



MENG 5361 – Biomechanics

Course Syllabus

Semester / Year	Fall 2023
Catalog Description	<i>The purpose of the course is to introduce students to concepts of mechanics as they apply to human movement, particularly those pertaining to exercise, sport, and physical activity. The student should gain an understanding of the mechanical and anatomical principles that govern human motion and develop the ability to link the structure of the human body with its function from a mechanical perspective. Furthermore, this course introduces students to musculoskeletal biomechanics and the quantitative analysis of human movement. Students will learn how muscles act as mechanical actuators to produce movement. Students will also evaluate how muscles, bones, and joints work together as a mechanical system. A course project is required towards the end of the course.</i>
Prerequisites	<i>Background in Dynamics and Physics or Graduate student standing</i>
Section number	001, 040
Instructor name	Dr. A. Ibrahim
Contact Information	Email: aibrahim@uttyler.edu , Office: RBN 3008
Class Type / Instruction Mode / Location	F2F Ratliff Building North 02011 Zoom Houston Engineering Ctr 0B208
Class Time	Mo 5:30PM - 8:15PM
Office hours	Mo 2:00 PM – 5:00 PM or by appointment.
No. of Credits	3
Required Textbook	No textbook is required as lectures will reference material from a range of text and provide a full complement of lecture notes.
Optional References	1- <i>Research Methods in Biomechanics</i> By D. Gordon E. Robertson, Graham E. Caldwell, Joseph Hamill, Gary Kamen, Saunders N. Whittlesey · 2013. ISBN:9780736093408, 0736093400 2- <i>Human Body Dynamics Classical Mechanics and Human Movement</i> By Aydin Tözeren · 2006. ISBN:9780387216911, 038721691X
Additional requirements	Basic programming skills with MATLAB
Evaluation Method	<i>First Exam 25 % Second Exam 25 % Third Exam 25 % Project 25 %</i>
Grading Policy / Scale	Letter grades: 90-100: A, 80-89: B, 70-79: C, 60-69:D, 0-59: F Note: 89.4 == B
Important events / dates	Census date: September 1 st , 2023. Last date to withdraw from one or more 15-week courses: October 30, 2023



	<p>(https://www.uttyler.edu/schedule/files/2023-2024/academic-calendar-2023-2024-main-20230328.pdf)</p> <p>First Exam Monday September 25th</p> <p>Second Exam Monday October 24rd</p> <p>Project PPT Monday November 27th</p>
Attendance / Makeup policy / other rules	<ol style="list-style-type: none"> 1. Attendance is required, 2. Missing 3 classes ==> F 3. No makeup exams will be authorized without providing an official document showing that your absence is in line with university rules. 4. The instructor has the right to make any changes and at any time to anything related to this course.
Course Learning Objectives / ABET & PEOs Relation	<p>At the end of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Describe the human body structure and specify the classes of the levering system. 2. Use marker selection technique in collecting and analyzing kinematic data from human motion. 3. Quantifying total and segmental body inertial characteristics. 4. Apply the Inverse Dynamics principle to bridges the areas of Kinematics and Kinetics. 5. Implement energy harvesting techniques in health monitoring applications.
Tentative Topics / Course Plans	<ol style="list-style-type: none"> 1. Human body structure 2. Levering system 3. Kinematics 4. Body Segment Parameters 5. Inverse Dynamics 6. Energy Harvesting
University Policies	<p>https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf</p>