MATH 309: Numerical Analysis

Fall 2020

Instructor:	Dr. Matthew McCurdy	**Email:**	matthew.mccurdy@trincoll.edu
Lecture Time:	MW 6:15pm - 7:30pm	**Location:**	Remote

Office Hours: MW 5:30-6:15pm, MW 7:30-8:00pm, T 2:15-3:30pm, remote with Zoom link on Moodle. I recognize that these office hours may not fit perfectly into everyone's schedule. However, I'm happy to meet outside of these office hours! You may schedule an appointment with me via e-mail. There are times when my schedule can be extremely busy, but I will try my best to find a time we can schedule an appointment.

Course Description: This course presents numerical methods for solving mathematical problems. It deals with the theory and application of numerical approximation techniques as well as their computer implementation. A tentative list of topics covered in this course are: computer arithmetic, interpolation and approximation, numerical integration and differentiation, solution of differential equations, solutions of nonlinear equations, and the method of least-squares.

This is a 1.0-credit course. Accordingly, it is expected that on this course, a student will spend an average of approximately 8-10 hours per week outside of class studying and completing assignments.

Prerequisites: C- or better in Computer Science 115, MATH 132, and any mathematics course numbered 200 or higher.

Course Page: Course announcements, resources, and homework will be posted on the Moodle page. It is your responsibility to check the Moodle site regularly and to read the announcements carefully. Additionally, you are expected to check your student e-mail daily.

Textbook: Reading and homework will be from: *Introduction To Numerical Computation* by Wen Shen.

MATLAB will be used for the computational aspects in this course. I strongly suggest you purchase access to MATLAB with a student license (good for the duration of your academic career!), or use a free, albeit less convenient, alternative like GNU Octave.

Lectures: You are expected to attend and participate in lectures! Partial lecture notes will be posted online. Students have found it beneficial to print the notes before class and fill them in during lecture. You are in no way required to use them though! Some sections have more material than we will talk about in lecture. Examples we do not cover in class are still good problems to practice for homework and in preparation for exams. If you miss a class for any reason, it is your responsibility to catch up on the work that you missed.

Assessments: Your final grade for the course will be determined by

Assessment	Date	Weight
Quizzes/ in-class work	Throughout semester	15%
Participation	Throughout semester	15%
Homework	Throughout semester	20%
Tests	8 Oct., 2 Nov.	15% each
Final Exam	Finals week	20%

Attendance Policy: Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official college activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness. A medical excuse must state explicitly that the holder should be excused from class. Note that students will not be given excused absences to attend family functions or other non-academic events. Registered Student Organizations and Greek Life activities are not considered official college activities. Students must provide advance notice of absences (when possible) as well as relevant documentation regarding absences to the instructor as soon as possible following the illness or event that led to an absence.

If a test absence is excused, then at the instructor's discretion, a make-up exam will be arranged. Students that do not contact the instructor to provide documentation or do not arrange for a makeup exam within a week of the absence will not be excused. If a student has an unexcused absence from the scheduled makeup exam, no additional makeup exam will be scheduled, and the exam will be treated as an unexcused absence.

Homework: will be assigned each week or two. Assignments will be submitted on Moodle and should be turned in prior to the beginning of the class when they are due. Late assignments will be penalized 30% per day. Problem sets will include written components as well as computational/coding components. Students are encouraged to work together on assignments, but are expected to write up their own solutions.

Quizzes/ in-class work: will be assigned in lecture throughout the semester. Like the written problem sets, these assignments will likely be scanned by students and submitted on Moodle as well. An emphasis will be placed on presenting clear, concise arguments to effectively communicate ideas in a logical and coherent manner. Make-up quizzes will not be given.

Tests, and Final: will be taken during lecture. Tests will be based roughly on lecture and homework material, and each will be worth 15% of the course grade. The tests will not be rescheduled for any reason. An unexcused absence from a unit test will be penalized. The final exam will be cumulative, worth 20% of the course grade, and will be based on all lecture and homework material covered in the course.

Grading Policy: For most assignments, I will annotate your .pdf submissions on Moodle and assign the grade there. It is your responsibility to make sure the grades on your assignment match those recorded in Moodle. *You have one week from the moment grades have been assigned to you to alert your instructor of a grading error.* Your final letter grade will be determined from your final numerical grade according to

Grade	A- to A+	B- to B+	C- to C+	D- to D+	F
Score	90 - 100	80 - 89	70 - 79	60 - 69	0 - 59

Plus or minus grades may be assigned.

Academic Honor Policy: In accordance with the Trinity College Student Integrity Contract, students are expected to abide by the highest standards of intellectual honesty in all academic exercises. Intellectual honesty assumes that student do their own work and that they credit properly those upon whose work and thought they draw. It is the responsibility of each student to make sure that they are fully aware of what constitutes intellectually honest work in every exam, quiz, homework, or other academic exercise submitted for evaluation in a course at Trinity College. Academic dishonesty will result in a score of zero on the exam, quiz, or assignment in question, or a grade of F for the course.

