Midwestern State University
Department of Computer Science
Fall 2025

Course Information
Course syllabus: Numerical Analysis
Course number: CMPS 5323
Course Section: 101.
Class hours: 12:30 pm to 1:50 pm, Monday, and Wednesdays.
Classroom: Bolin 324.

Instructor Information
Instructor's Name: Doctor Eduardo Colmenares.
Instructor's office: Bolin Hall, office 124B.
Instructor's email: eduardo.colmenares@msutexas.edu

Office Hours
Monday: 2:00 pm to 4:00 pm
Tuesday: 8:30 am to 9:30 am
Wednesday: 2:00 pm to 3:00 pm
Thursday: 8:30 am to 9:30 am
Friday: No Office hours

ZOOM information
Zoom Link

Course Description
This course introduces students to the fundamental theory and practice of numerical analysis and methods. A strong emphasis is placed on developing a deep understanding of the underlying theoretical concepts and building a solid mathematical foundation. Such knowledge is essential for scientists and engineers, who will inevitably encounter problems across multiple disciplines that are too complex to be addressed by traditional analytical techniques.

The course reinforces this theoretical foundation through practical application, making use of computational tools to implement numerical methods and solve challenging mathematical and scientific problems. In doing so, students not only gain insight into the principles of numerical analysis but also acquire the practical skills needed to apply these methods effectively in real-world contexts.

Textbook
Is the textbook required? The answer is No, however access to the book is strongly recommended since problems & reading assignments can occur and material from the book can be included on exams.

Textbook # 1 - name: Numerical Methods for Engineers.
Textbook # 1 - Author: Steven C. Chapra & Raymond Canale.
Textbook # 1 - edition: Seventh Edition
Publisher and ISBN: McGraw-Hill, ISBN: 978-0-07-339792-4.

Textbook # 2 - name: Applied Numerical Methods with Matlab for Engineers and Scientists.
Textbook # 2 - Author: Steven C. Chapra
Textbook # 2 - edition: Fourth Edition
Publisher and ISBN: McGraw-Hill, ISBN: 978-0-07-339796-2.

Course Objectives
The purpose of this course is to introduce computer science students to multiple numerical methods and concepts of key relevance in multiple fields of science and seed a strong numerical analysis foundation that can be coded with modern computational tools.

Course Dynamics
Every topic will be covered in the form of a traditional board lecture (unless decided otherwise by the instructor) and the students are not only expected, but also strongly advised to take notes as the lecture develops; this will help the students to remain focused on the lecture while writing. Questions are more than welcome.

Course Prerequisites
Object-Oriented Programming or Data Structures, Mathematical Statistics for Engineers and Scientists, or equivalent, and others as determined by the degree plan.

Expected prior knowledge and skills
The successful student should have competent skills in procedural and object-oriented programming, knowledge of data structures and algorithm analysis, and knowledge of statistical and probabilistic mathematics.

Grading Policy
90 to 100 points is an A.
80 to 89.99 points is a B.
70 to 79.99 points is a C.
60 to 69.99 points is a D.
0 to 59.99 points is an F.

Evaluation Process Summary Table

Category	Percentage
Test 1	14
Test 2	14
Test 3	14
Final Exam	19
Attendance	6
Homework (THH and ICH)	23
Participation (Quizzes and In Class Activities (ICAs)	10

Evaluation Process
The final grade for this course will be based on participation, homeworks and exams. A description is provided below:

- You will have three tests and one final exam. Each one of the tests is worth 14 percent, and the final exam 19 percent.

- Attendance counts for 6 percent of your grade. The attendance policy will be covered soon.
- There will be several homeworks, some to take home (THH) and some to solve in class (ICH). This category is worth 23 percent. The faculty member can reserves the right to question students either in person or via a quiz after each homework has been completed. Students need to be prepared to show understanding of the just completed homework.
- Participation is subdivided into two categories. In class activities (ICAs) and traditional quizzes. This category is worth 10 percent of your grade.

