

ECE 300: Advanced Engineering Mathematics

Term: Fall 2023

Instructor: Milad Marvian (mmarvian@unm.edu)

Office: ECE 235-D

Time and Location:

Lectures: Tuesdays and Thursdays 12:30-13:45 at MECH 208

Lab session: Wednesdays 11:00-11:50 MECH 208

Office hours: Mondays 5:15-6:15pm in-person in my office or on Zoom: <https://unm.zoom.us/my/marvian>
Additional time for in-person or virtual meetings can be scheduled by email.

Canvas: All announcements, assignments, and supplementary material will be distributed in <https://canvasinfo.unm.edu/>. It is your responsibility to check it regularly.

Grader: Saneeth Reddy Etikala < setikala@unm.edu >

Office hours: Wednesdays 4-5pm, Location: <https://unm.zoom.us/j/94857877032>

Credit Hours: 4

Prerequisite: MATH 1522

Midterms: Midterm 1: October 11 (Wednesday) 11:00-12:15

Midterm 2: November 15 (Wednesday) 11:00-12:15

Course Goals:

The course will introduce students to methods to solve first and second-order ordinary differential equations, Laplace and Fourier transforms, and also basic concepts in linear algebra including vector spaces and linear transformations, matrices, the eigenvalue problem, and singular value decomposition. Applications using MATLAB will be emphasized.

Course Outline:

- First-Order Differential Equations
- Second-Order Differential Equations
- Laplace and Fourier Transforms
- Systems of Linear Equations and Matrices
- Vector Spaces and Linear Transformations
- Eigenvalues and Eigenvectors

- Systems of First-Order Equations

Each topic will roughly take two weeks.

Textbooks:

- 1) Differential Equations and Linear Algebra by Stephen W. Goode and Scott A. Annin, fourth edition.
- 2) Worldwide Differential Equations with Linear Algebra by Robert McOwen.

The other recommended textbook is:

- 3) Differential Equations and Linear Algebra by Gilbert Strang.

Links to other resources will be provided on the course website.

Grading Policy:

- Homework (30%): Homework will be assigned weekly. The solutions should be submitted as a single pdf file through UNM Learn. Both typed or a clean scan of handwritten solutions (in one PDF file) are accepted. The two lowest scores will be dropped. We will often have bonus problems in the homework.

A clean presentation of the solutions is evaluated and is part of the grading. Every step in the derivations needs sufficient explanation and contributes to the grade.

Discussions on the problem sets are encouraged. But the final solution must be written individually, and any collaboration/discussion on the problem set needs to be acknowledged in the returned solutions.

- Weekly quizzes (10%): Each recitation session starts with a short quiz (10 to 15 minutes) with one or two questions similar or related to the homework problems that were due earlier that week. You can think of this as one extra homework problem that you do during the recitation session. (So don't be late for the recitation session.) Solutions to the homework problems will be provided after the quiz and during the recitation session. The two lowest scores of the weekly quizzes will be dropped.
- Two mini projects with MATLAB ($2 \times 2.5\%$)
- Two midterms ($2 \times 15\%$): dates to be determined.
- Final exam (25%): Cumulative exam, but with more weight on the last third of the course.
- Active class participation (5%).

Rather than curving grades at the end of the semester, the grading policy encourages active participation in class during the semester. The sum of the percentages listed above is 105%; in addition, we will often have bonus problems in the homework.

Grade Scale: 100-90: A; 90-80: B; 80-70: C; 70-60: D; < 60: F
(for example, 70-72.99 will be C−, and 73-76.99 will be C, and 77-79.99 will be C+)

MATLAB

We will use MATLAB in this course. You can download and obtain the license from here: <http://it.unm.edu/download/>

Feedback

I encourage you to give me feedback on how the course is going for you. This will help me to adjust the course to maximize your gain. In week 5 of the class, I will send an anonymous feedback form to check on everyone and whether we should make adjustments.

Academic dishonesty

Please familiarize yourself with [UNM's Student Code of Conduct](#). In particular:

“2.4. Academic dishonesty, including, but not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.”

and the [Student Disciplinary Procedure](#).

