Engineering Analysis II : MECH 3352

Class Meeting: (3:00- 4:20) TR
Location: UGLC-216
CRN: 24764

Instructor: Mohiuddin Ahmad, Ph.D.
Office: AME building, A315
Email: mahmad@utep.edu
Office Hours: TBD
another time by appointment.
Use MS Teams for quick response
Teaching Assistant: Luis Munoz (lemunoz5@miners.utep.edu)
Prerequisites: Engineering Computation, MECH 2103, and Differential Equations, MATH 2326

Textbooks and Electronic Media Required: SC Chapra, "Applied Numerical Methods with MATLAB for Engineers and scientists,"5th, McGraw-Hill.
Required: Computer with access to the UTEP network and Matlab software.
References materials:

- H Moore. "MATLAB for Engineers," 2nd Edition, Prentice Hall
- DV Griffiths and IM Smith. "Numerical Methods for Engineers," 2nd Edition, Chapman & Hall/CRC
- Online materials as provided by the instructor.

Course Objectives
The primary goal is to provide engineering majors with a basic knowledge of numerical methods including root-finding, elementary numerical linear algebra, solving systems of linear equations, curve fitting, and numerical solution to ordinary differential equations, and numerical integration. An advanced programming tool (e.g., MATLAB) will be used for the implementation and application of these numerical methods. The numerical techniques learned in this course enable students to work with mathematical models of technology and systems.
By the end of this course, the students should be able to do the following:

- Structured programming: Understand basic structured programming concepts involving decision making, loops, functions, and parameter passing implemented within the MATLAB programming environment.
- Numerical methods: Understand the most common numerical methods used in engineering analysis, when to use each method, and how to implement basic methods in a structured manner using MATLAB's programming language.

- Numerical accuracy: Estimate the amount of error inherent in different numerical methods.
- Numerical efficiency: Assess the efficiency of a selected numerical method when more than one option is available to solve a certain class of problem.

Class Materials

- Class Notes
- Presentations and Online Materials
- Exams, Quizzes, and Homework

Grading

There will be several assignments at regular intervals during the semester. You are required to submit the assigned work by the deadline. **Late submission of the assigned work will not be allowed** unless medical and extraordinary emergency reasons exist. The following percentages of the assignments, exams, and the project will constitute the basis for the assigning of the final grade in the course:

Grade distribution:

Assessment mode	Description	Overall weight
1) Homework	Assessments assigned outside of the class period will be considered as 'take-home' exercises.	15%
2) Class Participation	In-class exercises will be assigned during the class period and attendance (Quiz +Attendance and Responses)	10%
3) Exam 1	Exam 1	25%
4) Exam 2	Exam 2	25%
5) Exam 3	Exam 3	25%

The instructor reserves the right to revise this grading plan. However, students will be informed of any changes during the semester. **The instructor has the right to drop any student from the class if he/she missed 5 classes.**

Note: If conducting any of the exams gets badly affected due to unforeseen events (e.g., inclement weather, total computing infrastructure failure, etc.), the instructor will use one of the officially assigned days (e.g., class period or final exam time) to re-conduct the affected exam(s).

Letter grade – percentage score conversion method:

Letter grade	Overall percentage score
A	88% < Your score
B	78% < Your score < 88%

C	68% < Your score < 78%
D	58% < Your score < 68%
F	Your score < 58%

Important Dates

Drop/Withdrawal Deadline: April 4th

Class Environment

The in-class conversation will only be allowed during the class-discussion session as allowed by the instructor. No other form of conversations will be allowed during the class period.

Accommodation

Any student in this course who has a disability that may prevent him or her from demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodation necessary to ensure full participation and facilitate your educational opportunities.

Academic Honesty

During exams and quizzes, you are not allowed to use any form of wifi enabled electronic device, including cell phones or other electronic communication devices or methods (wrist watches, earbuds, etc.). No wristwatch or another electronic device may be worn. Calculators may be subject to inspection. You may be asked to remove glasses to allow for their inspection temporarily.

You may not bring backpacks, hats, or bulky coats into the exam room. Lockers are not available at the exam site so plan and leave your belongings in a secure location. You may NOT sit them in the corner of the exam room.