Attendance

- Attendance is a component of the course grade (six percent). Each student will begin with 100 points for their attendance grade. For each unjustified absence 33.33 points will be subtracted from the attendance grade.
- After five unjustified absences the student will be dropped from the class. This will be enforced.
- At the beginning of each class, the instructor will review the class roster and call students by name. Any student not present at that time will be marked absent, and the absence will not be removed upon late arrival. The attendance grade is therefore entirely under the student's control.
- Additional class attendance related MSU Policies will be applied.

Required Hardware

- Regular traditional scientific calculator are the only one allowed for the exams.
- Graphic and/or programmable calculators are not allowed.
- Passing or borrowing of calculators during the exams is not allowed. Every student must have a regular traditional scientific calculator during the exam. If you show up to the test without calculator you will be required to complete it without it. Please prepare your resources on time
- A Windows Laptop or MacBook.

Required Software

- The class will make use of a two scientific programming languages
    - Octave: https://octave.org/
    - Pyhton
- In class some of the principles and syntax associated with octave will be explained, however, the students are expected and/or recommended to support themselves in modern tools such as ChatGPT to dig deeper, practice and learn about this programming language, however no AI platform should be used to solve your homeworks.
- If the student does not want to use chatGPT then feel free to use to the multiple tutorials and videos that you can access on the web.
- Octave is very-very similar to Matlab.

Tests

Tests are comprehensive in nature. No make-up exams will be given, except for the following cases:

- Surgery, Medical Emergency, Death in the family, Presentation at a Conference, some others as determined by the instructor.
    a. If you miss an exam, you will receive a permanent zero unless you notify the instructor and demonstrate with the proper official documentation that an emergency that you could not

circumvent existed. This documentation must be presented not later than 24 hours after the test.

b. Students who miss an exam due to University business should notify the instructor in advance, and present the sponsoring university member's written justification.

- The exams for graduate students may differ from the undergraduate quizzes in the nature, type and number of questions.

If you do miss an exam and you fall in one of the categories above, this means that you have a properly documented case. Your instructor will proceed to assign a temporary grade of zero which will be substituted for your excused test grade (Final Exam). However, this substitution can only be performed once during the semester. Exams are uniquely composed for each term.

Final Exam

- There is no make-up final exam. The final exam will take place in our regular classroom. It is the student's responsibility to keep track of the designated date, time. A complete list of all MSU exams (by time) can be found at Final Exam Schedule.
- The date of our final exam is December 10th, from 3:30 pm to 5:30 pm.

Assignments - Late Policy & Deadlines

- In the case of graduate students the assignments may differ in length and complexity when compared to the one being assigned to undergraduate students.
- Submitted work is due when specified, as specified (format) by the instructor. It is in the student's best interest to keep track of all deadlines.
- The instructor is not required to remind students of ANY date and/or deadline associated with tests, homework, reports, project assignment, etc.
- **Late assignments WILL NOT BE ACCEPTED. This rule will be enforced**
    - **What does it mean to be late?** Answer: for example, if your assignment is due today at 8:00 am and you attempt to deliver your report by 8:00:01 am (1 second late) then it will be considered late. There will not be exemptions of any kind.
    - **Assignments MUST be submitted to the corresponding Dropbox via D2L before it closes (deadline).** If the Dropbox has closed and you cannot upload your assignment to it, then you are late and your assignment will not be accepted.
    - Students will have more than enough time to complete their assignment on time.
    - Internet outage, computer problems, car problems, work, and several others are NOT a valid excuse for a late delivery.
- Very Important: Before you submit any file, take your time and double OR triple check that
    a. You are uploading the correct and ALL necessary files
    b. Your work is correct at the best of your abilities
    c. Failure to fulfill (a) and (b) ON TIME, WILL NOT excuse you from a bad grade.

