Last updated: **January 16, 2024**

BMEN 3200 Course Syllabus (Spring 2024)

Course Information

Course Number: BMEN 3200
Course Title: Biomedical Engineering Fundamentals and Design
Term: Spring 2024
Location and Meeting Times:

• Friday Lecture	11:00AM – 11:50 AM	JSOM 2.722
• Tuesday Lab (Section 301)	1:00PM – 3:45 PM	ML1.118
• Wednesday Lab (Section 302)	11:30AM – 2:15 PM	ML1.118
• Wednesday Lab (Section 303)	11:30AM – 2:15 PM	ML1.122

Contact Information

Professor Christian Rivera, PhD
Email Address cprivera@utdallas.edu
Office Phone 972-883-4482
Office Location ECSN 2.906
Office Hours Monday 11:30AM – 2:30PM in ML1 1.118
Other Information Always glad to meet with students in-person or virtually
Additional office hours by appointment

Teaching Assistant Angeloh Stout
Email Address angeloh.stout@utdallas.edu
Office Hours Thursday 1:00PM – 4:00PM in ML1 1.118
Other Information Additional office hours by appointment

Teaching Assistant Gauri Renake
Email Address gauri.renake@utdallas.edu
Office Hours Friday 12:00PM – 2:30PM in ML1 1.118
Other Information Additional office hours by appointment

Client David Schmidtke
Email Address david.schmidtke@utdallas.edu
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)

Co-Requisites:

- BMEN 4310 (Feedback Systems in Biomedical Engineering)

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%

Ranges may change at the end of the semester.

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%	
Attendance	7%	
Training Requirements (6)	6%	(1% Each)
Reflections (5)	10%	(2% Each)
CAD Tutorials (2)	9%	(4.5% Each)
Pre-labs (2)	8%	(4% Each)

Attendance will be recorded in each class. You may work on CAD tutorials with your peers; however, everyone must submit a separate assignment. All other assignments must be done individually.

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

Final Group Grade (60%) = Group Assignments X Peer Evaluations

Group Assignments (65%)

Only one submission is needed per team for group assignments. All members will share the same score for a given assignment if they participated. Members who did not participate in assignment will receive a 0%.

Peer Evaluations:
Confidential evaluations will be performed 2 times throughout the semester. This will be used for student teams to evaluate group members in order to improve or maintain team dynamics. Your peer evaluation score will be assigned based on your % contribution to the project, which will be calculated as the average of the scores reported individually by your team members (including yourself). Based on your percent contribution a scaling factor will be assigned. We will average your two evaluations for one average scaling factor. This scaling factor will be multiplied with your group assignment score to calculate your final group grade.

For an evaluation if you contributed equally with your team members, you will get a 1.00x scaling factor; thus, in this nominal case the peer evaluation will not affect your grade. **If there is a significant disparity in effort on your team, please make the instructors aware of the issue as early as possible so that the instructors may provide guidance.**

For a 4-person team, the scaling factor will be assigned as follows:

Percent Contribution	Scaling Factor
<15%	0.5x
15.5-16%	0.6x
16-17%	0.7x
18-19%	0.8x
20-22%	0.9x
23-27%	**1.00x**
28-30%	1.1x
31-32%	1.2x
33-34%	1.3x
34.5-35%	1.4x
>35%	1.5x

Teams of 3 or 5 will be evaluated on a case-by-case basis, recognizing that the load is different than a 4-person team. **If you do not submit your evaluation, you will receive zero points for your peer evaluation score for that segment of the course.**

Grading Errors:
If you think we have made an error in grading, please email the original assignment to the instructors and TAs within one week of receiving the grade. Please note what you perceive to be the error, problem, or discrepancy. Changes to grades will be posted on eLearning. All questions regarding grades should be handled in office hours or via UTD email.

Academic Calendar

Week	Dates	Lab (Tuesday/Wednesday)	Lecture (Friday)
1	1/16 - 1/20	Lecture I: Syllabus Overview	Lecture: Intro to the Design Process Activity: Marshmallow Design
2	1/21 - 1/27	Lecture: Problem Statements and Stakeholders Activity: Practice Writing Problem Statements	Lecture: Requirements and Specifications I
3	1/28 - 2/3	Lecture: Requirements and Specification II Activity I: Obtaining Functions Activity II: Functional Diagrams	Lecture: Project Introduction
4	2/4 - 2/10	Lecture: Project Management Lab: Fabrication Tutorial **Meet in SPN**	Lecture: Team Building
5	2/11 - 2/17	Lab: Electrospinning Lab	Group Working Time
6	2/18 - 2/24	Activity: Peer Review of Problem Statements Lecture: Conceptual Designs	Lecture: Concept Downselection
7	2/25 - 3/2	Activity: Conceptual Design and Downselection Lab: Arduino Lab Day 1	Group Working Time
8	3/3 - 3/09	Lab: Arduino Lab Day 2	Group Working Time
9	3/10 - 3/16	**Spring Break**	
10	3/17 - 3/23	Lecture: Presentation Skills Lab: Arduino Lab Day 3	Group Working Time
11	3/24 - 3/30	**Preliminary Design Review**	
12	3/31 - 4/6	Build and Test Day 1	Group Working Time

13	4/7 - 4/13	Build and Test Day 2	Group Working Time
14	4/14 - 4/20	Build and Test Day 3	Group Working Time
15	4/21 - 4/27	Build and Test Day 4	Group Working Time
16	4/28 - 5/3	**Final Design Presentations and Demonstrations**	
17	5/6 - 5/10	Finals Week	

Jan 31 - Last day to drop without a “W”
March 9 - Midterm Grades
April 3 - Withdrawal period ends

Please note the dates of the exams. The schedule is subject to change, based on the pace of the course, inclement weather, etc. Changes will be announced in class, via email, and on eLearning The final exam date will be scheduled by the university, please check Coursebook for these details

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Course & Instructor Policies

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 use AI, 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 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/researchinstruction/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

Email Policy and Privacy:
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 in office hours.

Classroom Citizenship:
Please be respectful of your peers at all times.

Course Materials

The instructors 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 AccessAbility 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 regardless of modality. Students who fail to attend class regularly are inviting scholastic difficulty. **Attendance will be recorded in each class.** For Lab classes (Tuesday/Wednesday) arriving 15 minutes after class is considered late and 30 minutes is considered absent. For the Friday Lectures arriving after 15 minutes is considered late. Students are given one unexcused absence for the Friday lectures to be used when needed.

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 requirements 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.

The instructors may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructors or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

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.

Accommodations for Students with Disabilities

The University of Texas at Dallas is committed to providing reasonable accommodations for all persons with disabilities. The syllabus is available in alternate formats upon request. If you are seeking classroom accommodations under the Americans with Disabilities Act (2008), you are required to register with the AccessAbility Resource Center (ARC), located in the Administration Building, Suite 2.224. Their phone number is 972-883-2098, email: studentaccess@utdallas.edu and the website is https://accessability.utdallas.edu/. To receive academic accommodations for this class, please register and request services by completing the Request for Services form with the proper documentation and meet with the Director of ARC at the beginning of the semester.

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.