

The University of Texas at Tyler
Department of Health and Kinesiology
Course Information
Fall 2025

Course Title: Biomechanics
Course Number: KINE5335.060
Credits: 3.00
Days/Hours of Class:

This online course is available on the Canvas (<http://www.uttyler.edu/canvas>).

Dates: 08/25/2025 – 12/13/2025

Instructor Information

Name and Title: X. Neil Dong, Ph.D., Professor of Health and Kinesiology
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Office hours: Zoom Virtual Office, by appointment
Textbook:

Carol A. Oatis, Kinesiology: The Mechanics and Pathomechanics of Human Movement, (3rd edition, 2016). Lippincott Williams & Wilkins, Inc.
ISBN-13: 978-1451191561
ISBN-10: 1451191561

Catalog description:

Study of kinematic and kinetic analysis of human motion.

Expanded Description:

Biomechanics is the study of biological system by the application of the laws of mechanics.

There are several major parts in this graduate level course of biomechanics. In the first part, we will study the basic principles to understand the structure and function of the musculoskeletal system. Briefly, we will describe forces and moments, discuss principles of static analysis, and present the basic concepts in kinematics and kinetics.

In the second part of this course, we will apply these principles to each region of the body to understand the mechanics of normal movement at each region of the body and to appreciate the effects of impairments on the pathomechanics of movement. Specifically, we will describe the structure of the bones and articulations of the knee joint and their effects on the mobility and functional capacity of the knee; we will discuss the contribution of the muscles of the knee to the normal mechanics of pathomechanics of the knee; we will examine the forces sustained by the knee during normal function and consider the role of these forces in knee joint pathology.

Additionally, each group of students will choose an area of biomechanics and write a review paper of the pertinent literature. Topics must be biomechanically oriented with clinical relevance and must be cleared with the course instructor.

Student Learning Objectives: After the full completion of this course the student will be:

1. Able to understand the principles of analysis in biomechanics and the biomechanical properties of the primary tissues of the musculoskeletal system
2. Able to apply these principles to each region of the body to understand the mechanics of normal movement at each region.
3. Able to apply these principles to each region of the body to appreciate the effects of impairments on the pathomechanics of movement.
4. Able to develop research to answer the biomechanical questions asked related to activities of daily living, sports, basic movements and work-related tasks.

Methods of Instruction

Student learning experiences include but not limited to:

1. Online lectures.
2. Student participation and interaction are encouraged by using Zoom (www.zoom.us), a clouding meeting company that unifies mobile collaboration, cloud video conferencing and simple online meetings into one easy-to-use platform. It is encouraged that each group of six students will schedule a meeting of half an hour every week to discuss the review paper and course related questions. The instructor will be available at certain group meetings.
3. Problem solving situations.
4. Reading designated textbooks and supplementary materials upon assignment.

Student Learning Outcomes: After the full completion of this course the student will be:

Assessment and Measurement:

The students will be evaluated on the basis of performance on two examinations, weekly online quizzes, class participation, homework assignments, and group review paper. A percentage of total possible points will determine the course grade.

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Structure:

200 points	Two Non-Cumulative Exams (Midterm Exam and Final Exam)
50 points	Online Quizzes (The online quizzes will be taken after online lectures are completed. You are encouraged to use online quizzes to assess your own learning progress.)
100 points	Homework Assignments
100 points	Group Review Paper

Total Possible Points: 450 points

Group Review Paper

Each group of students will choose an area of biomechanics and write a review of the pertinent literature in that area. Topics must be biomechanical oriented with clinical relevance and must be cleared with the course instructor. A written paper will be required for each group. Example topics of review papers:

1. Texting may lead to a surge of thumb osteoarthritis
2. Rehabilitation strategies for the elderly population with ACL injuries
3. Chronic neck pain among nurses

The grade for biomechanics projects will be based on three parts: peer evaluation (30%), technical report or a written review paper (35%), and oral presentation (35%).

