

University of Texas at El Paso

Course Title: Tissue Engineering

CRN: 12223 (BME 5313)
14528 (MME 4390)
14498 (MME 5390)
15262 (MASE 6390)

Class Time: Fall 2023 Semester
TR 12:00-1:20 p.m.

Textbook: Tissue Engineering, 3rd Ed., Jan de Boer
Click [here](#) for Electronic Access via UTEP Library
Note, students must be connected to UTEP network for textbook access

Instructors: Dr. Sylvia Natividad-Diaz
Britanny Stark (Teaching Assistant)

Contact:
Instructor Email: slnatividad@utep.edu
TA Email: blpayanbaca@utep.edu

Office hours: Tuesdays and Thursdays 2:00-3:00 p.m., Blackboard Zoom or Office
For any meetings outside of Office Hours, please send a request to Dr. Natividad-Diaz via email
TA Office Hours: please schedule via email

Goals:

This course teaches the principles and practices of developing bioartificial tissues and organs including: cellular/material interaction and translation of information from two-dimensional surfaces to three-dimensional scaffolds; selection and processing of bio- materials to form tissue scaffolds; analysis of tissue engineered devices, standards, and regulation. Examples of engineering tissues for cardiovascular and bone repair/regeneration will be presented.

Prerequisites: BME 5310 with a grade of "C" or better. Departmental approval also required. Restricted to level of GR.

POINTS DISTRIBUTION:

Quizzes 10%, Homework 20%, Mid-term exam 20%, Final Exam 20%, Course project 30%

Approximate Schedule:

Week Number	Topic	Textbook Chapter
1	Introduction to Tissue Engineering Statistical Data Analysis Overview	1
2	Cell and Molecular Biology Fundamentals	N/A
3	Cell Signaling	4
4	Tissue Formation during Embryogenesis	2 and 3
5	Extracellular Matrix as a bioscaffold	5
6	Cell-material interactions	8
7	Synthetic Biomaterials	6
8	Degradation of Biomaterials	7
9	Scaffold Design and Fabrication	11
10	Controlled Release Strategies	12
11	Bioreactors and Strategies to promote Vascularization	13 and 14
12	Cartilage and Bone Regeneration	16
13	TE of the Nervous System	17
14	Cardiovascular TE	18
15	Clinical Translation	21

Course Project: Engineered Tissue Scaffold

A separate file with more specific instructions will be provided.

Midterm Report (10%): Introduction, Justification (including Intellectual Merit and Broader Impacts, see NSF guidelines), Materials and Methods, References (at least 10)

Final Presentation (10%): Introduction, Justification (including Intellectual Merit and Broader Impacts, see NSF guidelines), Materials and Methods, Results, Conclusions and Discussion (including applicable standards and regulatory pathways to commercialization and standards)

Final Report (10%):

Components: Introduction, Justification (including Intellectual Merit and Broader Impacts, see NSF guidelines), Materials and Methods, Results, Conclusions and Discussion (including applicable standards and regulatory pathways to commercialization), References (at least 30)

Technology Requirements

Course assignments are 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:** I will be meeting with students in-person in my office or remotely via Blackboard Zoom (student preference).
- **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.
- **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 learning activities of the course. Your participation in the course is important not only for your learning and success but also to create a community of learners. Participation is determined by completion of the following activities:

- Reading/Viewing all course materials to ensure understanding of assignment requirements

- Participating in engaging discussion with your peers on the discussion boards
- Other activities as indicated in the weekly modules

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 on Blackboard on Tuesday evenings and are due by the following Tuesday at 11:59 p.m.
- **Example:** If Homework #99 is posted on Tuesday (8/29/2023) at 6:00 p.m., this assignment is due on Wednesday (9/05/2023) by 11:59 p.m.
- Late work will not be accepted (except in the case of UTEP documented excused absences which include reports/emails from UTEP COVIDAction)

Quizzes

- 10-minute Quizzes will be given at the beginning of class on Tuesdays and will consist of material covered in the previous week’s lecture.
- **Late or Makeup Quizzes will not be accepted** (except in the case of UTEP documented excused absences which include reports/emails from UTEP COVIDAction)

Make-up Work

Make-up work will be given only in the case of a *documented* emergency or excused absence by UTEP. 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

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know via email as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID 19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org

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.

Guidance On Artificial Intelligence

The use of generative AI tools such as Chat GPT is permitted in this course for the following activities, which must be noted or cited:

- Project presentations
- Non-graded in-class participation activities

However, you may **not** use AI tools to complete the following activities:

- Written Project reports
- Homework
- Quizzes

Students must cite any borrowed content sources to comply with all applicable citation guidelines, copyright law, and avoid plagiarism. Instances that violate these guidelines will be referred to the Office of Student Conduct and Conflict Resolution.

Plagiarism Detecting Software

Some of your course work and assessments may be submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase. The threshold of 80% originality will be accepted by the instructor for all written assignments. Submissions below this originality score threshold will not be accepted or graded. All assignments must be submitted on time, late submissions resulting from attempts to reach originality score will not be accepted (i.e. this is not a valid excuse for late assignment submission).

UTEP Student Resources: Where you can go for assistance

UTEP provides a variety of student services and support:

Technology Resources

- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources

- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [History Tutoring Center \(HTC\)](#): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

- [The Miner Learning Center](#): Join peer-led study sessions in person or online to review content and discover study strategies in core curriculum courses.
- [UTEP Edge](#): UTEP's cross-campus framework for student success and empowerment – develops students' assets through high-impact experiences made possible by the expertise and dedication of faculty, staff, alumni, and community partners.

Individual Resources

- [Student Success Help Desk \(SSHD\)](#): Students experiencing challenges or obstacles to academic success including registration, financial, food, housing, and transposition resources may submit a ticket request assistance to studentsuccess@utep.edu
- [Military Student Success Center](#): Assists personnel in any branch of service to reach their educational goals.
- [Center for Accommodations and Support Services](#): Assists students with ADA-related accommodations for coursework, housing, and internships.
- [Counseling and Psychological Services](#): Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.
- [UTEP Food Pantry](#): Non-perishable food items are available to students who are currently enrolled in classes. Bring a Miner Gold Card to Memorial Gym, Room 105, Monday through Friday, 10 a.m. to 2 p.m.

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.