You must show your work for all problems. You must use the paper provided by the instructor. If no work is shown, you may not receive credit. After the exam, the instructor may require you to explain how you solved a problem on the exam. If you refuse to or cannot explain your work, you may be subject to discipline.

No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless explicitly mentioned in writing by the instructor. As a part of the zero-tolerance policy, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam or if you share your work with someone else, you will be reported to the proper authorities, and you may receive a zero on the exam and an F in the class. Other actions, including suspension, may also be pursued.

No one will be allowed to leave the room during an exam. This includes restroom breaks.

University approved recording devices may be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media.

If you are suspected of scholastic dishonesty, you may or may not be directly confronted about your conduct by the instructor or proctor. You will, however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and your exam may not be admissible. Your grade in the class may not be available until OSCCR makes a final ruling; this may adversely impact your ability to enroll in other classes.

If you arrive more than 15 minutes late to an exam, you will not be allowed to take the examination.

There will be no makeup exams administered. If you have a university approved excuse, your instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given.

If you miss more than one exam, the instructor may choose to administratively drop you from the class. This may adversely impact a visa and financial aid.

No food or drink may be brought into the examination room.

Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign in. Not having a UTEP issued ID when asked will result in forfeiture of the exam.

Scholastic dishonesty on homework, lab assignment, and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

Class Attendance Policy

Attendance is mandatory. Anyone with 5 or more absences will be dropped from the class. A drop for not attending will count toward the State Allowed Six-Drop Limit. If you are failing the class at the time of the drop, you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid, and other programs.

As per UTEP rules, you may be asked to show a UTEP ID at any time during class. Anyone who is present and not registered in the class will be subject to disciplinary action unless the instructor gives prior approval.

Excused Absence for Exams

The UTEP catalog allows Exam Absence to be excused ONLY for University-Recognized Activities and very specific other situations. Medical absence is NOT allowed in the UTEP catalog. For consistency with the catalog, students will NOT be excused from exams due to illness.

Harassment Policy

The department has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment would be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made, or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment, but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.
- Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.
- Similar behavior towards department staff and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students and should be treated with due respect.

External Resources

Students are encouraged to make use of external resources in order to expand and improve their learning experience. Attached is a list of links that will be useful during the course.

Name	**Hyperlink**
Dynamic Learning Framework	dlf.utep.edu/
Engineering Technology Center	http://etc.utep.edu/
Mathworks Online Documentation	https://www.mathworks.com/help/matlab/?requestedDomain=www.mathworks.com
Vanderbilt University Online Course	https://www.youtube.com/watch?v=VheLmG7rh9w

Weeks	Date	Readings Due	Assignments Due	Notes
Week 1 1/21-1/27	*Class introduction *Syllabus Chapter-5	MATLAB Programming Roots and Optimizations		
Week 2 1/28-2/3	Chapters 5 and 6	-Roots and Optimizations -Roots-Open Method		
Week 3 2/4-2/10	Chapters 6	-Roots-Open Method		
Week 4 2/11-2/17	Chapter-7	-Optimization		
Week 5 2/18-2/24	Part Three- Linear Systems Chapters 8 &9	**Test#1**	**Test #1 due 2/20** Chapter 5-7	
Week 6 2/25-3/3	Chapter 10	LU Factorization		
Week 7 3/4-3/10	Chapter-12	Iterative Methods Linear and Nonlinear systems		
Week 8 3/11-3/17			Spring Break	

Week 9 3/18-3/24	Chapter-13	Eigenvalues	**Test #2 due 3/20 Chapter 8,9,10,12**	
Week 10 3/25-3/31	Chapter -14-	Curve Fitting		
Week 11 4/1-4/7	Chapter-16	Fourier Analysis		
Week 12 4/8-4/14	Part Five- Chapter-19-	Numerical Integration Formulas		
Week 13 4/15-4/21	Chapter-19- Numerical Integration Formulas	19.4 Simpson's Rules		
Week 14 4/22-4/28	Chapter-20-	Numerical Integration of Functions	Thanksgiving Holiday	
Week 15 4/29-5/5	Chapter-21	Numerical Differentiation	**Test #3 Due to 5/1** Chapter 13,14,19, 20, 21	**End**