BMEN 3200 Course Syllabus (Summer 2025)

Course Information

Course Number & Section:	BMEN 3200
Course Title:	Biomedical Engineering Fundamentals and Design Lecture + Lab
Term:	Summer 2025
Location:	ML1 1.118
Meeting Times:	Tuesday & Thursday 10:00 AM – 12:45 PM

Contact Information

Teacher	Angeloh Stout MSc.
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Office Phone	TBD
Office Location	TBD
Office Hours	TBD
Other Information	Additional office hours by appointment

Teaching Assistant	Tarik Shihabeddin
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Other information	TBD

Client	David Schmidtke
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Office Hours	Office hours via appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Pre-Requisites:

- BMEN 3220 (Electrical and Electronic Circuits in Biomedical Engineering Lab)
- BMEN 3320 (Electrical and Electronic Circuits in Biomedical Engineering)
- BMEN 3331 (Cell and Molecular Engineering)
- BMEN 3399 (Introductory Biomechanics)

If you have not mastered or forgotten these concepts, please visit me or the TA and we will provide resources that can help you learn and review the material which should prepare you for this course.

Course Description

This course will cover the fundamentals of biomedical engineering and design techniques through a combination of labs, lectures, and a guided design project.

Students will learn the broad fundamentals of biomedical engineering and also the design process including such topics as ethical behavior, particularly with respect to human and animal subjects, intellectual property considerations, global biomedical engineering, codes and standards, and FDA regulations.

The students will receive hands-on training on machining, wet-lab techniques, computer-aided modeling and simulation, basic electrical and electronic circuit design and computer programming.

Completion of this course will provide students with the skills and knowledge to enable them to be successful in future design courses

Student Learning Objectives/Outcomes:

1. **Apply design principles to a bioengineering problem and create potential solutions based on client specifications (SO2 - Engineering Design)**
2. **Fabricate and assemble a prototype that meets a client's requirements (SO2 Engineering Design)**
3. **Test and analyze systems to draw conclusions (SO6 - Analyze Data)**
4. **Document work in technical reports and verbally communicate project results to an audience (SO3 – Communication)**
5. **Develop team collaboration skills (SO5 – Teamwork)**

Textbooks and Materials

Required Materials: Computer with internet, webcam, and audio

Recommended Textbook(s): Zenios, Makower, Yock, "Biodesign: The Process of Innovating Medical Technologies", 1st ed., Cambridge University Press, 2009. (ISBN 978-0521517423)

Assignments & Grading Policy

The final course grade will be determined based on the following assessments:

- Individual Assignments **(40%)**
- Final Group Grade **(60%)** = Group Assignments x Peer Evaluations

From the percentage points, letter grades will be assigned according to the following table:

Letter Grade	Numerical Grade
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	≤60%

Letter grades are reflective of course performance:

A – Expectational performance that would result in *employee earning a promotion*

B – Satisfactory performance that would result in *employee earning a bonus*

C – Employee *performance is acceptable*, but it will not lead to bonus or advancement

D – Employee would be put *"on notice"* at a company and would require significant additional oversight

F – *Unsatisfactory performance* resulting in employee being fired

You will be expected to allow for a minimum of two hours working outside of class for every credit hour.

Assignment Breakdown

Individual Assignments (40%)

Individual Assignments	40%	
Professionalism	10%	
Training Requirements (6)	5%	**(0.83% each)**
Reflections (5)	10%	**(2% each)**
Pre- Labs (2)	15%	**(7.5% each)**

Attendance will be recorded in each class. All assignments must be done individually.

****Failure to meet satisfactory performance (28% out of 40% in Individuals Assignments) in this category will result in your grade becoming a minus (e.g., B → B-)**

Professionalism

Professionalism is assessed based on attendance and individual performance/behavior during class, labs, and lectures. Active participation is essential, and failure to engage in these activities will result in deductions from your grade. Professionalism also includes being punctual, contributing to discussions and group work, and maintaining a respectful attitude towards peers and instructors.