Peer evaluation will be performed by group members at the end of semester, including the following categories:

- Is punctual in attending scheduled group sessions?
- Contributes meaningfully to group discussions
- Prepare work in a quality manner
- Demonstrates cooperative and supportive attribute
- Contributes overall to the success of the project

Written papers: Form and style of the written papers should be consistent with the most recent edition of the Publication Manual of the American Psychological Association. All written papers will be evaluated by the instructor with the following criteria:

Introduction: orienting the reader to what the paper is about (purpose/intent) and the major issues, themes, or topics around which it's organized.

Flow: the logic of the paper's organization (how easy or difficult it is to follow), use of headings and subheads, and transitions between and among themes/topics/ideas.

Content: the relationship of each major sections (and its associated subsections) to the paper's purpose/intent; how well the arguments of assertions are made and built/fleshed out (clear synthesis of ideas); balance of perspectives or points of view; how well ideas/themes are supported

Writing techniques: grammar (including active vs. passive voice), punctuation, sentence structure, spelling, subject/verb agreement, use of pronouns, parallel construction, etc.

Citation structure: including appropriate use of direct quotations and accuracy of the in-narrative and reference list cites.

Oral presentations: Zoom Video Conference will be used to record a 15-minute PowerPoint presentation. All group members need to participate in the oral presentation. The recording can be uploaded to File Exchange of Group Page on Blackboard.

The oral presentation will be evaluated by the instructor with the following components

Introduction: Background, motivation, problem set-up, etc.

Materials and Methods: How you solve the problem? Is the method reasonable?

Results and Discussion: Good analysis? Realistic? Useful?

Presentation: Slides, presentation skills, timing, etc.

Course Outline

Week 1	Module 1: Introduction to Biomechanics Course Online quiz#1 is due at 11:59pm on 8/31/2025
Week 2	Module 2: Biomechanics of Bone (Chapter 3) Online quiz#2 is due at 11:59pm on 9/7/2025
Week 3	Module 3: Biomechanics of Skeletal Muscle (Chapter 4) Online quiz#3 is due at 11:59pm on 9/14/2025 Homework Assignment#1 is due at 11:59pm on 09/14/2025
Week 4	Module 4: Introduction to Biomechanical Analysis: Forces and Moments (Chapter 1) Online quiz#4 is due at 11:59pm on 9/21/2025
Week 5	Module 5: Introduction to Biomechanical Analysis: Statics (Chapter 1) Online quiz#5 is due at 11:59pm on 9/28/2025
Week 6	Module 6: Biomechanics of Tendons and Ligaments (Chapter 6) Online quiz#6 is due at 11:59pm on 10/5/2025 Homework Assignment#2 is due at 11:59pm on 10/5/2025
Week 7	Module 7: Biomechanics of Joints (Chapter 7) Online quiz#7 is due at 11:59pm on 10/12/2025

Week 8	Midterm Exam will be due at 11:59pm on 10/19/2025
Week 9	Module 8: Structures and Function of Bone and Noncontractile Elements of the Knee (Chapter 41) Online quiz#8 is due at 11:59pm on 10/26/2025
Week 10	Module 8: Structures and Function of Bone and Noncontractile Elements of the Knee (Chapter 41, Continued) Homework Assignment#3 is due at 11:59pm on 11/2/2025
Week 11	Module 9: Mechanics and Pathomechanics of Muscle Activity at the Knee (Chapter 42) Online quiz#9 is due at 11:59pm on 11/9/2025
Week 12	Module 9: Mechanics and Pathomechanics of Muscle Activity at the Knee (Chapter 42, Continued) Group Review Paper is due at 11:59pm 11/16/2025
Week 13	Module 10: Analysis of the Forces on the Knee during Activity (Chapter 43) Online quiz#10 is due at 11:59pm on 11/23/2025 Homework#4 is due at 11:59pm on 11/23/2025
Week 14	Thanksgiving holidays; no class
Week 15	Module 10: Analysis of the Forces on the Knee during Activity (Chapter 43, Continued)
Week 16	Final Exam

Online Etiquette:

Tone Down Your Language: If you feel particularly strongly about a point, it may be best to write it first as a draft and then to review it, before posting our statement. If someone states something you find offensive, mention it directly to the instructor. Remember the person may be new to online learning. What you find offensive may be an unintended and can be corrected by the instructor.

