

**BMEN 1300.001 Discover Biomedical Engineering
Fall 2025**

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

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Office Location: Discovery Park K240 J

Office Phone: 940.369.8950

Office Hours: Th 1-3 PM, or by appointment via email

Lectures: T/Th 8:30-9:20 AM @ Discovery Park B185

Lab Location: Discovery Park E225B (**no labs in the first week; all labs start from the second week**)

Course Description

- Exploratory core course in Biomedical Engineering (BMEN), which shapes the BMEN student's first-year experience. The course covers basic concepts of biomedical engineering and their connection with the spectrum of human activity. It serves as an introduction to the fundamental science and engineering on which biomedical engineering is based.
- Prerequisites: None

Course Objectives

- Upon completion of the course, students should be able to gain (1) an understanding of engineering ethics and professionalism; (2) insight into BMEN research through invited guest speakers; (3) problem-solving skills in engineering; (4) an understanding of engineering and mathematics fundamentals. The laboratory exercises and projects teach students to think critically and creatively by applying various analysis techniques borrowed from many engineering and science disciplines.
- ABET Outcomes 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Brief List of Topics to Cover

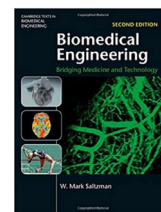
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|--------------------------------------|--------------------------------------|
| • Cell culture technology | • Artificial implants |
| • Stem cell engineering | • Introduction to bioinstrumentation |
| • Engineering of immunity | • Introduction to 3D (bio)printing |
| • Introduction to biomaterials | • Clinical translation and ethics |
| • Tissue engineering and bioreactors | |

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Course Materials

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

Biomedical Engineering: Bridging Medicine and Technology (2nd Edition) by Mark Saltzman
(ISBN 9781107037199)



Major Assignments and Grading

• Attendance	5%	A	89.5 – 100 %
• Homework and Quizzes	20%	B	79.5 – 89.49 %
• Laboratory	25%	C	69.5 – 79.49 %
• Three Exams	45%	D	59.5 – 69.49 %
• Term Essay	5%	F	< 59.5 %

Important Dates

- Labor Day Holiday 9/1 (No Class)
- Exam 1 9/18 (8:15-9:20 AM)
- Exam 2 10/23 (8:15-9:20 AM)
- Exam 3 12/9 (8:30-10 AM)
- Mock Freshman Design 11/13 (8:30-9:20 AM) (subject to change)
- Thanksgiving Holiday 11/24-28 (No Class)

Course Policy

Communication Expectations

- You are expected to regularly check university emails and Canvas announcements (make sure to turn push notifications on!). When you miss a class, you are expected to check the course calendar shortly after class to be aware of announcements, assignments, quizzes, and other materials. For quick questions, UNT email via Outlook is preferred, and you can expect a response within 24 hours during the workweek (M-F). Office hours are preferred for questions or discussions that are inappropriate for the TAs.

Attendance and Participation (5%)

- Research has shown that students who attend class are more likely to be successful. You are expected to participate in every class unless you have a UNT-approved absence. Full attendance is worth 5% in the final grade. Being punctual indicates our respect for others. If you are late, you are welcome to join the class, but please do so without distracting others.
- If you cannot attend a class due to an emergency, please *provide a copy of official documentation to the instructor or any TA at your earliest convenience*. For a list of acceptable excused absences, refer to the UNT policy <https://policy.unt.edu/policy/06-039>

Laboratories (25%)

- A separate lab syllabus can be expected on Canvas in your lab section.
- The teaching assistants are in full charge of the labs. For lab-related questions, directly communicate with your respective TA.

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Homework and Quizzes (20%)

- Homework is due at the designated time unless otherwise stated and must be submitted to Canvas in *MS Word or PDF files*. Handwriting copies, photocopies, email attachments, or wrongly submitted documents will *NOT* be accepted.
- Quizzes will be given on Canvas periodically. For each quiz, you will have *two* timed attempts (15 minutes each); the higher score will be retained. After the graded quiz is closed, you may use the non-graded practice quiz to review quiz questions.
- Late policy: 2% deduction per hour lateness. Submission portals will automatically close 50 hours after the designated due time, resulting in a zero score.