Training Requirements

Training requirements include completing the mandatory BioRaft training, which is essential for fabricating or working in certain labs. Failure to complete this training will prevent you from being able to work in the lab, resulting in a zero for the corresponding lab section. It is important to complete all required training before attempting related tasks to ensure both safety and the ability to fully participate in the project.

Reflections

Reflections are free-response feedback documents where students analyze and discuss topics covered during lectures. Grading will be based on the clarity of your responses, as well as the depth and thoughtfulness of your reflections. Simply completing the document without thorough engagement or understanding will result in a lower grade, so it is important to take the time to reflect meaningfully on the material covered.

Pre-Labs

Pre-labs will focus on topics such as Arduino and electrospinning. Students will be required to answer a set of questions related to these topics in preparation for the upcoming lab sessions. Grading will be based on the correctness of the answers provided, ensuring students understand the concepts before engaging in hands-on work.

Final Group Grade (60%) = Groups Assignments × Peer Evaluations

Group Assignments	60%	
Team Contract and Outing	1%	
Design Updates (4)	8%	**(2% each)**
Post – Labs (2)	8%	**(3% each)**
Preliminary Design Review	5%	
Final Prototype Demonstration	9%	
Final Design Review	10%	
Final Design Report	15%	
Client Evaluation	4%	**(2% each)**

Only one submission is required per team for group assignments. All members will receive the same score for an assignment, provided they actively participate. Members who did not contribute/participate in assignment will receive a 0%.

All group assignments are subjected to follow the CORPORATE GUIDELINES failure to do as such will result in reduction on grading regarding formatting.

Team Contract:

The Team Contract is a collaborative agreement created by all team members at the start of the project. It should clearly outline each member's roles and responsibilities, communication expectations (such as response times and meeting frequency), and procedures for resolving conflicts. The contract must also specify penalties for failing to meet team expectations—for example, a member who is late to a meeting may be required to take on a specific task—and define a clear process for team expulsion, such as a three-strike policy, unanimous team vote, or escalation to the instructor. In addition, the assignment includes participation in a team outing to encourage bonding and collaboration outside the classroom. This assignment is graded on a pass/fail basis and will be evaluated based on the clarity and completeness of the contract, including well-defined expectations and expulsion procedures.

Design Updates:

The design updates are living documents that evolve through each iteration, ultimately culminating in the final design report. Each update focuses on a specific phase of the design process and builds upon the work completed previously. Design Update 1 lays the foundation by clearly defining the project background, problem statement, and design requirements. In Design Update 2, the team shifts to concept generation, with each member contributing three distinct ideas, resulting in approximately 15 to 18 initial concepts per team. Design Update 3 is divided into two parts: the first outlines how the team will verify that each design requirement is met by establishing a clear evaluation plan, while the second presents a preliminary prototype that visually represents the device. Design Update 4 then combines and refines the content from

earlier updates, narrowing the concepts down to three final options through structured down-selection methods; this update typically follows the Preliminary Design Review. Throughout the process, each update should demonstrate thoughtful iteration, incorporate feedback, and show clear improvements over previous submissions. Failure to adequately address the required revisions may lead to penalties on the relevant sections.

Post- Labs

Post-labs are team-written documents created after each lab session. These reports are collaborative efforts that help students learn how to craft technical documents. The focus is on synthesizing the lab results, analyzing data, and presenting findings clearly and professionally. Grading will be based on the quality of the technical writing, clarity of analysis, and the team's ability to effectively communicate their understanding of the lab exercises.

Preliminary Design Review

The Preliminary Design Review (PDR) is a presentation where teams showcase their initial design concepts, ideas, and approach. The grading will focus on the thoroughness of the design process, how well the team communicates their ideas, the feasibility of the design, and the ability to address potential issues. The PDR is an opportunity to receive feedback, so a clear and well-prepared presentation is essential.

