Mathematical Engineering
Fall, 2020
Lecture: on M W F, 11:00 – 11:50

Instructor: Sihua Shao
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Office Hours: Same-day or next-day appointment (Zoom)

Course Description: Standard programming languages in engineering are applied to data acquisition, data analysis, and mathematical modeling and computations. Fundamental concepts in MATLAB and C are used to develop programming skills and techniques by addressing problems related to electrical engineering.

Mode of Instruction: Synchronously online delivery via Zoom with asynchronous video recording (access through Canvas - *Panopto Recordings* tab) for later review.

Co-requisites: *MATH 131* (Calculus and Analytic Geometry I)

Place in Curriculum: This course is normally offered in Fall semester, for both majors and non-majors. It is a requirement for the Electrical Engineering major.

Course Learning Outcomes:
After completion of this course, students are expected to be able to:

- Use MATLAB to perform basic matrix operations.
- Program and plot with MATLAB functions and files.
- Understand data types, functions, array, and pointers in C programming.
- Solve engineering problems with MATLAB and C.

Program Learning Outcomes: https://www.nmt.edu/academics/eleceng/undergrad/index.php

Course Requirements:
Textbook: *MATLAB for Engineering Applications, Fourth Edition. William J. Palm III, McGraw Hill, 2019.*

Other Resources:

- "Learn MATLAB" available to view as web pages at https://www.tutorialspoint.com/matlab/ or purchase as a pdf at https://www.tutorialspoint.com/matlab/matlab_pdf_version.htm
- "Learn C Programming" available to view as web pages at https://www.tutorialspoint.com/cprogramming/ or purchase as a pdf at https://www.tutorialspoint.com/cprogramming/cprogramming_pdf_version.htm

Where to find MATLAB:

- MATLAB is installed on computers in labs maintained by Information Technologies and Communications (ITC) (see https://www.nmt.edu/itc/itclabs.php for a list of rooms) and electrical engineering (Workman Center 116 and 187)
- MATLAB can be purchased at
  - MATLAB's website - https://www.mathworks.com/academia/student_version.html
  - New Mexico Tech's bookstore
- GNU Octave, which is largely compatible with MATLAB, can be downloaded and used for free - https://www.gnu.org/software/octave/

Where to find C:

- GNU C/C++ compiler is free with versions readily available for Linux, Mac OS and Windows
- Remote use of computers maintained by ITC (see https://www.nmt.edu/itc/itclabs_remote.php) or electrical engineering on which GNU C/C++ compiler is installed

Course Schedule:
The first 2/3 of the course will be used to cover Chapters 1-5 and 8 of the textbook (MATLAB). The remaining of the course will be used to cover the basics of C programming.

Grading:

- Homework: 45%
- Projects: 45%
- In-class quest (group): 10%

A	90-100	C	70-72
A-	86-89	C-	66-69
B+	83-85	D+	63-65
B	80-82	D	60-62
B-	76-79	F	<60
C+	73-75		

Homework will typically due one week after the post date. Projects will typically due three weeks after the post date. Submission of homework and projects will be done via Canvas online assignment portal. Students may work together on homework and projects but must turn in individual assignments that CANNOT BE IDENTICAL. Late homework and projects will not be accepted unless requested via email before the due date with a valid reason (e.g., family emergency).

In-class quest: i) 10 minutes at the beginning of each lecture. ii) 4 or 5 students in each group, 2 or above show up in the synchronous course can take the quest. iii) Performance during the in-class quest will be used as reference to determine the final score. iv) Given a certain topic, the group will decide who will be raising the question and who will be solving the question.

Academic Honesty: New Mexico Tech's Academic Honesty Policy for undergraduate and graduate students is found in the student handbook, which can be found at: https://www.nmt.edu/studentlife/dos/NMT%20Student%20Handbook%202019-20.pdf. You are responsible for knowing, understanding, and following this policy.

Reasonable Accommodations:
New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs known to the Office for Disability Services (ODS) as soon as possible. To schedule an appointment, please call 835-6209, or email disability@nmt.edu.

Counseling Services:
New Mexico Tech offers individual and couples counseling, safety assessments, crisis intervention and consultations through The Counseling Center. These confidential services are provided free of charge by licensed professionals. For more information, please call 835-6619, email counseling@nmt.edu or complete an Intake Form on our website at https://www.nmt.edu/cds/. All services are provided via phone or Zoom during the Covid-19 pandemic.

Respect Statement: New Mexico Tech supports freedom of expression within the parameters of a respectful learning environment. As stated in the New Mexico Tech Guide to Conduct and Citizenship: "New Mexico Tech's primary purpose is education, which includes teaching, research, discussion, learning, and service. An atmosphere of free and open inquiry is essential to the pursuit of education. Tech seeks to protect academic freedom and build on individual responsibility to create and maintain an academic atmosphere that is a purposeful, just, open, disciplined, and caring community."

COVID-19 Safety Issues for Face-to-Face Instruction: Students must follow campus-wide safety protocols, including mandatory use of face coverings and maintaining a minimum of 6 ft social distance from other students and faculty. Students should not enter the classroom earlier than 10 minutes prior to start of class and should exit the classroom within 10 minutes of the end of class. Students who fail to comply are subject to disciplinary procedures. [*Only needed for F2F classes.*]

Title IX Reporting:
Sexual misconduct, sexual violence and other forms of sexual misconduct and gender-based discrimination are contrary to the University's mission and core values, violate university policies, and may also violate state and federal law (Title IX). Faculty members are considered "Responsible Employees" and are required to report incidents of these prohibited behaviors. Any such reports should be directed to Tech's Title IX Coordinator (Dr. Peter Phaiah, 20D Brown Hall, 575-835-5187, titleixcoordinator@nmt.edu). Please visit Tech's Title IX Website (www.nmt.edu/titleix) for additional information and resources.