MATH/CSCI-4800-02 Numerical Computing

Spring 2019

Instructor:	Professor Fengyan Li
	Amos Eaton 332, lif@rpi.edu, 276-3201
Lectures:	2:00pm-3:50pm, Mondays and Thursdays, Carnegie 112
Office Hours:	3:00pm-4:00pm on Tuesdays, 5:00pm-6:00pm on Thursdays
URL	http://homepages.rpi.edu/∼lif/S19/MATHCSCI4800.html
	(Your grades will be posted on LMS. Class announcement will be available via emails and LMS.)
Textbook:	*Numerical Analysis* by Timothy Sauer (3rd Edition)
Prerequisite:	CSCI 1100 and MATH 2010 or ENGR 1100; MATH 2400
	(*calculus, matrix algebra, differential equations, and programming with MATLAB*)

About the Course:

Contents: Topics from Chapters 0-6 (and possibly more it time permits), including floating point arithmetic, solving linear and nonlinear algebraic equations, interpolation and data fitting, numerical differentiation and integration, numerical methods for differential equations

Objectives and Learning Outcomes:

- ◇ To understand the basic concepts in numerical computing, such as conditioning, stability and convergence
- ◇ To learn and mathematically understand commonly used numerical algorithms in scientific computing, and to carry out mathematical derivation and numerical analysis for these algorithms
- ◇ To implement and to evaluate standard algorithms, and preferably to be able to interpret /analyze numerical results and extract useful information
- ◇ To design numerical algorithms for some problems

Homework Assignments and Exams:

Homework: Homework will be assigned regularly and graded. The work you hand in is expected to be neatly written and well-organized.

Computing problems: You are expected to use MATLAB for all programming assignments. The course website contains some references on MATLAB, and other relevant books and articles can be found from the institute library or internet. Except an introductory lecture on the first day, no tutorial lectures on MATLAB will be provided systematically in class. You are always welcome to discuss your MATLAB questions with the instructor.

Mathematical derivation and numerical analysis: In both exams and homework assignments, there are questions involving mathematical derivation and numerical analysis. Regardless of your academic disciplines, your answers to such questions should be mathematically reasonable and have as much rigor as possible in order to receive more points. Examples of such analysis and derivation will be presented frequently during lectures.

Late homework policy: Each homework assignment has a due time (including the actual time and date). There will be a 2-hour grace period in the submission time if the due time coincides with the start of a lecture (which is typically 2pm on a lecture day).

There is a submission box located in the main office of math department (Amos Eaton 301). When using the submission box, it is your responsibility to put your report in the RIGHT box. For a late submission, remember to write down your submission time and date at the **top-left corner** of the cover page of your report. Unless there is an advanced arrangement with the instructor, any homework report found in the submission box up to one-day late will be penalized 20% in the grade; any homework report found in the submission box between one and two days late will be penalized 40% in the grade; homework reports are not accepted two days after the official due time.

Exams: There are two midterm exams and one final for this course. The second midterm exam, though mainly covering materials that are not covered by the first exam, can refer to previous materials. The final will be comprehensive and covers the entire semester. The midterm exams are tentatively scheduled during **the weeks of February 11 and March 25**. The instructor reserves the right to change the date(s) when needed. No books, notes, calculators, and any other devices are permitted.

What if you have questions on the grading? Questions or concerns regarding the grading of assignments and exams must be discussed with the instructor **on the day** when the reports are returned.

Grading: Your grade for this course is determined by your performance in homework assignments (30%) and exams (70%: 20%+20% for midterms, and 30% for the final).

The grade cutoffs will be no stricter than

A	A-	B+	B	B-	C+	C	C-	D+	D	F
92-100	89-91	86-88	83-85	80-82	76-79	73-75	70-72	63-69	55-62	<55

Academic Integrity:

Student-teacher relationships are based on mutual trust. Acts that violate this trust undermine the educational process. The Rensselaer Handbook defines various forms of academic dishonesty and you should make yourself familiar with them. The penalties for cheating in this course include zero grade to the assignments or exams, and students being reported to the Dean of Students Office.

Collaborations:

For homework assignments, you are encouraged to discuss with other students. However, the work you turn in must be written by yourself and represent your own understanding on the subjects. If your work involves significant help from other people, online sources, reference books or papers, or the codes shared by the instructor (yes you can modify the codes and use them in your homework), it is required that you **explicitly state** this in your report to avoid penalty in grade.

It is strictly forbidden to **copy any part** of the homework solutions or computer codes from others (including classmates, books etc). Any violation will result in **zero grade** for that part of the assignment.

For exams, there is no collaboration of any kind permitted. Any violation will result in **zero grade for the entire exam**, and a report will also be made to the Dean of Students Office.

Other Policies:

On Attendance: Attendance is expected. Those who have to miss a class due to unforeseen reasons are responsible for finding out what is discussed or announced in class. Be on time for lectures. If you have to leave a lecture early, do so during the class break if possible.

On Email Correspondence: Any email to the instructor is expected to consist of the greeting, the text of the email, and the name of the sender.