No Procrastination Policy

Students are strongly encouraged to contact the instructor during office hours to clarify questions associated with lectures, exams, assignments, presentations, quizzes, homework, etc. Questions are more than welcome from the moment the assignments, projects, quizzes,

exams are either released or announced, however, all questions stop the day before the assignment, exam, quiz, presentation is due. This rule is designed to promote responsible time management and personal organization.

Additional Grade Policy
Once the grades, have been either returned to the students, or published via D2L, the student will have one week to examine them and check for inconsistencies, errors, etc. After the one week window of opportunity all grades will become PERMANENT and WILL NOT change. It is not only the student's responsibility to check the accuracy of his/her grades, but also in his/her best interest to do it. This rule DOES NOT apply to the final exam because the final is exam triple checked by the instructor before publishing the grade.

Important Information about our grading policy
The instructor reserves the right to adjust the grade distributions for the whole class. What does it mean? It means that grade distributions will not be adjusted on an individual basis.

Departmental Academic Misconduct Policy & Procedures:
Cheating, collusion, and plagiarism (the act of using source material of other persons, devices, AI Generators, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). The Department of Computer Science has adopted the following policy related to cheating (academic misconduct). The policy will be applied to all instances of cheating on assignments and exams as determined by the instructor of the course. (See below for link to MSU definitions.)

- 1st instance of cheating in a course: The student will be assigned a non-replaceable grade of zero for the assignment, project or exam. *In addition, the student will receive a one letter grade reduction in course, if the grade doesn't result in a grade reduction.*
- 2nd instance of cheating in a course: The student will receive a grade of F in course & immediately be removed from course.
- All instances of cheating will be reported to the Department Chair and, in the case of graduate students, to the Department Graduate Coordinator.

Note: Letting a student look at your work is collusion and is academic misconduct!

Can I use AI to solve my homework and/or project: The answer is NO, this is also an academic misconduct!

Policy on Testing Process
The Department of Computer Science has adopted the following policy related to testing.

a) All bags, purses, electronics (turned off), books, etc. will be placed in the front of the room during exams, or in an area designated by the instructor.
b) Unless otherwise announced by the instructor, nothing is allowed on the desk but pen/pencil/eraser and test papers.
c) You are not allowed to leave the classroom. Please take this seriously and into consideration before any test and the final. Prepare yourself to be in the classroom during the entire exam.
d) If you decide to leave the classroom during a test and/or the final exam, your exam will be collected, and you will not be allowed to continue.

Classroom Civility
All violations of classroom civility will be reported to the Dean of Students.
Students are expected to assist in maintaining a classroom environment that is conducive to learning. In order to ensure that all students gain from time spent in class, students are prohibited from engaging in any form of distraction, e.g. leaving the room for extended periods of time, reading newspapers (or other articles), working on other courses, and using cell-phones or laptops for calls or messages. If you indulge in any such inappropriate behavior (without explicit consent of the instructor), you will (at the very least) be asked to leave the classroom. MSU Dean of Students Website.

Student with Disabilities
Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from disability support office during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Disability Support Office has been provided. For additional information you may contact the Disability Support Office in Clark Student Center 168 - Phone: (940) 397-4140.
Disability Support Services.

Dean of Students
The Dean of Students can assist in notifying the campus community of student illnesses, immediate family deaths and/or student death. Generally, in cases of student illness or immediate family deaths, the notification to the appropriate campus community members occur when a student is absent from class for four consecutive days with appropriate verification. It is the student's responsibility for missed class assignments and/or course work during their absence. MSU Dean of Students Website.

RECORDING OF CLASS LECTURES
Permission must be requested in writing & obtained from the instructor before recording of class lectures. If permission is granted, the recording may only be used by the student making the recording. Recordings may NOT be posted on any internet source without written permission of the instructor. Failure to adhere to the policy may result in removal from the course with a grade of F or other appropriate punishment.

Broadcasting of Lectures
Not a single lecture will be broadcasted or recorded unless

- The faculty members is instructed or required to work from home

University's Campus Carry
Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Areas excluded from concealed carry are appropriately marked, in accordance with state law. For more information regarding campus carry, please refer to the University's webpage at Campus Carry.