COVID-19 Health and Awareness:

UNM is a mask friendly, but not a mask required, community. If you are experiencing COVID-19 symptoms, please do not come to class. If you do need to stay home, please communicate with me at mmarvian@unm.edu; I can work with you to provide alternatives for course participation and completion. Let me, an advisor, or another UNM staff member know that you need support so that we can connect you to the right resources. Please be aware that UNM will publish information on websites and email about any changes to our public health status and community response.

Support:

- Student Health and Counseling (SHAC) at (505) 277-3136. If you are having active respiratory symptoms (e.g., fever, cough, sore throat, etc.) AND need testing for COVID-19; OR If you recently tested positive and may need oral treatment, call SHAC.
- LoboRESPECT Advocacy Center (505) 277-2911 can offer help with contacting faculty and managing challenges that impact your UNM experience.

Accommodations:

UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class

and/or program, please contact Accessibility Resource Center at arcsrvs@unm.edu or by phone at 505-277-3506.

Support: Contact me at mmarvian@unm.edu or in office/check-in hours and contact Accessibility Resource Center (<https://arc.unm.edu/>) at arcsrvs@unm.edu (505) 277-3506.

Credit hour statement:

This is a four credit-hour course. Class meets for two 75-minute sessions of direct instruction, in addition to a 50-minute of lab session, for fifteen weeks during the Fall 2023 semester. Please plan for a *minimum* of eight hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

Support: Resources to support study skills and time management are available through [Student Learning Support](#) at the Center for Teaching and Learning.

Title IX:

To meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered “responsible employees.” This designation requires that any report of gender discrimination, which includes sexual harassment, sexual misconduct and sexual violence, made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office Compliance, Ethics and Equal Opportunity (ceeo.unm.edu). For more information on the campus policy regarding sexual misconduct and reporting, see: <https://policy.unm.edu/university-policies/2000/2740.html>.

Support: [LoboRESPECT Advocacy Center](#) , the [Women’s Resource Center](#) and the [LGBTQ Resource Center](#) all offer confidential services.

Land Acknowledgement:

Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

Resource: [Division for Equity and Inclusion](#).

Citizenship and/or Immigration Status:

All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration’s welcome is found on our website: <http://undocumented.unm.edu/>.

Respectful and Responsible Learning:

We all have shared responsibility for ensuring that learning occurs safely, honestly, and equitably. Submitting material as your own work that has been generated on a website, in a publication, by an artificial intelligence algorithm, by another person, or by breaking the rules of an assignment constitutes academic dishonesty. It is a student code of conduct violation that can lead to a disciplinary procedure. Please ask me for help in finding the resources you need to be successful in this course. I can help you use study resources responsibly and effectively. Off-campus paper writing services, problem-checkers and services, websites, and AIs can produce incorrect or misleading results. Learning the course material depends on completing and submitting your own work. UNM preserves and protects the integrity of the academic community through multiple policies including policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the Student Pathfinder (<https://pathfinder.unm.edu>) and the Faculty Handbook (<https://handbook.unm.edu>).

Support: Many students have found that time management workshops or work with peer tutors can help them meet their goals. These and are other resources are available through Student Learning Support at the Center for Teaching and Learning.

Connecting to Campus and Finding Support:

UNM has many resources and centers to help you thrive, including [opportunities to get involved](#), [mental health resources](#), [academic support including tutoring](#), [resource centers](#) for people like you, free food at <https://loborespect.unm.edu/services/lobo-food-pantry.html>, and [jobs on campus](#). Your advisor, staff at the [resource centers](#) and [Dean of Students](#), and I can help you find the right opportunities for you.

Safety:

UNM offers several resources to help keep Lobos safe. LoboGuardian, <https://loboguardian.unm.edu> is a mobile app that increases user safety by creating a virtual safety network of friends and family. The entire UNM campus has blue light emergency phones. UNM Police Department, tel.: (505) 277-2241, offers a free escort service for safety. Lobo Alerts <https://loboalerts.unm.edu> is UNM's emergency text messaging system that can inform you of any occurrences that impact safety. Get Help Now at <https://loborespect.unm.edu/GetStudent> Health Services <https://shac.unm.edu> provides counseling and health services to all students.