

Musculoskeletal Biomedical Engineering

BME 6983 Section 6L22

Class Periods: Tuesday (9:35am -11:30am) / Thursday (9:35am – 10:25am)

Location: COMM (HSC) C1-015 (Tuesdays) / C1-007 (Thursdays)

Academic Term: Spring 2023

Instructor:

Dr. Brittany Taylor (she/her/hers)

Brittany.taylor@ufl.edu

(352) 273-5012

Office Hours: By Appointment

Teaching Assistant/Peer Mentor/Supervised Teaching Student: N/A

Course Description

This course will focus on the structure and function of musculoskeletal tissues in the homeostatic, diseased/injured, and healing states. We will explore current biomedical engineering approaches that restore, maintain, diagnostic, or improve musculoskeletal tissues. Through gaining knowledge of the clinical needs in the field and knowledge gaps in literature, we will use engineering principles to develop novel interventions. This course will be a combination of lectures, discussions, journal club, and a cumulative final project. (3 credits)

Course Pre-Requisites / Co-Requisites

There are no required pre-requisites or co-requisites. However, an understanding of anatomy and physiology will be useful.

Course Objectives

Students who successfully complete Musculoskeletal Biomedical Engineering should be able to:

- Describe the biology and structure-function relationship of musculoskeletal tissues
- Identify state-of-the-art biomedical engineering approaches used to study early detection/diagnosis, treatment, and prevention of diseased and injured musculoskeletal tissues.
- Critically read, synthesize, and discuss the musculoskeletal literature
- Design an innovative biomedical engineering solutions to specifically address musculoskeletal diseases and/or injuries
- Explore the social impact of musculoskeletal diseases, disorders, and injuries
- Communicate effectively to various audiences, including investors, fellow engineers, and the general public

Materials and Supply Fees

None

Required Textbooks and Software & Recommended Materials

No specific textbook is required for this course. Course notes and assigned readings are derived from various published sources and professional records of the course instructor. These materials, along with useful resources, will be distributed through the course website on Canvas.

Course Topics

The topics covered in this course are tentative and subject to change. See Canvas course site for updated course schedule, pre-class materials, and due dates for assignments. Student-driven topics will also be included in the course based on a selection process of topics that are most interesting and relevant to their professional goals.

- Introduction to Musculoskeletal Biomedical Engineering
- Tendon/Ligament
- Muscle
- Cartilage/Bone
- Joints

- Societal impacts of musculoskeletal diseases/injuries

Class Policies (Attendance Policy, Class Expectations, and Make-Up Policy)

Attendance Policy:

The health and safety of you and others comes first, therefore I trust you will make the best to keep yourself and those around you safe, and to attend our class when it makes sense to do so.

- Attendance is highly encouraged as in-class participation is 15% of the cumulative grade. *Lectures, discussions, presentations, and other class activities will not be recorded.*
- All assignments will be submitted via Canvas and have a set deadline (e.g., 11:59pm EST). See Canvas course site for more details. Quizzes must be completed individually with no collaboration.
- It is your responsibility to keep up to date on the course assignments and due dates.
- Excused absences that interfere with assignments must be consistent with university policies in the Graduate Catalog (<https://catalog.ufl.edu/graduate/regulations>) and require appropriate documentation. Additional information can be found here: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Class Expectations:

Professional and respectful conduct:

- Students are expected to engage with Dr. Taylor and fellow students in a courteous and professional manner when participating in the classroom and via Canvas.
- Students are expected to treat their fellow classmates, Dr. Taylor, and themselves with respect, tolerance, fairness, and justice.
- Dr. Taylor will gladly honor your request to address you by an alternate name or gender pronoun. Please advise Dr. Taylor of this preference early in the semester so that she may make appropriate changes to her records.
- Any student who behaves in a disrespectful or disorderly manner may be asked to leave the classroom.

Communication:

- Address the instructor as Dr. Taylor or Professor Taylor in all communication and be respectful and mindful of proper naming and preferred pronouns for your fellow classmates.
- Dr. Taylor requires that all students use Canvas when sending messages for automatic association with the class. While you may email Dr. Taylor at the provided UF email account in the case of emergencies (with subject line "BME 6983"), the university strongly encourages communication via Canvas to avoid any potential violations of student confidentiality protected by FERPA. All communication should be professional.
- You may contact Dr. Taylor via Canvas (or email in the case of emergencies) at any time that is convenient for you. However, Dr. Taylor will respond between the hours of 9am and 5pm within two business days. Expect a delayed response if the message/email is sent at night or during the weekend, holidays, or breaks. Therefore, plan communications accordingly for all assignment deadlines.
- Class announcements will be posted to Canvas. All students are responsible for ensuring awareness of these postings. Failure to review the course website is not an excuse for missing announcements.

Make-Up Policy

Homework/Quizzes:

- Unless prior arrangements or an excused absence has been granted by the instructor, students will be deducted 2 letter grades for late homework (grading will start at 75% [C]).
- The deduction occurs at the time the work is due.
- Once 48 hours after the due/time has passed, a zero will be assigned for late assignments that are not excused.
- Students with an excused absence shall be permitted a reasonable amount of time to make up the assignment.

- In the case of technical issues with Canvas while completing your assignment, send an email with documentation and screenshots to Dr. Taylor prior to the time the assignment is due. Additional time to complete the assignment will be up to the discretion of Dr. Taylor.
- Make-up assignments are permitted only for documented university approved excused absences.
- In general, acceptable reasons for excused absence include illness, serious family emergencies, special curricular requirements, military obligation, court-imposed legal obligations, and religious holidays. In all cases, you will be required to provide written documentation, and obtain prior instructor approval.
- You must notify Dr. Taylor no less than 1 week prior to the scheduled exam for non-health related excuses.
- In the case of an emergency that prevents prior notification of an anticipated missed exam, you must notify the instructor as soon as possible.

Evaluation of Grades

Assignment	Percentage of Final Grade
Homework	20%
Participation	15%
Literature Presentation	25%
Quizzes	10%
Final Project	30%
	100%

** The assignments and grades shown in Canvas are provisional and do not always take into account the correct weighting. If you want to calculate your grade, please use the weighting in the table below.

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

The instructor reserves the right to adjust the grade distributions, however, grades will not be adjusted for individuals.

More information on UF grading policy may be found at:

[UF Graduate Catalog](#)
[Grades and Grading Policies](#)

Final cumulative numerical grades will be rounded to the nearest tenth of a point. Curving of assignments is exceptionally rare and typically only due to the entire class missing a question. **There is no curving of final grades.**

Grade challenges

Requests to modify points be submitted in writing to Dr. Taylor within 1 week from when the grade is made available. The request should identify the question and provide clear justification/reasoning for the requested change. The instructor will then review the request and modify the grade, as necessary. The instructor also reserves the right to turn down unreasonable or frivolous grade challenge requests.

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/state-authorization-status/#student-complaint>.