

THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
DEPARTMENT OF Mathematical Sciences

Course #: MATH 5329 (CRN 11748)
Course Title: Numerical Analysis
Credit Hours: 3
Term: Fall 2020
Course Meetings & Location: MW 10:30 ~ 11:50, Virtual class meetings via Zoom
Prerequisite Courses: MATH 3323 and programming experience
Course Fee (if applicable) None
Instructor: Dr. Son-Young Yi
Office Location: Bell Hall 218
Contact Info: E-mail syi@utep.edu
Phone 747-6864

Office Hours: The office hours will be held virtually on MW 13:30 - 14:30 via Zoom.
Textbook(s), Materials: Numerical Analysis, Mathematics of Scientific Computing, Third Edition, by D. Kincaid and E. Cheney.

Course Objectives
(Learning Outcomes): The objectives of the class are to understand
1. the principle of numerical methods
2. how to implement the methods in a computer language (MATLAB)
3. how to apply these methods to application problems

Course Activities/Assignments: **Meetings:** We will meet virtually via Zoom. You will be able to find a link to a virtual classroom once you log in to Blackboard.

Homework: There will be approximately 5-6 homework assignments this semester. Assignments will be posted and collected on Blackboard. Most of the homework problems will be from the textbook. No late homework will be accepted. Your homework should show all necessary work you used to solve problems, and the reasoning and logic underlying all arguments should be clearly spelled out. Some homework assignments will involve computer programming. Computer projects must be done in MATLAB. For every assignment, turn in a complete set of hand-written answers and MATLAB programs along with the outputs.

Assessment of Course
Objectives: The exams will be take-home exams using Respondus Lockdown Browser and Respondus Monitor inside of Blackboard. No notes or textbook materials are permitted during the test. The following dates are tentative exam dates. Please, mark your calendar.

Midterm exam: Monday, Oct. 19 at 10:30 am.

Final exam: Friday, Dec. 11 at 10:00 am.

Grading Policy:	<p>Homework 30%, Midterm exam 30%, Final exam 40%</p> <p>Note: A grade of Incomplete is only used in extraordinary circumstances confined to a limited event. If the student has missed a significant amount of work (e.g. multiple assignments or tasks), a grade of Incomplete is not appropriate or warranted.</p>
Make-up Policy:	<p>Make-up exams will be given only in the case of a documented emergency (e.g. hospitalization, immediate family member's funeral). It is important that you reach out to me immediately and preferably before the exam.</p>
Course Schedule:	<p>8/24: Course introduction Section 2.1: Floating-point numbers and round-off errors</p> <p>8/26: Section 2.1 continued</p> <p>8/31: Section 2.2: Absolute and relative errors, loss of significance errors</p> <p>9/02: Section 2.3: Stable and unstable computations: conditioning</p> <p>9/07: No class (Labor Day Holiday)</p> <p>9/09: Section 3.1: Bisection method</p> <p>9/14: Section 3.2: Newton's method</p> <p>9/16: Section 3.3: Secant method</p> <p>9/21: Section 3.4: Fixed point iteration</p> <p>9/23: Section 4.2: LU and Cholesky factorization</p> <p>9/28: Section 4.3: Pivoting and constructing an algorithm</p> <p>9/30: Section 4.3-continued Section 4.4: Norms and the analysis of errors</p> <p>10/05: Section 4.6: Solution of equations by iterative methods</p> <p>10/07: Section 4.7: Steepest Descent and Conjugate Gradient methods</p> <p>10/12: Section 4.7 continued</p> <p>10/14: Section 6.1: Polynomial interpolation</p> <p>10/19: Midterm</p> <p>10/21: Section 6.2: Divided differences</p> <p>10/26: Section 6.3: Hermite interpolation</p> <p>10/28: Section 6.4: Spline interpolation</p> <p>10/30: Fall drop/withdrawal deadline</p> <p>11/02: Section 7.1: Numerical differentiation and Richardson extrapolation</p> <p>11/04: Section 7.2: Numerical integration based on interpolation</p> <p>11/09: Section 7.3: Gaussian quadrature</p> <p>11/11: Section 8.2: Taylor-series method</p> <p>11/16: Section 8.3: Runge-Kutta methods</p> <p>11/18: Section 8.4: Multistep methods</p> <p>11/23: Section 8.4 continued</p> <p>11/25: Section 8.8: Boundary value problem: Shooting method</p> <p>11/30: Section 8.9: Boundary value problem: Finite-Differences</p> <p>12/02: Section 8.9 continued</p> <p>12/11: Final exam @ 10:00 am</p>

Test proctoring software

The exams will make use of Respondus Lockdown Browser and Respondus Monitor inside of Blackboard to promote academic integrity. You are encouraged to learn more about how to use these programs prior to the first midterm exam.

Please, review the following guidelines:

- A reliable internet connection is essential to completing the exam. If you must go to a location to take the exam (such as the library), be sure to follow their health and safety requirements.
- Respondus Lockdown Browser will require that all internet tabs are closed prior to the start of the test.
- Respondus Monitor requires a webcam and microphone.
- You will be required to show the webcam your student ID prior to the start of the test.
- Your face should be completely visible during the test. Blocking the camera will disable the test.
- No notes or textbook materials are permitted during the test. Respondus Monitor requires you to take a video of your surrounding area (desk, chair, walls, etc).
- You should not have any communications with other people and/or leave and return to the area during the test.

Alternating means of submitting work in case of technical issues:

I strongly suggest that you submit your homework with plenty of time to spare in the event that you have a technical issue with Blackboard, network, or your computer. If you are experiencing difficulties submitting your exam, you can email me your files before the exam end time as a last resort.

Attendance Policy:

Students are expected to participate in scheduled Zoom sessions with a webcam and microphone. The sessions will be recorded and provided so that they can be reviewed at a later time. Students should not record the sessions and post them to any sites outside of Blackboard.

Academic Integrity Policy:

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as one's own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict](#)

[Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

Course Drop Policy:

The UTEP Fall 2020 drop deadline is **October 30, 2020**. We will not approve any student- or faculty-initiated drop requests for a course after that date, except under circumstances of complete withdrawal of all courses due to medical or non-medical reasons.

Accommodation Policy:

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#).