Final Prototype Demonstration

The final prototype demonstration involves presenting the functional prototype developed by the team. The demonstration should highlight the prototype’s performance and its alignment with the project requirements. To meet the grading criteria, the prototype must fulfill at least 8 out of the 12 specified requirements. Grading will focus on the prototype’s functionality, the quality of the demonstration, and the team’s ability to clearly explain and justify their design choices.

Final Design Review

The Final Design Review is a comprehensive presentation of the completed design and the work done throughout the project. It should cover the design process, key decisions made, final prototype performance, and any challenges or lessons learned. Grading will evaluate the clarity of the presentation, the depth of analysis, the quality of the final design, and how well the team addresses questions or feedback from the instructors.

Final Design Report

The final design report should incorporate all the previous design updates, culminating in the final design. It should include professional-style images of the final design, a CAD model, a process diagram, flowcharts, a circuit diagram, and a detailed description of the design. Additionally, the report should provide a concluding paragraph that discusses obstacles faced during the project and outlines potential future directions for the design.

Client Evaluation

The Client Evaluation is based on feedback from the client regarding the team's performance throughout the project. This includes assessing how well the team met the project requirements, their professionalism, and the quality of communication. Grading will be based on the client's overall satisfaction with the team's ability to deliver a functional solution, meet deadlines, and respond to feedback. A positive evaluation will reflect the team's ability to effectively address client needs and expectations.

Peer Evaluation:

Confidential evaluations will be conducted multiple times throughout the semester to help student teams assess individual contributions and improve or maintain team dynamics. Your peer evaluation score will be based on your percentage contribution to the project, which will be calculated as the average of the scores given by your team members (including yourself). Based on this contribution percentage, a scaling factor will be assigned. We will then calculate the average of your evaluations to determine one final scaling factor. This scaling factor will be applied to your group assignment score to determine your final grade for the project.

If you contribute equally with your team members, you will receive a 1.00x scaling factor, meaning your peer evaluation will not impact your grade. However, if there is a significant disparity in effort within your team, please notify the instructors as soon as possible so they can provide guidance.

Poor peer evaluations may result in a student being removed (FIRED) from the team at the request of the instructor or by the team. In this case, the student will be required to complete the remainder of the project independently and submit their assignments for a separate grade.

For a 6-person team (16.67% each), the scaling factor will be assigned as follows:

Percent Contribution	Scaling Factor
<10%	0.5x
10–11%	0.6x
11–12%	0.7x
12–13%	0.8x
13–15%	0.9x
15–17%	0.95x
17–19%	1x
19–21%	1.05x
21–23%	1.1x
23–25%	1.15x
25–27%	1.2x
>27%	1.25x

Teams of different numbers will be evaluated on a case-by-case basis, recognizing that the load is different than a 6-person team. **For each peer evaluation that is not submitted, a deduction of 0.05 will be applied from your average scaling factor (i.e. 2 missed peer evaluations would result in a 0.9x → 0.8x)**

Grading Errors:

If you believe there has been an error in grading, please email the original assignment to the instructor and TA within one week of receiving your grade. Be sure to specify the perceived error, issue, or discrepancy. Any grade adjustments will be posted on eLearning. For all grading inquiries, please use office hours or email to address your concerns.

Academic Calendar

Days (Tues | Thurs)		Week	Tuesday	Thursday
3-Jun	5-Jun	1	Lecture I: Syllabus Overview Lecture: Intro to design process	Lecture I: Teamwork and Project Managements Lecture II: Problem Statements & Stakeholders
10-Jun	12-Jun	2	Lecture I: Project Introduction Lecture II: Problem Scoping	Lecture I: Writing Problem Statements Lecture II: Requirements and Specifications
17-Jun	19-Jun	3	Introduce Teams Lecture I: Requirements and Specifications	HOLIDAY JUNETEENTH
24-Jun	26-Jun	4	Fabrication Workshop/Lab: Electrospinning	Fabrication Workshop/Lab: Electrospinning
1-Jul	3-Jul	5	Activity: Peer Review of Problem Statements Lecture: Conceptual Designs	Concept Down Selection Activity: Conceptual Design and Down Selection
8-Jul	10-Jul	6	Lab: Arduino Lab Day 1	Lab: Arduino Lab Day 2/Feedback DU I
15-Jul	17-Jul	7	Lab: Arduino Lab Day 3/Feedback DU II	Prep PDR/Arduino Day 4
22-Jul	24-Jul	8	Preliminary Design Review	Build and Test Day 1
29-Jul	31-Jul	9	Build and Test Day 2/ Feedback DU 4	Build and Test Day 3/Preliminary Prototype
5-Aug	7-Aug	10	Build and Test Day 4	Build and Test Day 5
12-Aug	14-Aug	11	Final Design Presentation and Final Prototype Demonstration	

