

# MAE2360 Numerical Analysis and Programming

Spring 2024

## Instructor

Vatsal Joshi

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Office Hours: Wednesday from 10:00 am to 12:00 pm or by appointment

## Teaching Assistant

TBA

## Course Specifics

MAE2360-001 Numerical Analysis and Programming

Lecture: Tuesdays and Thursdays 2:00 pm to 2:50 pm in University Hall 108

Lab: Tuesday from 5:30 pm to 8:20p m and Thursday from 11:00 am to 1:50 pm in Woolf Hall 406

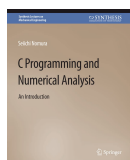
## Course Content

- Part I: Programming
  - Introduction to Unix
  - C language
  - FORTRAN, MATLAB
- Part II: Numerical analysis
  - Roots of equations
  - Numerical differentiation/integration
  - Matrix manipulation
  - Simultaneous equations
  - Differential equations
  - CGI programming

## Student Learning Outcomes

- Exposure to scientific computer programming (C, FORTRAN, MATLAB)
- Competency at solving engineering analysis problems using software tools

## Textbook and Other Course Material



C Programming and Numerical Analysis: An Introduction  
Publisher: Springer  
Edition: 1st (March 26, 2018)  
ISBN-10: 3031796047  
ISBN-13: 978-3031796043

## Assignments and Examinations

Several lab reports will be assigned throughout the semester. Lab reports will be due, online, one week after the assigned date at 11:59 pm. There will be a midterm and a final exam. Both exams will be closed book/note.

*The final exam date and time cannot be changed, except in very extreme cases.*

## Key Assignments

This course specifically assesses your ability for techniques skills and tools for solving engineering problems by programming. Therefore, certain related assignments in this course must be passed in order to pass the course. **The midterm exam and one of the homework assignments before the final are designated as key assignments.** In order to pass this class, students must submit and pass all key assignments. If any key assignment is not submitted and passed, the student will not pass the class even if he/she scores perfectly on all exams and other assignments.

## Grading Policy

Weights for final grade calculation are as follows,

Lab Reports	30%
Midterm	30%
Final Exam	40%

Grading Scale: A = 100-90%, B = 89-80%, C = 79-70%, D = 69-60%, F = below 60%.

## Homework Policy

- The contribution of lab reports to the final grade is calculated as:

$$30\% \times \frac{\text{sum of all lab report scores that one gets}}{\text{sum of all possible HW and lab report scores}}$$

For example, if there were only 2 lab reports and a student scores 90 out of 100 in the first report, and 120 out of 200 in the second lab report, then that student gets  $30\% \times (90 + 120)/(100 + 200) = 21\%$  out of 30% in the contribution of lab reports.

- Students are allowed to discuss concepts. Any other form of collaboration such as sharing code, solution or result is not allowed. You may consult outside reference materials, the teaching assistant and/or the instructor. However, all the outside material used should be cited properly.
- All solutions that are handed in should reflect the student's understanding of the subject at the time of writing. The lab assignments will be posted on Canvas.
- Late submissions will not be graded.

## Expectations for Out-of-Class Study

Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend a minimum of **9 hours per week** of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

## Grade Grievances

Objections concerning the grading of lab reports and exams should be raised within one week after they are returned. The grade will be permanent after one week. Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. See specific policies for engineering students at <https://catalog.uta.edu/engineering/#text>. See University grading policies at <https://catalog.uta.edu/academicregulations/grades/#undergraduatetext>. For student complaints, see <https://www.uta.edu/deanofstudents/complaints/index.php>.

## Computer Teaching Lab Policies (Woolf Hall 406)

- WH 406 must be officially reserved for all events including classroom instructions due to the limited classroom space equipped with computers and scheduling logistics. Please see Lanie or Janet for a reservation.
- WH 406 is a computer teaching lab. Faculty and Instructors must be present while students occupy this room. When an instructor leaves the room, students are to leave WH 406 as well. Instructors should encourage students to use WH 320 if needed after class is over. The computer lab in WH 320 is available for MAE student access 24/7.
- WH 406 doors are not to be propped open. Propped doors are considered a security breach by the UTA Police Department and a hazard violation by the Fire Inspector.
- Food, drink, and tobacco products are prohibited in WH 406.

## Course Schedule

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. - Vatsal Joshi

Date	Topic	Material
Jan 16	Introduction/Syllabus	Ch. 1
Jan 18	Basics of a C program / Compile / Execute	
Jan 23	Types / Cast / Input/Output	Sec. 2.1-2.2
Jan 25	Variable Operators	Sec. 2.3
Jan 30	Control Statements	Sec. 2.4
Feb 01	Functions	Sec. 2.5
Feb 06	Recursion	Sec. 2.5.3
Feb 08	Random Numbers	Sec. 2.5.4
Feb 13	Arrays & Matrices	Sec. 2.6
Feb 15	Strings & Characters	Sec. 2.9
Feb 20	Structures	Sec. 2.11
Feb 22	Pointers & Addresses	Sec. 2.8
Feb 27	File Handling	Sec. 2.7
Feb 29	Command Line Arguments	Sec. 2.10
Mar 05	Midterm Review	Ch. 1, 2
Mar 07	Midterm Exam	
Mar 12	Spring Break	
Mar 14		
Mar 19	Roots of Equations	Ch. 4
Mar 21		
Mar 26	Numerical Differentiation	Ch. 5
Mar 28		

Apr 02 Apr 04	Numerical Integration	Ch. 6
Apr 09 Apr 11	Differential Equations	Ch. 8
Apr 16 Apr 18	Solving Simultaneous Equations	Ch. 7
Apr 23 Apr 25	Other Topics in Programming / Spare	
Apr 30 TBD	Final Review Final Exam	

## Institutional Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit <https://resources.uta.edu/provost/course-related-info/institutional-policies.php> which includes the following policies among others:

- Drop Policy
- Observance of Religious Holy Days
- Disability Accommodations
- Non-Discrimination Policy
- Title IX Policy
- Academic Integrity
- Electronic Communication
- Campus Carry
- Final Review Week
- Student Feedback Survey
- Active Shooter
- Counseling and Psychological Services (CAPS)
- Academic Success Center

## Additional Information

**Attendance:** Attending class sessions is a critical predictor and indicator of student success. The University of Texas at Arlington does not recognize a single attendance policy but encourages faculty to establish class-specific policies on attendance. As the instructor of this section, I do not record attendance for the lecture, but it is recommended that students attend class. The U.S. Department of Education requires that UT Arlington have a mechanism in place to verify Federal Student Aid recipients' attendance in courses. UT Arlington instructors are expected to report the last date of attendance when submitting students' final course grades; specifically, when a student earns a course grade of F, instructors must report the last date a student attended their class. For on-campus classes, the last date of attendance can be based on attendance rosters or on academic engagements - a test, participation in a class project or presentation, or Canvas-based activity. Online or distance education courses require regular and substantive online interaction and

participation. Students must participate in online course activities in Canvas to demonstrate attendance; logging into an online class is not sufficient by itself to demonstrate attendance. The last date of attendance is reported to the U.S. Department of Education for federal financial aid recipients.

**Emergency Exit Procedures:** Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

**Academic Success Center:** The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: Academic Success Center. To request disability accommodations for tutoring, please complete this tutoring request form.

**The IDEAS Center:** 2nd Floor of Central Library offers FREE tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at [www.uta.edu/IDEAS](http://www.uta.edu/IDEAS), or call (817) 272-6593. The Library's 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation.

**Emergency Phone Numbers:** In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **817-272-3003** (campus phone). You may also dial 911. Non-emergency number **817-272-3381**.