



MENG 5361 – Biomechanics

Course Syllabus

Semester / Year	Spring 2025								
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.</i>								
Prerequisites	<i>Background in Dynamics and Physics or Graduate student standing</i>								
Section number	050, 051								
Instructor name	Dr. A. Ibrahim								
Contact Information	Email: aibrahim@uttyler.edu , Office: RBN 3008								
Class Type / Instruction Mode / Location	Hybrid F2F and Zoom Ratliff Building North 03038 Houston Engineering Ctr 0A217								
Class Time	T 5:00PM - 7:45PM								
Office hours	T 1:00 PM – 4:00 PM or by appointment.								
No. of Credits	3								
Required Textbook	<i>No textbook is required as lectures will reference material from a range of text and provide a full complement of lecture notes.</i>								
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	<table> <tr> <td><i>Quizzes</i></td> <td>25 %</td> </tr> <tr> <td><i>First Exam</i></td> <td>25 %</td> </tr> <tr> <td><i>Second Exam</i></td> <td>25 %</td> </tr> <tr> <td><i>Final Exam</i></td> <td>25 %</td> </tr> </table>	<i>Quizzes</i>	25 %	<i>First Exam</i>	25 %	<i>Second Exam</i>	25 %	<i>Final Exam</i>	25 %
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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: January 27 th , 2025. First drop for non-payment: 01/21/2025 Last date to withdraw from one or more 15-week courses: March 31, 2025								



	<p><i>Spring break for faculty and students: March 17-21, 2025</i></p> <p>https://www.uttyler.edu/schedule/files/2024-2025/academic-calendar-2024-2025-main-20241212.pdf</p> <p><i>Quizzes: Expect a quiz every week based on the materials covered on the previous week.</i></p> <p>First Exam Tuesday, February 11th</p> <p>Second Exam Thursday, March 11th</p> <p>Final Exam As assigned by UT Tyler for the Final Exam (TBD)</p>
Attendance / Makeup policy / other rules	<ol style="list-style-type: none"> 1. Attendance is required, 2. No makeup exams will be authorized without providing an official document showing that your absence is in line with university rules. 3. The instructor has the right to make any changes, at any time, to anything related to this course.
Course Learning Objectives / ABET & PEOs Relation	<p><i>By the end of this course, students will be able to:</i></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>

Note:

The instructor reserves the right to modify the syllabus at any time during the semester to accommodate unforeseen circumstances, enhance the learning experience, or ensure the course objectives are met. Any changes will be communicated promptly to all students.