

BMEN 1400 Software for Biomedical Engineers Spring 2026

Welcome to UNT!

As members of the UNT community, we have all made a commitment to be part of an institution that respects and values the identities of the students and employees with whom we interact. UNT does not tolerate identity-based discrimination, harassment, and retaliation. UNT's full Non-Discrimination Policy can be found in the UNT Policies section of the syllabus.

Instructor

Dr. Xiaodan Shi

Email: Xiaodan.Shi@unt.edu

Lecture: M and W, 8:30-9:50 AM @ DP-B150

Office Hours: M and W, Th, 1-2 PM @ DP-K240J or by appointment via email

Teaching Assistants

Nastaran: NastaranJafari@my.unt.edu (Sections 302, 304)

Nowshin: NowshinNawal@my.unt.edu (Sections 303, 305)

Apoorva: ApoorvaSatishJanorkar@my.unt.edu (Sections 301, 306)

Course Description

An entry-level course to introduce the common programming language (e.g., MATLAB) used in biomedical engineering practice. Medical applications such as measurements in the physiological systems, detection and diagnosis of diseases, and monitoring of biomedical devices will be discussed in various examples.

A brief list of topics to cover:

- Introduction to computer programming
- Variables and data types
- Control structures and functions
- File input and output
- Visualization and imaging processing
- GUI/App development

Course Objectives

Upon completion of this course, students will be able to: (1) gain a general understanding of C-based coding language; (2) practice computational data processing in the field of biomedical engineering; (3) understand the connections among computational methods, mathematics, and biomedical engineering. *To succeed in the course, dedicated practice outside of class is strongly encouraged.*

Prerequisites or co-requisites: MATH 1650 with a grade of C or better

ABET Outcome 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

ABET Outcome 7: Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Course Materials

No required textbook. All course materials will be posted on Canvas, including lecture notes, assignments, readings, other companion materials, etc. Recommended reference:

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- *MATLAB Programming for Biomedical Engineers and Scientists*, by Andrew P. King and Paul Aljaba (ISBN: 9780128122037 2017)

Major Assignments and Grading

The following grade weights are subject to change.

Attendance and Participation	10%	A	89.5 – 100%
Homework and Quizzes	20%	B	79.5 – 89.4%
Laboratory	25%	C	69.5 – 79.4%
Exams	30%	D	59.5 – 69.4%
Final Project	15%	F	< 59.5%

Important Dates

1/19	Martin Luther King Day, no class
2/18	Exam 1 (8:30-9:50 AM)
3/9-13	Spring Break, no class
4/1	Exam 2 (8:30-9:50 AM)
5/3	Final Project

Communication Expectations

- You are expected to regularly check university emails and Canvas announcements. When you miss a class, you are expected to check the course calendar shortly after class to be aware of assignments, quizzes, and other materials. For quick questions, ***email via Outlook is preferred*** (Canvas messages may be missed), and you can expect a response within 24 hours during the work week (M-F). For involved questions or discussions, office hours are preferred.

Attendance Policy

- Research has shown that students who attend class are more likely to be successful. Being punctual indicates our respect for others. If you are late, know that you are welcome to join the class, but please do so without distracting others.
- Attendance is mandatory. Full attendance is worth 10% in the final grade. Arriving at class more than 30 minutes late or leaving early will be considered absent. <https://policy.unt.edu/policy/06-039>

Homework, Quizzes, In-class Exercises

- Homework will be submitted through MATLAB Grader unless otherwise stated. All students are expected to start an account on the MathWorks website to access this (see class materials for the online learning section). Some homework assignments may be submitted through Canvas at the instructor's discretion.
- Quizzes will be given on Canvas periodically. There will be no time limit, and the use of notes is encouraged. However, only one attempt will be given per quiz.
- Late policy: 25% deduction from the received raw score per day of lateness.
- You are expected to ***bring a MATLAB-supported device to every class***. Graded in-class exercises may be randomly given to review/test the covered content.

Exams

- **Exam 1** is closed-book and will be delivered *via Respondus Lockdown Browser (no webcam needed) in person in class*. No bio-breaks or use of other electronic devices during exams. A mixture of multiple choice, matching, true/false, and practical coding questions will be included. You are expected to understand, read, and write MATLAB syntax without notes.

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- **Exam 2** aims to assess your problem-solving skills in coding. Practical coding problems will be the focus for this exam, and the use of notes and MATLAB is allowed. Be aware that studying and practicing MATLAB problems before exam day is essential for success.
- You will have one timed (80 minutes) attempt on each exam. Students who requested an Alternate Testing accommodation from the Office of Disability Access (ODA) will receive extra time on timed exams. <https://studentaffairs.unt.edu/office-disability-access/students/requesting-letters>
- No make-up exams will be given without a university-approved permission. https://policy.unt.edu/sites/default/files/06.039_StudAttnandAuthAbsence.Pub2_.19.pdf
- Students who have *more than two* final exams scheduled on one day may request to reschedule one of the examinations on another day during the final examination period as follows: <https://registrar.unt.edu/exams/exam-policies>

Final Project

- You are expected to complete your project independently and to submit your own unique code. Discussions over problem-solving methods amongst classmates are permitted, but under no circumstances is copying code acceptable. Turnitin will be used to assess plagiarism. A grade of zero will be awarded if you are found to be cheating.
- The project topic will be introduced around the midpoint of the semester. The topic will likely be coding a game, as it is easy to test whether the code is working properly.
- Rough draft/Milestone assignments will be due leading up to the final due date of the project. These assignments will account for a percentage of your final project grade. Failure to submit any work or submitting a blank document will result in a zero.

Rough Draft 1/Code Diagram	15%
Rough Draft 2	25%
Final Submission	60%

Academic Integrity Policy

According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to, cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in penalties or sanctions, including admonition and expulsion from the University.

Prohibition of Discrimination, Harassment, and Retaliation

The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities. The University takes active measures to prevent such conduct and investigates and takes remedial action when appropriate. <https://policy.unt.edu/policy/16-004>

Class Materials for Online Learning

This course includes online learning components. To fully participate in this class, you will need internet access to reference content on Canvas and Respondus Lockdown Browser. Information on how to succeed in an online learning environment is available at Learn Anywhere (<https://online.unt.edu/learn>).

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The tentative schedule is subject to change in any way that serves the best interests of teaching and learning outcomes.

#	Date	Day	Topics
1	1/12	M	Introduction
2	1/14		MATLAB environment
3	1/19	M	Martin Luther King Day
4	1/21		Variables, arrays
5	1/26	M	Variables, arrays
6	1/28		Data types
7	2/2	M	Data types
8	2/4		Data types
9	2/9	M	Control structures
10	2/11		Control structures
11	2/16	M	Control structures
12	2/18		Exam 1
13	2/23	M	Control structures
14	2/25		Functions
15	3/2	M	Functions
16	3/4		Functions
17	3/9	M	Spring break
18	3/11		Spring break
19	3/16	M	File input/out
20	3/18		File input/out
21	3/23	M	Program development & Testing
22	3/25		Program development & Testing
23	3/30	M	Visualization
24	4/1		Exam 2
25	4/6	M	Visualization
26	4/8		Image processing
27	4/13	M	Image processing
28	4/15		GUI
29	4/20	M	GUI
30	4/22		GUI
31	4/27	M	GUI
32	4/29		Pre-final day
33	5/3		Final Project due