Civility Policy: Lectures are devoted time for learning. Activities that interfere with this process will not be tolerated. Failure to comply will result in you being kicked out of the lecture, and will impact your final grade.

Americans with Disabilities Act: Students with disabilities needing academic accommodation should

1. register with and provide documentation to the Student Accessibility Resources Office; and

2. communicate with the instructor indicating the need for accommodation and what type.

Trinity College is committed to creating an inclusive and accessible learning environment consistent with the Americans with Disabilities Act. If you have approval for academic accommodations, please notify faculty during the first two weeks of the semester or a minimum of 10 days prior to needing your accommodations. Please be sure to meet with me privately to discuss implementation. This syllabus and other class materials are available in alternative format upon request. For more information about services available to Trinity students with disabilities, contact the:

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Student Accessibility Resources Office
Level A of the Raether Library and Information Technology Center (LITC)
(860) 297-4025
Email:  Lori.Clapis@trincoll.edu
https://www.trincoll.edu/sarc/
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Free Tutoring From Trinity: is available at the Aetna Quantitative Center.

Student Responsibilities: You are expected to keep up with the class and engage with the course material. Midterms and exams are expected to be products of individual students as per the Trinity College Academic Honor Policy. You are welcome to collaborate with your peers on homework problems and preparation questions.

Syllabus Change Policy: Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

Preparing for remote classes: Before our class (and any other courses you have!), you should try to create an environment around you that's conducive for learning. Some tips for this are:

- Find a quiet location to work where you won't be interrupted,

- Work on each subject a little each day to help stay you on track,

- If possible, have earphones/earbuds available,

- Make sure your electronic devices are charged,

- Have your course materials (paper, pencils/pens, etc.) with you before class begins.

If/when we switch to remote instruction, there will be 'test assignments' to ensure that students are able to submit assignments on Moodle correctly. Additionally, I expect students to have their cameras on during remote lectures to encourage participation and promote accountability. If this is an issue, please speak with me before class.

You will need a variety of tools to take this course online if we switch to remote instruction. The particular apps you use will depend one your hardware. Verify that you have the hardware and software needed for each of the following activities. If you don't have the necessary resources and need help locating or acquiring them, please contact me and I can help you find the appropriate resources on campus.

- Make sure you have the latest version of Zoom and Chrome or FireFox.

- You will need to be able to show work on assessments. This will involve creating files containing images of your work. The files must be saved as .pdf. If you create a file type different from these you will need to check with your instructor to see if your instructor can read it. Options with showing your work are:

  - Using a tablet with pencil and an app like notability.
  - Writing your work on clean paper with a blue or black pen and then scanning the work. Popular scanning apps for smart phones are Genius Scan or CamScanner.
  - Taking a picture of written work. With pictures, you will need to make sure your file size is not too large to transfer easily and that you have the ability to export them as pdfs.

- You will need to be able to upload the images of your work to Moodle and the process needs to be quick and easy. Possibilities include:

  - Upload straight from your device on which the image is created and saved. Note that some but not all phones are capable of uploading files to Moodle quizzes.
  - Use a file transfer app to move the file from your phone to your computer to upload. For example: Airdrop, OneDrive, Dropbox, Google Drive.
  - E-mail from your phone to your computer. This is usually the slowest and least reliable method.

Tentative schedule of topics:

Date	Week	Topics
7-11 Sept.	Week 1	1.1, 1.2, 1.3, 1.4, 1.5, 1.6
14-18 Sept.	Week 2	2.1, 2.2, 2.3, 2.4, 2.5
21-25 Sept.	Week 3	2.6, 3.1, 3.2, 3.3
28 Sept.- 2 Oct.	Week 4	3.4, 4.1, 4.2, 4.3
5-9 Oct.	Week 5	4.4, 4.5, **Test 1**
12-16 Oct.	Week 6	4.6, 4.7, 4.8, 4.9
19-23 Oct.	Week 7	5.1, 5.2, 5.3
26-30 Oct.	Week 8	5.4, 5.5, 5.6
2-6 Nov.	Week 9	9.1, 9.2, 9.3, **Test 2**
9-13 Nov.	Week 10	9.4, 9.5, 9.6
16-20 Nov.	Week 11	9.7, 9.8, 9.9, 9.10
23-27 Nov.	Thanksgiving break	
30 Nov.- 4 Dec.	Week 12	8.1, 8.2, 8.3, 8.4
7-11 Dec.	Week 13	8.5, 8.6, 8.7, 8.8
12-14 Dec.	Review period	
15-21 Dec.	**Final exams**	