MECH 3352: Engineering Analysis II

**Prerequisites:** Successful completion *Engineering Analysis I (Differential Equations)* or equivalent.

**Prepared By:** Dr. Vinod Kumar

**Class time and location:** MW 3:00 - 4:20 PM

**Office hours:** MW 9:00 - 10:00 AM (Instructor: A106) or by appointment

**Contact:** vkumar, or x6075, Engineering Building, RM A106 or E212

**Teaching Assistant:** Ashesh Chattopadhyay (akchattopadh@miners.utep.edu)

1. **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 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.

1. **Textbooks and Electronic media**


**Required:** Computer with an access to the UTEP network and Matlab software

References materials:

• Online materials as provided by the instructor

1. **ABET Program Outcomes Impacted**

This class significantly addresses the following ABET Objectives (From [ABET](#) on page 3):
(a) An ability to apply knowledge of mathematics, science, and engineering
(e) An ability to identify, formulate, and solve engineering problems
(i) Recognize the need for engaging in lifelong learning
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

1. **Class Materials**

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

1. **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 emergency reasons exist. The following percentages of the assignments, exams, and project will constitute the basis for the assigning of the final grade in the course:

<table>
<thead>
<tr>
<th>Grade distribution:</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment mode</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>1) Take-home exercises (home works)</td>
<td>Assessments assigned <strong>outside of the class-period</strong> will be considered as 'take home' exercises.</td>
</tr>
<tr>
<td>2) In-class exercises (quizzes)</td>
<td>Unannounced quizzes will be assigned during the class period.</td>
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<tr>
<td>3) <strong>Exam 1</strong></td>
<td></td>
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<td>4) <strong>Exam 2</strong></td>
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<td>5) <strong>Exam 3</strong></td>
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<tr>
<td><strong>Final exam</strong></td>
<td>Final exam will be comprehensive</td>
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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). If none of the officially assigned dates are available, the instructor will have you an option of either prorating the best exam to replace the affected exam or conduct it on an individual basis. Further clarifications on in-class quizzes: The main purpose of eliminating six assessments is to alleviate any burden caused by uncontrollable issues that can affect a student's ability to perform, e.g., sickness, software connectivity issues, laptop/computing device issues, power outlet, personal issues, crossing-the-border issues, course registration issues. There will be no-make up (see make-up policy for more) for any of these but the instructor will arrange for extra-assessment(s) on individual basis if any student face problems in more than six assessments as a result of technical issues (mostly wireless issues). For wireless issues, please report to the ETC on every occurrence and also inform me (via email) accordingly. ETC and IT is doing their best to resolve any outstanding wireless connectivity issues. I need your help to get it resolved on an urgent basis.

Letter grade – percentage score conversion method:

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Overall percentage score</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>90% &lt; Your score</td>
</tr>
<tr>
<td>B</td>
<td>80% &lt; Your score &lt; 90%</td>
</tr>
<tr>
<td>C</td>
<td>70% &lt; Your score &lt; 80%</td>
</tr>
<tr>
<td>D</td>
<td>60% &lt; Your score &lt; 70%</td>
</tr>
<tr>
<td>F</td>
<td>Your score &lt; 60%</td>
</tr>
</tbody>
</table>

Note: Any outstanding issues related to grading of assigned work (quizzes, exams or projects) should be resolved within two weeks from the day of returning of the graded work as announced in the in class. In case of any disagreement about the grading policy or processes that may arise on individual basis but falls beyond the scope of this syllabus, you should discuss with your department’s undergraduate/graduate coordinator and get appropriate approval.

1. **Academic Misconduct**

Students are encouraged to work together to discuss the subject, however, all graded materials must represent the student individual work. Scholastic dishonesty is the attempt of any student to present as his or her own work of another, or any work which he/she has not honestly performed, or attempting to pass any examination by improper means. Scholastic dishonesty is a serious offense and will not be accepted. Academic misconducts will be handled according to the current university policy.

1. **Accommodation**
Any student in this course who has 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.

IX. Make-up policy
There will be NO make-up exams, quizzes or any other evaluation methods. Under exceptional conditions (usually medical conditions), however, you may be allowed to have make-up exams or quizzes. In this case, the instructor will require appropriate supporting materials. Additionally, you must participate in at-least 75% of all the scheduled in-class assessments to qualify for any make-up exams or quizzes.

1. Class Environment

In-class conversation will only be allowed during the class-discussion session as allowed by the instructor. No other form conversation will be allowed during the class.