Covid Precautions
I encourage all those who wish to wear a mask to do so. Any vulnerable or unvaccinated person should wear an N95 or equivalent, if they want to protect themselves from others. I will also meet with students via Zoom by appointment.

Research and Creative Activity Opportunities at MSU
Enhancing Undergraduate Research Endeavors and Creative Activities (EURECA) is a program that provides opportunities for undergraduates to engage in high-quality research and creative activities with faculty. EURECA provides incentives and funding through a system that supports faculty and students engaged in collaborative research and creative works. For more information contact the Office of Undergraduate Research at (940) 397-6274 or by email at eureca@msutexas.edu or better yet, stop by the UGR office located in the atrium of the Clark Student Center, room 161. Information and resources are also available at Eureca's website

Undergraduate Research Opportunities and Summer Workshop (UGROW)
Like EURECA, UGROW provides opportunities for students to conduct research with faculty. However, the research occurs in the summer. For five weeks UGROW students experience the authenticity of scientific research as well as research and creative activities in art, music, theater education, business, health and social sciences, English, history, etc. in a highly interdisciplinary environment. Students work on projects of their choice and present their findings at the end of program and the MSU Undergraduate Research and Creative Activity Forum. Faculty members will introduce their research ideas February 13th, 2019, at 5:00 p.m., Comanche Suites, Clark Student Center. A break-out session with individual faculty members will follow. If you have any questions, contact the Office of Undergraduate Research at (940) 397-6274 or by email at eureca@msutexas.edu. More information and resources are available at ugrow's website

Council on Undergraduate Research
To support undergraduate research and creative activities, Midwestern State University holds an enhanced institutional membership with the Council on Undergraduate Research (CUR). This institutional membership includes unlimited memberships for any interested faculty, staff, and students. Students find information on benefits and resources at the council for undergraduate research website and sign up at no cost at this website.
I would like to personally invite you to become a member of CUR so that you benefit from all the opportunities CUR offers to you.
CUR Undergraduate Resources Webpage contains:

- Research Opportunities;
- Presentation Opportunities;
- Undergraduate Research Journals;
- CUR-Sponsored Student Events;
- The Registry of Undergraduate Researchers;
- And more!

ScholarBridge
Midwestern State University is excited to announce a new resource designed to address a commonly expressed student need—the creation of a centralized searchable database of faculty research interests and opportunities. We have entered into a partnership with ScholarBridge, is a website designed to help students participate in undergraduate research and creative activities. I strongly encourage you to join ScholarBridge at your earliest convenience.

Laptop Policy

For this class, you are not required to buy a laptop. However, if the instructor announces an ICH (In Class Homework) or ICA (In Class Activity), you are responsible for:

a. Bringing a laptop with all necessary programs properly installed, configured a tested.
b. Bringing the laptop's charger: If you do not bring your charger and cannot complete the assignment(s) because your battery died, then your grade will not be a good one.
c. Make sure that you have a fully working and in-classroom tested Wi-Fi capabilities. If you cannot submit your homework because your Wi-Fi does not work, then your grade will not be a good one.

Excusing Late Work

Any document used to excuse the late delivery of an assignment MUST be presented no longer than one week from the corresponding missed deadline. Valid excuses (Surgery, Medical Emergency, Death in the family, and Presentation at a Conference). Failure to fulfill this requirement will make null the excuse, leading to a permanent grade of zero in the corresponding assignment.

Tentative Agenda

We will try to respect this agenda as much as possible, however it is possible that some topics will require more, or less time to cover them, which may lead to changes. Students will be informed about those changes in class. The instructor reserves the right to modify, add, remove, and update the proposed agenda.

- Computer Arithmetic
- Numerical Solutions to Non-linear equations
- Root finding Bracketing Methods
- Root finding Open Methods
- Curve Fitting
- Interpolation
- Numerical Differentiation and Integration
- Ordinary Differential Equations