



**Jordan University of Science and Technology**  
**Faculty of Applied Medical Sciences**  
**Physical Therapy Department**

P.T205 Biomechanics

First Semester 2023-2024

**Course Catalog**

2 Credit Hours. Explore the mechanical bases of musculoskeletal systems relevant to human movements, including movement mechanics, fluid mechanics, and joint mechanics. Explore the common and unique constituents and features of musculoskeletal tissues, including bone, skeletal muscles and tendon, ligaments, cartilage, and joints. Identify the mechanical behavior of the musculoskeletal tissues and their adaptation to different mechanical loads. Describe the roles of musculoskeletal tissues during normal function and after injury. Describe the anatomy and mechanics of the upper and lower extremities and the spine. Identify and describe the mechanisms of injuries to the upper and lower extremities and spine. Establish an overview of injury mechanisms, principles of injury, and contributing factors to injury.

**Text Book**

<b>Title</b>	Fundamentals of Biomechanics
<b>Author(s)</b>	Duane Kundson
<b>Edition</b>	2nd Edition
<b>Short Name</b>	Ref # 1
<b>Other Information</b>	Publisher Springer

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
Ref # 2	Joint Structure and Function: A comprehensive analysis	Pamela K. Levangie and Cynthia C. Norkin	12th Edition	F.A. Davis Company. Philadelphia
Ref # 3	Basic Biomechanics	Susan J. Hall	7th Edition	

**Instructor**

<b>Name</b>	<b>Dr. Zakariya Nawasreh</b>
<b>Office Location</b>	Medical Building M5, L-4
<b>Office Hours</b>	Sun : 08:30 - 12:30 Sun : 13:00 - 16:00 Mon : 14:30 - 16:00 Tue : 09:00 - 12:00 Tue : 14:00 - 16:00 Wed : 09:00 - 12:00
<b>Email</b>	zhnawasreh@just.edu.jo

**Class Schedule & Room**

Section 1:  
 Lecture Time: Mon : 08:30 - 09:30  
 Room: NG76

**Prerequisites**

Line Number	Course Name	Prerequisite Type
821035	HSS103PHY General Physics	Prerequisite / Study
921031	PHY103 General Physics	Prerequisite / Study
1112030	P.T203 Musculoskeletal Anatomy (Lab)	Pre./Con.

**Tentative List of Topics Covered**

Weeks	Topic	References
Week 1	Introduction to Biomechanics	<b>Handouts From Ref # 1</b>
Week 2	Basic Biomechanics: Human Movement Mechanics: Kinematics	From <b>Ref # 1</b> , From <b>Ref # 3</b>

Week 3	Basic Biomechanics: Human Movement Mechanics: Kinematics	<b>Ch 3 &amp; handouts</b> From Ref # 1, From Ref # 3
Week 4	Basic Biomechanics: Human Movement Mechanics: Kinetic	<b>Ch 4 and handouts</b> From Ref # 1, From Ref # 3
Week 5	Basic Biomechanics: Kinetic Concept and Measures	<b>Ch 4 &amp; handouts</b> From Ref # 1, From Ref # 2
Week 6	Tissue Biomechanics and adaptation: Muscle and bone Biomechanics	<b>Ch 5 &amp; handouts</b> From Ref # 1, <b>handouts</b> From Ref # 2
Week 7	Tissue Biomechanics and adaptation: Bone Biomechanics	<b>Handouts</b> From Ref # 1, <b>Handouts</b> From Ref # 2
Week 8	Tissue Biomechanics and adaptation: Cartilage	<b>Handouts</b> From Ref # 1, <b>Handouts</b> From Ref # 2, <b>Handouts</b> From Ref # 3
Week 9	Tissue Biomechanics and adaptation: Spine and intervertebral Disc Biomechanics	<b>Handouts</b> From Ref # 1, <b>Handouts</b> From Ref # 2, <b>Handouts</b> From Ref # 3
Week 10	Tissue Biomechanics and adaptation	<b>Handouts</b> From Ref # 2, <b>Ch8</b> From Ref # 3
Week 11	Joint Stability, Flexibility	<b>Handouts</b> From Ref # 2, <b>ch 7</b> From Ref # 3
Week 12	Posture	<b>Handouts</b> From Ref # 1, <b>Handouts</b> From Ref # 2, <b>Handouts</b> From Ref # 3
Week 13	Balance and equilibrium	<b>Handouts</b> From Ref # 1, <b>Handouts</b> From Ref # 2, <b>ch 7</b> From Ref # 3

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Understanding mechanical bases of musculoskeletal system relevant to human movements	20%	
Identify the different types of musculoskeletal tissues, their constituents and features	10%	
Understand the mechanical properties of musculoskeletal tissues	15%	
Understanding the mechanisms of injuries of the upper and lower extremities and spine	25%	
Fundamentals governing balance, equilibrium and applications of forces.	10%	
Understand the basics of human posture, gait and abnormal gait patterns	20%	