Test for Clarity: Messages may often appear perfectly clear to you as the writer but turn out to be confusing by another reader. One way to test for clarity is to read your message aloud to see if it flows smoothly. Be concise when possible when contributing to a discussion. If you have several points you want to make, it may be a good idea to post them individually in more focused messages rather than a single, all-encompassing message.

Communication Policy:

If you email me, expect a response within one business day at UT Tyler (M-F).

Student Resources:

Faculty can update student resources to provide additional supports appropriate for each course.

Resources to assist you in the course

- [UT Tyler Student Accessibility and Resource \(SAR\) Office](#) (provides needed accommodations to students with document needs related to access and learning)
- [UT Tyler Writing Center](#)
- [The Mathematics Learning Center](#)
- [UT Tyler PASS Tutoring Center](#)
- [UT Tyler Supplemental Instruction](#)
- [Upswing \(24/7 online tutoring\) - covers nearly all undergraduate course areas](#)
- [Robert Muntz Library](#) and [Library Liaison](#)
- [Canvas 101](#) (learn to use Canvas, proctoring, Unicheck, and other software)
- Digital Support Toolkit (for supported courses only. Students are automatically enrolled in the toolkit for supported courses)
- LIB 422 -- Computer Lab where students can take a proctored exam
- [The Career Success Center](#)
- [UT Tyler Testing Center](#)
- [Office of Research & Scholarship Design and Data Analysis Lab](#)

Resources available to UT Tyler Students

- [UT Tyler Counseling Center](#) (available to all students)
- [MySSP App](#) (24/7 access to Student Support Program counseling through phone or chat and online wellness resources available in a variety of languages)
- [Student Assistance and Advocacy Center](#)
- [Military and Veterans Success Center](#) (supports for our military-affiliated students)
- [UT Tyler Patriot Food Pantry](#)

- [UT Tyler Financial Aid and Scholarships](#)
- [UT Tyler Student Business Services](#) (pay or set up payment plans, etc.)
- [UT Tyler Registrar's Office](#)
- [Office of International Programs](#)
- [Title IX Reporting](#)
- [Patriots Engage](#) (available to all students. Get engaged at UT Tyler.)

University Policies and Information

Withdrawing from Class

Students may [withdraw](#) (drop) from this course using the [Withdrawal Portal](#). Withdrawing (dropping) this course can impact your Financial Aid, Scholarships, Veteran Benefits, Exemptions, Waivers, International Student Status, housing, and degree progress. Please speak with your instructors, consider your options, speak with your advisor, and visit the One-Stop Service Center (STE 230) or email enroll@uttyler.edu to get a complete review of your student account and the possible impacts to withdrawing. We want you to make an informed decision. UT Tyler faculty and staff are here for you and often can provide additional support options or assistance. Make sure to carefully [read the implications for withdrawing from a course and the instructions](#) on using the [Withdrawal portal](#).

Texas law prohibits students from dropping more than six courses during their entire undergraduate career*. The six courses dropped includes those from other 2-year or 4-year Texas public colleges and universities. Consider the impact withdrawing from this class has on your academic progress and other areas, such as financial implications. We encourage you to consult your advisor(s) and Enrollment Services for additional guidance.

CAUTION #1: Withdrawing before census day does not mean you get a full refund.

Please see the [Tuition and Fee Refund Schedule](#). **CAUTION #2:** All international students must check with the [Office of International Programs](#) before withdrawing. All international students are required to enroll full-time for fall and spring terms.

CAUTION #3: All UT Tyler Athletes must check with the Athletic Academic Coordinator before withdrawing from a course. **CAUTION #4:** All veterans or military-affiliated students should consult with the [Military and Veterans Success Center](#).

* Students who began college for the first time before 2007 are exempt from this law.

