that I can post solutions to the homeworks in a timely way for the class.
2. The default plan is to have all HW assignments count towards the final grade in the class.
3. In order to receive credit on a homework, you must at least attempt the computer parts of the homework assignments (if there are any).
4. If you have any conflicts with these exam days due to University-sponsored activities, I need to know by September 14th (two weeks from the first day of class). After the exam dates are finalized, you may only miss the exam due to a serious illness or emergency and, in this case, you will need to provide a written medical excuse or other documentation.
5. There will be no make-up exams. If you miss a midterm with an excused absence (i.e., illness with a note from a doctor), the other midterm and the final exam will be weighted accordingly.
6. You are not allowed (and will not need) to use a calculator on midterms or finals.
7. You are allowed to bring a single 8x11 sheet of paper containing notes on both sides (formulas, whatever you find useful) to each midterm and to the final. My view is that this allows you to focus on learning how to do the problems and understanding the material, rather than on memorizing formulas.
8. **Hint for Midterms and Final:** A couple questions on all three exams should look very familiar. (I will put at least one slightly more challenging problem on each exam, which is not just a variation of a homework problem; this ensures that everyone will have some challenge on the exam.)
9. The time of the final exam cannot be rescheduled. Please be careful when making plans for winter break.
10. If you need to miss a class due to a university-sponsored activity, such as athletics, please contact me ASAP.
11. If you have a disability that may require an accommodation for taking this course, please contact the Learning Assistance Center (758-5929) within the first two weeks of the semester.
12. I take the honor code very seriously. All work turned in for a grade must comply with the honor code. This means you may discuss assignments with classmates, but you may not copy classmates’ homework. Students who do not comply with this or cheat on exams will be turned in to the Honor and Ethics Council.
13. In case of a pandemic, this class will be continued online. Please check this course website for information.
LECTURES: My lectures may sometimes expand a bit on a particular topic beyond what is in that section of the book, if I think it is particularly important or useful. Similarly, I may skip some of the topics in the book. You will only be tested on topics we cover in class.

Homework assignments will be a combination of theoretical and computer problems; this will require some computer programming using MATLAB.

HOMEWORK 1: Due Friday, September 9

- Read Sections 2.1-2.4 on MATLAB and follow along with the text by inputting the commands yourself to see if the results match the book.
- Read pages 71-80 in your textbook (stop at Section 4.2).
- Turn in the homework here.

- Solutions are posted here and here.

HOMEWORK 2: Due Friday, September 16

- The homework can be found here.
- The MATLAB worksheet can be found here.
- Solutions are posted here.

HOMEWORK 3: Due Friday, September 23

- Read Section 4.2 and 4.3 in the textbook.
- The homework can be found here.
  NOTE: You may want to use the my_newton.m file to help you with questions other than #5. So, I suggest trying #5 first before trying some of the other written homework questions.
- The "my_newton.m" file can be found here.

- Solutions can be found here.
HOMEWORK 4: Due Friday, September 30

- Homework can be found here. Note: This homework will not be collected.
- Solutions can be found here and here.
- The first exam will be Friday, September 28. It will cover everything we have learned this semester.

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HOMEWORK 5: Due Friday, October 14

- Homework can be found here.
- Solutions are posted here

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HOMEWORK 6: Due Friday, October 21

- Homework can be found here.
- Due to fall break (no class October 21), this homework will NOT be collected. Solutions will be posted later.
- Solutions are posted here.

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HOMEWORK 7: Due Friday, November 4

- Homework can be found here.
- This homework is based on the lectures before and after fall break.
- In honor of the second exam on Friday, November 4, this homework will NOT be collected.
- Solutions to the first two problems are posted here.
- Solutions to problems 3 and 4 are posted here.
- The solution to 5 is posted here.
- Problem 6 was done in class, so please check your notes.
- The solution to 7 is posted here.
- The solution to 8 is posted here.

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HOMEWORK 8: Due Friday, November 18

- Homework can be found here.
- Please note: This homework was updated on Sunday, Nov 13th.
- Nearly everyone got 100%, so no solutions are needed. However, ask me if you have any questions!

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**HOMEWORK 9:** Due Friday, December 2

- Homework can be found [here](#).