Relationship to Program Student Outcomes (Out of 100%)																
PLO1-K1	PLO8-C1	PLO9-C2	PLO5-S1	PLO2-K2	PLO3-K3	PLO6-S2	PLO4-K4	PLO10-C3	PLO7-S3	MS_PLO1	MS_PLO2	MS_PLO3	MS_PLO4	MS_PLO5	MS_PLO6	MS_PLO7

Evaluation	
Assessment Tool	Weight
Frist exam	30%
Second exam	30%
Final	40%

Policy	
Course Policies for On-line lectures	<p>The lectures in this course will be recorded and then transformed into video. The video and the PDF file of the lecture will be uploaded into a Google Drive folder. The link to the Google Drive folder will be shared with the students? emails. Students will be able to view the video and PDF files. Students are not supposed to delete any of the files in the folder.</p> <p>There will be online meetings during the lecture to answer student questions and to discuss and clarify certain topics per students? requirements.</p> <p>Students are supposed to keep checking their JUST email and JUST news for any update. Students should also keep checking their el-learning account for any update about the class and exam time, and the time for meetings.</p> <p>Students who have questions can send an email to the instructor, and they should expect a reply to their emails within one to two business days. In case there are more there is a group of students ask questions related to specific lecture or topic, a discussion meeting will be held on Microsoft meeting app at a specific time that will be announced for 1-3 days in advance.</p>
Exam and assignemnt policy	Cheating in exams or homework assignments is completely unexpected. The instructor will strictly follow JUST?s discipline system for cheating.

Course Policies for in class lectures	<p>. Attendance and participation in lectures and labs is expected. As a JUST?s student, it is expected that you assume responsibility for learning/understanding the material, and that you become an active participant in the learning process.</p> <p>2. As a Physical Therapy student, you are expected to adopt behaviors which will ensure courtesy, professional behavior, and safety at all times. You should interact with each other and with the faculty/guest speakers as you would with patients and fellow health professionals.</p> <p>3. The criteria to which you must adhere are listed below:</p> <ol style="list-style-type: none"> <li>1. Lab clothing must be worn for all lab sessions unless otherwise instructed.</li> <li>2. Avoid wearing any jewelry that might cause injury to your partner or self or damage to the equipment.</li> <li>3. Professional behavior is always expected. Sample behaviors include: ?Dignity, comfort, and safety must be provided. ? BEING ON TIME FOR CLASS and prepared ? Giving your full attention to the speaker (not talking while speaker is presenting, not doing other work during class) ? Actively participating during class and lab (asks relevant and appropriate questions, answers questions, shares own experiences/thoughts) ? NO GUM during lab.</li> <li>4. You are responsible for the housekeeping and maintenance of the classroom/lab and proper care of the equipment. Please report any accidents, malfunctioning, or defective equipment to the course instructor immediately. Strict observation of all safety precautions is essential and mandatory.</li> <li>5. If you are unable to be present for an announced exam (due to illness or emergency), you must notify the course instructor prior to the examination. Failure to give prior notification will result in a zero grade for the missed exam. A make-up date will be arranged only for excused absences (illness-will need MD note, or bereavement).</li> <li>6. All assigned readings must be read PRIOR to the class for which they are designated.</li> <li>7. Students are responsible for all material presented in lectures and labs. If the student is absent from class, he or she is responsible for obtaining all materials. The professor, speakers and lab instructors reserve the right to refuse entrance to students who are late to class.</li> <li>8. Cheating in exams or homework assignments is completely unexpected. The instructor will strictly follow JUST?s discipline system for cheating.</li> </ol>
Professional behavior is always expected of students.	<p>Attitude and professional behavior are a minimum criterion for passing this class. Repeated lack of professional behavior will result in failure of the course. Examples of unprofessional behavior include but are not limited to missing classes (see attendance policy), tardiness, lack of attention for a speaker, talking to others during lecture, passing food during lecture, leaving a lecture prior to its completion without prior authorization of the instructor, working on other class material during class, inappropriate dress for labs, and sleeping during class.</p>
Attendance policy:	<p>? Students are expected to attend more than 90% of lectures If absence is more than 10% student will be banned from the course after electronic notification from the university through student e-mail.</p> <p>? Each student is expected to sit in his numbered seat.</p> <p>? Empty seat will be counted as absent.</p> <p>? All absences will be entered electronically into the University site.</p>
Communication with instructor	<p>Electronic mail is the best way to reach me as I consistently check it. However, students can still use the above-listed phone numbers.</p> <p>Cell phones: Please do not use cell phones in class or labs. If you are depended upon for anticipated emergencies, please put cell phones on vibration and answer the phone outside the classroom. I WILL KEEP MY CELL PHONE IN MY OFFICE OR ON VIBRATION MODE DURING CLASS TIME.</p>

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