June 12 - Last day to drop without a "W" July 11 - Withdrawal period ends

Please note the dates of the presentations. The schedule is subject to ch ange, based on the pace of the course, inclement weather, etc. Changes will be announced in class, via email, and on eLearning.

Assignment Schedule

Week	Due Monday Morning	Due Monday Night	Due Tuesday Morning	Due Friday Night
1				Training Requirements
2	Reflection I		Project Request (Night)	Reflection II
3				Team Contract
4	Reflection III		Pre-Lab Electrospinning	Post-Lab Electrospinning
5		DU 1 Draft		Team Outing
6	DU 1 Final	Peer Eval 1	Pre-Lab Arduino	
7	DU 2			Reflection IV
8			PDR	Arduino Post Lab Peer Eval 2 (Saturday Night)
9	DU 3 Test Plan Draft		DU 3 Preliminary Prototype	DU 3 Test Plan Final Bonus Training Fab Shop
10	DU 4			Reflection V CAD Bonus
11		Final Prototype Demo Final Design Presentation		**Final Report** Peer Eval 3 (Saturday Night)

Course & Instructor Policies

Corporate Guideline:
All submitted documents must follow "**Corporate Documentation Guidelines**". Failure to follow these guidelines will result in a penalty of up to 15% of the assignment grade.

Life Policy:
Life happens and personal situations can introduce complications. Please talk to the instructors if you need assistance regarding class. The instructors want you to succeed and early communication is key. Allowances will be accepted for exceptional documented circumstances or with prior consent of the instructors. In such circumstances, late work will be dealt with on a case-by-case basis. Contact the instructors and TAs by email as soon as practical if these circumstances may apply to you. The email reply documenting acceptance of reason and documentation for late work will set a new deadline.

Late Work:
Assignments turned in after the due date and time will be assessed a penalty of 25% per 24 hours. For team assignments all members are equally affected by this penalty. Email the assignment to the instructors and TAs directly if you experience or expect an error submitting an assignment on eLearning.

Academic Dishonesty:
Academic dishonesty can occur in relation to any type of work submitted for academic credit or as a requirement for a class. It can include individual work or a group project. Academic dishonesty includes plagiarism, cheating, fabrication, and collaboration/ collusion. In order to avoid academic dishonesty, it is important for students to fully understand the expectations of their professors. This is best accomplished through asking clarifying questions if an individual does not completely understand the requirements of an assignment.

UT Dallas has a no-tolerance policy for plagiarism, copyright infringement, or scholastic dishonesty. Plagiarism is using another's work as your own without appropriate credit or attribution. Do not cheat. Do not copy assignments, do not post assignments or make answers public, do not work on assignments as a group unless instructed to, do not plagiarize, do not use the internet or outside sources when you are not allowed to, do not discuss assignments with those who are not done, or do anything else that would be construed as academic dishonesty.

If the instructor suspects academic dishonesty, they will follow UTD procedures with the Office of Community Standards and Conduct (OCSC).

Academic dishonesty is considered an 'unacceptable performance' and a drop of 1 letter grade for the course will be recommended to OCSC.

