Department of Mechanical Engineering
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Uttyler.edu/engineering

MENG 5361/4361 – Biomechanics
Course Syllabus

Semester / Year	*Spring/ 2026*
Catalog Description	*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.*
Prerequisites	*Background in Dynamics and Physics or Graduate student standing*
Section Number	*001, 051*
Instructor Name	*Dr. 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 0C203*
Class Time	*T/Th 6:30 AM - 7:50 AM*
Office Hours	*Mo 9:20 AM - 11:00 AM* *Mo 12:15 PM-1:35 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. *Research Methods in Biomechanics By D. Gordon E. Robertson, Graham E. Caldwell, Joseph Hamill, Gary Kamen, Saunders N. Whittlesey · 2013. ISBN:9780736093408, 0736093400.* 2. *Human Body Dynamics Classical Mechanics and Human Movement By Aydin Tözeren · 2006. ISBN:9780387216911, 038721691X.*
Additional Rules and Requirements	1. *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.*

	2. *Since the mechanical engineering program is designed to prepare students for professional practice, all submitted work (e.g., homework, lab reports, projects, presentations) is expected to meet professional standards. Work that does not reflect professional quality may be subject to grade reductions, even if professionalism is not explicitly listed in the grading rubric.* 3. *AI tools are allowed to support students' learning and productivity, provided that their use aligns with academic integrity standards. When required, students must disclose their use of AI.*
Evaluation Method	***Quizzes*** ***50%*** ***Midterm Exam*** ***25%*** *Tuesday, March 17th* ***Final Exam*** ***25%*** *As assigned by UT Tyler*
Grading Policy / Scale	*Letter grades, scale:* *A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60*
Important Events / Dates	• *Check the University academic calendar before entering the dates: https://www.uttyler.edu/academics/academic-calendar-25-26/academic-calendar-15-week-and-summer.php* • *Census date: Jan 26, 2026* • *Midterm Exam Tuesday, March 17th* • *Final Exam As assigned by UT Tyler for the Final Exam* • *Last date to withdraw from one or more 15-week courses: March 30, 2026* • *Final date: April 27-30, 2026* • *Martin Luther King, Jr. Holiday, all offices closed, no classes: January 19, 2026* • *Spring break for faculty and students: March 9-13, 2026*
Attendance / Makeup policy / other rules	1. *Mandatory Attendance: Regular attendance is required for this course. Students are expected to attend every class session on time and stay for the entire duration.* 2. *Absences: Students are allowed a maximum of 3 unexcused absences during the semester. Any additional unexcused absence will result in failing the course and an F as a final grade.* 3. *Excused Absences: Excused absences include illness (with a doctor's note), family emergencies, university-sponsored events, or other circumstances approved by the instructor in advance. Documentation must be provided within one week of the missed class.* 4. *Tardiness: Arriving late at class is disruptive and will be recorded. Three instances of tardiness will count as one*

	unexcused absence. If you arrive more than 10 minutes late, it will be considered an absence. 5. *Participation: Active participation is strongly encouraged to enhance your learning experience and requires regular attendance. Attending classes consistently and engaging in discussions will greatly benefit your understanding of the course material.* 6. *Pop Quizzes: The instructor reserves the right to administer unannounced quizzes anytime throughout the semester. These quizzes may cover recent material, reinforce key concepts, or assess attendance.* 7. *Other Classes: Engagement in other classes' activities, including related exams, meetings, or presentations, will not be accepted as an excuse for missing class. Any absence due to these commitments will count as a missed class.* 8. *Make-Up Work: Students who miss a class with a valid, documented excuse may be allowed to make up missed work at the instructor's discretion. It is the student's responsibility to contact the instructor to arrange for any make-up work.* 9. *Notification of Absence: If you anticipate missing a class, please notify the instructor and provide the excuse note as soon as possible. Failure to inform the instructor in advance may result in the absence being marked unexcused.* 10. *Withdrawal: If your absences become excessive and are impacting your performance, the instructor may recommend withdrawing from the course. Be mindful of the university's deadlines for course withdrawal.*
Course Learning Objectives / ABET & PEOs Relation	*By the end of this course, students will be able to:* 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	1. *Human body structure* 2. *Levering system* 3. *Kinematics* 4. *Body Segment Parameters* 5. *Inverse Dynamics* 6. *Energy Harvesting*

University Policies	*https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information-rev122025.pdf*