Exams (45%)

- Three *in-person, sectional, closed-book* exams will be given throughout the semester. Each exam will only cover materials from the previous lecture section; there will be *no* cumulative exams. Exam questions will be a combination of multiple-choice, true-or-false, fill-in-the-blank, matching, short-answer, calculation, and other types.
- For each exam, you will have *one* timed attempt. Students who have requested an Alternate Testing accommodation from the Office of Disability Access (ODA) will be given extra time on each timed exam. You are responsible for contacting the ODA and testing center to schedule a time and space.
<https://studentaffairs.unt.edu/office-disability-access/students/requesting-letters>
- Students who are more than 30 minutes late to the classroom after the start time will *NOT* be allowed to take the exam.
- All exams will be delivered via *Respondus Lockdown Browser* on Canvas and must be taken *in person in the classroom*. You are expected to resolve any potential technical difficulties in advance, including compatibility issues, updates, and internet connection problems. No other electronic devices or bio-breaks (without ODA accommodations) are allowed during exams. Download the software:
<https://download.respondus.com/lockdown/download.php?id=165715487>
- Make-up exams will *NOT* be given without UNT-approved excuses per UNT policy 06-039.
- If you have *more than two (three or more)* final exams scheduled on one day, you may request to reschedule one of the exams for another day during the final examination period.
<https://registrar.unt.edu/exams/exam-policies>

Term Essay (5%)

- You are expected to independently write a term essay due at the semester's end. The general goal is to reflect on what you learned throughout the semester. Details and requirements will be posted on Canvas later.
- Turnitin will be used for similarity checks and AI-assisted writing checks. A similarity score or AI-assisted writing score of 20% or higher will be considered plagiarism, violating Academic Integrity Policy 06-003.

UNT Policy

Academic Integrity Policy

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- Academic Integrity Standards and Consequences. 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 a range of academic penalties or sanctions, ranging from admonition to expulsion from the University. <https://policy.unt.edu/policy/06-003>

Prohibition of Discrimination, Harassment, and Retaliation

- 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>

ADA Policy

- UNT makes reasonable academic accommodations for students with disabilities. Students seeking accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding the student's specific course needs. Students may request accommodations at any time; however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Students must obtain a new letter of accommodation for every semester and meet with each faculty member before implementation in each class. For additional information, see the ODA website. <https://disability.unt.edu/>

Course Safety Procedures (for Laboratory Sections)

- While working in laboratory sessions, students enrolled in BMEN 1300 are required to follow proper safety procedures and guidelines in all activities requiring lifting, climbing, walking on slippery surfaces, using equipment and tools, handling chemical solutions, and hot and cold products. Students should be aware that UNT is not liable for injuries incurred while students are participating in class activities. All students are encouraged to secure adequate insurance coverage in the event of accidental injury. Students who do not have insurance coverage should consider obtaining Student Health Insurance. Brochures for student insurance are available in the UNT Student Health and Wellness Center. Students injured during class activities may seek medical attention at the Student Health and Wellness Center at reduced rates compared to other medical facilities. If students have an insurance plan other than Student Health Insurance at UNT, they should ensure that it covers treatment at this facility. If students choose not to go to the UNT Student Health and Wellness Center, they may be transported to an emergency room at a local hospital. Students are responsible for expenses incurred there.

Emergency Notification & Procedures

- UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to the UNT Learning Management System (LMS) for contingency plans for covering course materials.

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*** This schedule is subject to change in any way that serves the educational needs of the students enrolled in this course.*

#	Date	Day	Tentative Topic
1	8/19	T	Curriculum Overview by Department Chair
2	8/21	Th	Syllabus and Introduction to BME
3	8/26	T	Introduction to BME + Cellular basics for BME
4	8/28	Th	Cellular basics for BME
5	9/2	T	Cell culture techniques
6	9/4	Th	Cell culture techniques contd.
7	9/9	T	Stem cells as building blocks
8	9/11	Th	Stem cells as building blocks contd.
9	9/16	T	<i>Special Topic – Cure the broken heart by itself: the magic of iPSCs</i>
10	9/18	Th	Exam 1 (8:15-9:20 AM)
11	9/23	T	Engineering of immunity
12	9/25	Th	Engineering of immunity contd.
13	9/30	T	Engineering of immunity contd.
14	10/2	Th	Introduction to biomaterials
15	10/7	T	Introduction to biomaterials contd.
16	10/9	Th	Introduction to Tissue Engineering
17	10/14	T	Introduction to Tissue Engineering contd.
18	10/16	Th	<i>Special Topic - Smart Polymers</i>
19	10/21	T	<i>Special Topic – Biomimetics: Organ-on-chip systems</i>
20	10/23	Th	Exam 2 (8:15-9:20 AM)
21	10/28	T	Introduction to artificial implants
22	10/30	Th	Artificial implants contd.
23	11/4	T	Artificial implants contd.
24	11/6	Th	Artificial implants contd.
25	11/11	T	Artificial implants contd.
26	11/13	Th	Mock Freshman Design
27	11/18	T	<i>Special Topic – TBD</i>
28	11/20	Th	<i>Special Topic – TBD</i>
29-30	11/24-28	T	Thanksgiving Week, no classes
31	12/2	T	Organ transplant and ethics in BME
32	12/4	Th	Pre-final day, no class
33	12/9	T	Exam 3 (8:30-10 AM)