

**The University of Texas at Tyler**  
**Department of Health and Kinesiology**  
**Course Information**  
**Fall 2023**

**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:** 08/21/2023 – 12/9/2023

**Instructor Information**

**Name and Title:** X. Neil Dong, Ph.D., Professor of Health and Kinesiology  
**Office location:** HPC 2165  
**Phone number:** 903-565-5615  
**Email address:** [xdong@uttyler.edu](mailto:xdong@uttyler.edu)  
**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](http://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/intend; 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

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Week 1	Module 1: Introduction to Biomechanics Course Online quiz#1 is due at 11:59pm on 8/27/2023
Week 2	Module 2: Biomechanics of Bone (Chapter 3) Online quiz#2 is due at 11:59pm on 9/3/2023
Week 3	Module 3: Biomechanics of Skeletal Muscle (Chapter 4) Online quiz#3 is due at 11:59pm on 9/10/2023 Homework Assignment#1 is due at 11:59pm on 09/10/2023
Week 4	Module 4: Introduction to Biomechanical Analysis: Forces and Moments (Chapter 1) Online quiz#4 is due at 11:59pm on 9/17/2023
Week 5	Module 5: Introduction to Biomechanical Analysis: Statics (Chapter 1) Online quiz#5 is due at 11:59pm on 9/24/2023
Week 6	Module 6: Biomechanics of Tendons and Ligaments (Chapter 6) Online quiz#6 is due at 11:59pm on 10/1/2023 Homework Assignment#2 is due at 11:59pm on 10/1/2023
Week 7	Module 7: Biomechanics of Joints (Chapter 7) Online quiz#7 is due at 11:59pm on 10/8/2023

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Week 8	Midterm Exam will be due at 11:59pm on 10/15/2023
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 10/22/2023
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 10/29/2023
Week 11	Module 9: Mechanics and Pathomechanics of Muscle Activity at the Knee (Chapter 42) Online quiz#9 is due at 11:59pm on 11/5/2023
Week 12	Module 9: Mechanics and Pathomechanics of Muscle Activity at the Knee (Chapter 42, Continued) Group Review Paper is due at 11:59pm 11/12/2023
Week 13	Module 10: Analysis of the Forces on the Knee during Activity (Chapter 43) Online quiz#10 is due at 11:59pm on 11/19/2023 Homework#4 is due at 11:59pm on 11/19/2023
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).

**University Policies****STUDENTS RIGHTS AND RESPONSIBILITIES**

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please go to the following site:

<http://www.uttyler.edu/wellness/StudentRightsandResponsibilities.html>

**GRADE REPLACEMENT**

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grade point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler (2006-2008 Catalog, P. 35).

**STATE-MANDATED COURSE DROP POLICY**

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during his/her entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the 12th day of class (See Schedule of Classes for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Registrar's Office and must be accompanied by documentation of the extenuating circumstance. Please contact the Registrar's Office if you have any questions.

**DISABILITY SERVICES**

In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Support Service counselor. If you have a disability, including a learning disability, for which you request an

accommodation, please contact the Disability Support Services office in UC 3150 or call (903) 566-7079.

### CLASS ATTENDANCE

Responsibility for class attendance rests with the student. When a student has a legitimate reason for being absent, the instructor has the option of permitting make-up work. The university reserves the right to consider individual cases of nonattendance. In general, students are graded on the basis of intellectual effort and performance. In many cases, class participation is a significant measure of performance, and nonattendance can adversely affect a student's grade. When, in the judgment of the instructor, a student has been absent to such a degree as to jeopardize success in the course, the instructor informs the Office of Student Records that the student is to be dropped from the course.

### APPROVED STUDENT ABSENCES

On those occasions when it may be necessary for students to miss a regularly scheduled class in order to participate in an official university event or activity, faculty sponsors and program directors are requested to observe the following procedures:

- 1 . Faculty sponsors or program directors should draft a memorandum to the vice president for academic affairs. This memorandum should include information concerning the nature of the event, the date(s) on which students would be absent from class, and the names of the students involved.
2. Copies of the memorandum addressed to the vice president should be given to each of the students listed on the memorandum.
3. Students should be directed to communicate with their instructor(s) prior to the date of the planned absence.

It is expected that students will not abuse the privilege of being absent from class for authorized university activities, and that make-up assignments will be made at the discretion and convenience of the instructor.

### ACADEMIC DISHONESTY POLICY

At The University of Texas at Tyler students and faculty are responsible for maintaining an environment that encourages academic integrity. Students and faculty members are required to report an observed or a suspected case of academic dishonesty immediately to the faculty member in charge of an examination, classroom or laboratory research project, or other academic exercise.

Since the value of an academic degree depends on the absolute integrity of the work done by the student for the degree, it is imperative that a student maintain a high standard of individual honor in scholastic work. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, and collusion:

"Cheating" includes:

- 1 . Copying from the paper of another student, engaging in written, oral or any other means of communication with another student, or giving aid to or seeking aid from another student when not permitted by the instructor;
2. Using material during an examination or when completing an assignment that is not authorized by the person giving the examination or making the work assignment;

3. Taking or attempting to take an examination for another student, or allowing another student to take an examination for oneself;
4. Using, obtaining, or attempting to obtain by any means, the whole or any part of an unadministered examination or work assignment.

"Plagiarism" includes the unacknowledged incorporation of the work of another person in work that a student offers for credit.

"Collusion" includes the unauthorized collaboration with another person in preparing written work that a student offers for credit.

#### GRADE APPEAL PROCEDURE

A student who wishes to contest a grade given by an instructor must initiate the procedure by contacting the instructor who assigned the grade. The instructor and the student should informally review the criteria for assignment of grades and the student's performance. The instructor may affirm the grade or revise the grade.

If the student is not satisfied after the informal discussion with the instructor, then the student may initiate a formal grade appeal by completing a Grade Appeal Form that may be obtained from the Office of Student Records. Normal grade appeals should be filed at the earliest date possible, but no later than six months from the final date of assignment. The instructor and the student should complete the appropriate parts of the form clearly indicating the instructor's rationale for the grade given and the student's basis for the grade appeal.

At each administrative level of the appeal process, an attempt will be made to resolve the issue. If the instructor holds one of the administrative positions used in the appeal process, then that level is omitted. If no resolution is reached at a particular level, then the appeal is forwarded with the recommendation of the administrator at that level with all documentation.

If the appeal is to be considered by the vice president for academic affairs, then a copy of the Grade Appeal Form shall be forwarded by the academic dean of the students. The Office of the President is the final step in the appeal process at The University of Texas at Tyler.

#### FOOD AND DRINK IN CLASSROOMS

Consumption of food and drink in university classrooms is prohibited.

#### INDOOR SMOKE-FREE CAMPUS

The University of Texas at Tyler is an indoor smoke-free campus. No smoking will be permitted in any building, office, hallway, classroom, laboratory, restroom, lounge, or any other indoor location.

#### IMPORTANT COVID-19 INFORMATION FOR CLASSROOMS AND LABORATORIES

Students are required to wear face masks covering their nose and mouth, and follow social distancing guidelines, at all times in public settings (including classrooms and laboratories), as specified by [Procedures for Fall 2020 Return to Normal Operations](#). The UT Tyler community of Patriots views adoption of these practices consistent with



its [Honor Code](#) and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature will be excused from class and should stay at home and may join the class remotely. Students who have difficulty adhering to the Covid-19 safety policies for health reasons are also encouraged to join the class remotely. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email [saroffice@uttyler.edu](mailto:saroffice@uttyler.edu).

#### RECORDING OF CLASS SESSIONS

Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

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