From this point forward the instructor will no longer be involved in the investigation or results. The instructor will not notify a student of a report to OCSC, nor will they discuss pending investigations with the student. Do not cheat.
Additional information related to academic dishonesty and tips on how to avoid dishonesty may be found here: https://conduct.utdallas.edu/dishonesty
You should cite any sources you reference, providing in-text citation and references, both in your written work and in your online postings. If you are uncertain about how to cite sources, the following references are useful resources to guide you." (Dr. Bill Hefley)

Guidance on citations and references:

- https://libguides.utdallas.edu/citation-resources-guide
- https://www.utdallas.edu/library/research%02instruction/websites/#citations
- https://owl.purdue.edu/owl/avoiding_plagiarism/index.html
- https://owl.purdue.edu/owl/research_and_citation/using_research/quoting_paraphrasing_and_summarizing/index.html
- https://owl.purdue.edu/owl/research_and_citation/resources.html

AI policy:
Some assignments in this course will explicitly state that you may use Artificial Intelligence (A.I.) such as ChatGPT when completing the work. If you use A.I you must clearly indicate any use of A.I. tools and provide appropriate citations or references for any A.I.-generated content or results produced. This should include full documentation of exactly how the tool was used. Use of A.I. to produce or help develop content when an assignment does not explicitly allow for it is a form of plagiarism and will be treated as academic misconduct.

A.I. should not replace your individual effort or original work but rather, should be used as supplemental resources to support your own analysis, critical thinking, and problem-solving. Any misuse or violation of the policy, including unauthorized or excessive use of A.I., will be considered a breach of academic integrity and subject to disciplinary actions as per the institution's policies and procedures on academic misconduct. (Adapted from the University of Nebraska's A.I. Policies)

Acceptable uses:
• Using AI to help brainstorm ideas and organize thoughts.
• Using AI image generators to create visuals.
• Using AI to help with grammar and spelling checks.

• Using AI to explain confusing concepts in simple language.
• Using AI to translate text from one language to another.

Unacceptable uses:
• Using AI to generate paragraphs for reports.
• Using AI to plagiarize content from other sources.
• Using AI to answer reflection questions.
• Using AI to automate the completion of assignments.

Email Policy:
All official student email correspondence will be sent only to a student's UT Dallas email address and UT Dallas will only consider email requests originating from an official UT Dallas student email account. **Please wait 1 business day for all email responses. If you do not receive an email within that time period, please send a follow-up email or reach out in-person.**

UTD takes your privacy very seriously. The instructor is unable to email grades or discuss grades by email. Grades will be posted on eLearning and all questions regarding grades should be handled during office hours.

Classroom Citizenship:
Please always be respectful of your peers.

Course Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement an approved Office of Student Accessibility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Attendance and Participation
Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. **Attendance will be recorded in each class. Arriving 15 minutes after class is considered absent.**

Regular class participation is expected. This also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to university requirements, as presented in this syllabus. Failure to comply with these university requirement is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Resources

Academic Support Resources: The information contained in the following link lists the University's academic support resources for all students. Student Resources: A variety of resources are available to help students to obtain counseling, health care, and academic support.

Accommodation for Students with Disabilities

It is the policy and practice of UT Dallas to make reasonable accommodation for students with properly documented disabilities. If you are a student with a disability and believe you will need academic accommodation for this class, you are encouraged to register with the Office of Student Accessibility (OSA). Some aspects of the course, the assignments, the in-class activities, and the way the course is typically taught may be accommodated to facilitate your participation and progress. OSA will assist you in determining academic accommodations that are appropriate for your situation. Any information you provide is private and confidential and will be treated as such. To avoid any delay, please contact OSA as soon as possible. Please note that accommodation is not retroactive and disability accommodation cannot be provided until an OSA Letter of Accommodation has been given to the instructor. Students who have questions about receiving accommodations, or those who have, or think they may have, a disability (mobility, sensory, health, psychological, learning, etc.) are invited to contact OSA for a confidential discussion. OSA is located in the Administration Building, AD 2.224 They can be reached by phone at 972-883-2098, or by email at studentaccess@utdallas.edu.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.