

University of Texas at El Paso

Course Title: BME 3303: Fundamentals of Biomedical Engineering I

CRN: 25558

Class Time: Spring 2023 Semester
Thur. 1:00 – 2:50 p.m. (class)
Fri. 9:00 a.m. – 11:50 a.m. (lab)

Textbook: none, course materials will be posted on UTEP Blackboard

Instructors: Dr. Sylvia Natividad-Diaz

Contact: UTEP Email or Microsoft Teams
slnatividad@utep.edu

Office hours: Online via Blackboard Zoom or in-person (SND Office)
Tues. 11:30 a.m. – 12:30 p.m.
Wed. 6:00 p.m. – 7:00 p.m. (by appointment, online only)

Goals:

This course teaches the application of various engineering principles to analyze and understand the structure, function, and control of biological systems and relevant medical devices.

Prerequisites: BME minor or consent of instructor.

POINTS DISTRIBUTION:

Weekly Quizzes 10%, Homework 20%, Class project 30%, Lab 40%

Approximate Schedule:

Week 1: Introduction to Biomedical Engineering
Week 2: Basic Statistics and Clinical Trial design
Week 3: Basic Molecular and Cell Biology
Week 4: Basic Molecular and Cell Biology
Week 5: Pathogens and the Immune System
Week 6: Wound healing
Week 7: Biocompatibility
Week 8: Biomaterials Part 1
Week 9: Spring Break
Week 10: Biomaterials Part 2
Week 11: Implant Sterilization
Week 12: Cardiovascular devices
Week 13: Orthopedic devices
Week 14: Medical Device Standards and FDA regulation
Week 15: Translational Medicine and Ethics in BME

Course Project: Medical Device Evaluation

Midterm Report (10%): Device Description, history, targeted disease epidemiology and patient demographics, biocompatibility

Final Presentation (10%): Device Description, history, targeted disease epidemiology and patient demographics, materials selection, biocompatibility, loading and stress analysis, FDA regulations (current clinical trials if relevant), intellectual property and commercialization

Final Report (10%): A separate file with more specific instructions will be provided.

Components: Device Description, history, targeted disease epidemiology and patient demographics, materials selection, biocompatibility, loading and stress analysis, FDA regulations (current clinical trials if relevant), intellectual property and commercialization

Technology Requirements

Some course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP Blackboard account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have access to a computer/laptop, scanner, a webcam, and a microphone. You will need to download or update the following software: Microsoft Office, Adobe Acrobat Reader, Windows Media Player, QuickTime, and Java. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

If you do not have a word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about [Microsoft Office 365](#) and follow the instructions.

IMPORTANT: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP [Help Desk](#) as they are trained specifically in assisting with technological needs of students. Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you.

Course Communication

- **Office Hours:** Online via Blackboard Zoom or in-person (SND Office)
Tues. 10:30 a.m. – 11:30 a.m.
Wed. 6:00 p.m. – 7:00 p.m. (by appointment, online only)
- **Email:** UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 24-48 hours of receipt. When e-mailing me, be sure to email from your UTEP student account and please put the course number in the subject line. In the body of your e-mail, clearly state your question. At the end of your e-mail, be sure to put your first and last name. **Emails related to this course sent to my Blackboard account will not be answered. Emails related to this course sent to my UTEP account (outside of Blackboard) will not be answered.**
- **Discussion Board:** If you have a question that you believe other students may also have, please post it in the Student Community Board of the discussion boards inside of Blackboard. Please respond to other students' questions if you have a helpful response. I will not check this as often as Blackboard email, so please send urgent questions to me directly (via Blackboard).
- **Announcements:** Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

Netiquette

As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep these netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider audience. This is a college-level course; therefore, all communication should reflect polite and respectful consideration of other's ideas.
- Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.
- Keep in mind, anything posted on Blackboard is permanent even if you delete it.

Course Policies

Attendance and Participation

Attendance in the course is determined by participation in the class learning activities (quizzes, homework, project). Your participation in the course is important not only for your learning and success but also to create a community of learners.

Excused Absences and/or Course Drop Policy

According to UTEP Curriculum and Classroom Policies, "When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of "W" before the course drop deadline and with a grade of "F" after the course drop deadline." See academic regulations in the UTEP Undergraduate Catalog for a list of excused absences.

Deadlines, Late work, and Absence policy

Homework Assignments

- Assignments will be posted at the start of each course module and are due by the specified date on the course calendar at 11:59 p.m. MST on UTEP Blackboard
- **Late work will not be accepted** (except in the case of UTEP documented excused absences, including UTEP COVIDAction email)

Weekly Quiz

- Quizzes will be given at the beginning of each class and are due within 15 minutes.
- **Late work will not be accepted** (except in the case of UTEP documented excused absences, including UTEP COVIDAction email)

Make-up Work

Make-up work will be given *only* in the case of a *documented* emergency or excused absence by UTEP (including UTEP COVIDAction email). Note that make-up work may be in a different format than the original work. If you miss an assignment and the reason is not considered excusable, you cannot make up

the work. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

Alternative methods of submitting work in case of technical issues

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save (back up) all your work (answers to discussion boards, quizzes, homework, and presentations) in separate files on your own computer or external hard drive. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a **last resort**.

Incomplete Grade Policy

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

Accommodations Policy

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#).

COVID-19 Accommodations and Precautions

If you are experiencing difficulty completing course requirements due to COVID-19 infection, you should email me as soon as possible so we can arrange necessary and appropriate accommodations. Please do not come to class if you are sick or suspect you have been exposed to COVID-19.

According to UTEP Policy, you must STAY AT HOME and REPORT if you: (1) have been diagnosed with COVID-19, (2) are experiencing COVID-19 symptoms, or (3) have had recent contact with a person who has received a positive coronavirus test. Reports should be made at COVIDaction@utep.edu. If you know of anyone who should report any of these three criteria, you should encourage them to report. If the individual cannot report, you can report on their behalf by sending an email to COVIDaction@utep.edu. Please note, this is not a disciplinary action, this reporting system has been established by UTEP to provide support for employees and students affected by COVID-19.

Academic Integrity

Students are expected to have a commitment to honesty, reliability, and responsibility, without which you cannot earn the trust and respect of others. Therefore, plagiarism, lying, cheating, or stealing will not be

tolerated in any form.

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

Class Recordings

The use of recordings will enable you to have access to class lectures online via Blackboard. Recordings are governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. **You may not share recordings outside of this course.** Doing so may result in disciplinary action.

Plagiarism Detecting Software

Some of your course work may be submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment submissions for originality.

Copyright Statement for Course Materials

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.