Artificial Intelligence Statement

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that

AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy. *Refer to the About This Course section of the UT Tyler Syllabus Module for specific information on appropriate use of AI in your course(s).*

For this course, AI is encouraged during the course, and appropriate acknowledgment is expected. Students can use AI platforms to help prepare for assignments and projects. You can use AI tools to revise and edit your work (e.g., identify flaws in reasoning, spot confusing or underdeveloped paragraphs, or correct citations). When submitting work, students must identify any writing, text, or media generated by AI. In this course, sections of assignments generated by AI should appear in a different colored font, and the relationship between those sections and student contributions should be discussed in a cover letter that accompanies the assignment when submitted.

Final Exam Policy

Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the Dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members must maintain student final examination papers for a minimum of three months following the examination date.

Incomplete Grade Policy

If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in place of a grade *only when all of the following conditions are met*: (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all coursework or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor, and (c) the student presents these reasons before the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average.

The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to meet all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has yet to be assigned within one year, then the Incomplete will be changed to an F, or NC. If the course was

initially taken under the CR/NC grading basis, this may adversely affect the student's academic standing.

Grade Appeal Policy

Disputes regarding grades must be initiated within sixty (60) days from the date of receiving the final course grade by filing a Grade Appeal Form with the instructor who assigned the grade. A grade appeal should be used when the student thinks the final course grade awarded does not reflect the grades earned on assessments or follow the grading scale as documented in the syllabus. The student should provide the rationale for the grade appeal and attach supporting document about the grades earned. The form should be sent via email to the faculty member who assigned the grade. The faculty member reviews the rationale and supporting documentation and completes the instruction section of the form. The instructor should return the form to the student, even if a grade change is made at this level. If the student is not satisfied with the decision, the student may appeal in writing to the Chairperson of the department from which the grade was issued. In situations where there is an allegation of capricious grading, discrimination, or unlawful actions, appeals may go beyond the Chairperson to the Dean or the Dean's designee of the college from which the grade was issued, with that decision being final. The Grade Appeal form is found in the [Registrar's Form Library](#).

NOTE: The Grade Appeal Form is different from the Application for Appeal form submitted to the Student Appeals Committee, which does not rule on grade disputes as described in this policy.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), the University of Texas at Tyler offers accommodations to students with learning, physical, and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler/> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with the Assistant Director Student Accessibility and Resources/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <https://www.uttyler.edu/disability-services>, the SAR office located in the Robert Muntz Library, LIB 460, email saroffice@uttyler.edu, or call 903.566.7079."

Military Affiliated Students

UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with your faculty member if any aspect of

your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make your faculty member aware of any complications as far in advance as possible. Your faculty member is willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. The [Military and Veterans Success Center \(MVSC\)](#) has campus resources for military-affiliated students. The MVSC can be reached at MVSC@uttyler.edu or via phone at 903.565.5972.

Students on an F-1 Visa

To remain in compliance with Federal Regulations requirements you must do the following:

- Traditional face-to-face classes: Attend classes on the regular meeting days/times.
- Hybrid Classes: Attend all face-to-face classes convened by the instructor according to the schedule set for your specific course.
- Online course: Only one online course can count toward your full-time enrollment. Students are expected to be fully engaged and meet all requirements for the online course.

Academic Honesty and Academic Misconduct

The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the [Student Conduct and Discipline policy](#) in the Student Manual Of Operating Procedures (Section 8).

FERPA

UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in [University Policy 5.2.3](#). The course instructor will follow all requirements to protect your confidential information.

Absence for Official University Events or Activities

This course follows the practices related to [Excused Absences for University Events or Activities](#) as noted in the Catalog.

Absence for Religious Holidays

This course follows the practices related to [Excused Absences for Religious Holy Days as noted in the Catalog](#).

Absence for Pregnant Students

This course follows the requirements of Texas Laws SB 412, SB 459, SB 597/HB 1361 to meet the needs of pregnant and parenting students. Part of the supports afforded pregnant students includes excused absences. Faculty who are informed by a student of needing this support should make a referral to the Parenting Student Liaison. NOTE: Students must work with the Parenting Student Liaison in order to receive these supports. Students should reach out to the Parenting Student Liaison at parents@uttyler.edu and also complete the [Pregnant and Parenting Self-Reporting Form](#).

Campus Carry

We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>.

Note: This syllabus is subject to change based on the needs of the class.