


**Form:  
Course Syllabus**

<b>Form Number</b>	EXC-01-02-02A
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1.	Course Title	<b>Biomechanics and kinesiology 1</b>
2.	Course Number	<b>1831261</b>
3.	Credit Hours (Theory, Practical)	<b>3 (3,0)</b>
	Contact Hours (Theory, Practical)	<b>3 (3,0)</b>
4.	Prerequisites/Corequisites	<b>General Physics for Life Sciences (0342103) + Anatomy of Extremities and Trunk (0532108)</b>
5.	Program Title	<b>B.Sc. in Physiotherapy</b>
6.	Program Code	<b>1801</b>
7.	School/Center	<b>Rehabilitation Sciences</b>
8.	Academic Department	<b>Physiotherapy</b>
9.	Course Level	<b>Undergraduate/ Second year</b>
10.	Year of Study/Semester	<b>2024/2025 – First semester</b>
11.	Program Degree	<b>Bachelor</b>
12.	Other Departments involved in Teaching the course	<b>None</b>
13.	Main Teaching Instruction	<b>English</b>
14.	Learning Types	<input type="checkbox"/> Face to Face <input checked="" type="checkbox"/> Blended <input type="checkbox"/> Fully Online
15.	Online Platform(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams
16.	Issuing Date	<b>Oct – 2025</b>
17.	Revision Date	<b>Oct – 2025</b>

**18. Course Coordinator**

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## 19. Other Instructors

## 20. Course Description

As stated in the approved study plan.

This course covers the fundamental mechanical concepts and principles that are applied to the movement of the human body. It encompasses topics such as the study of motion (kinematics), and the forces acting on the body (kinetics). It focuses on understanding the force-motion relationship within the musculoskeletal system. The course also introduces various biomechanics techniques and tools for measuring human body movements. It covers the topic of Gait biomechanics analysis. In this course, emphasis is also placed on the mechanical properties of musculoskeletal tissues and how they respond to different mechanical loads. Furthermore, the course connects biomechanical principles to the comprehension of injury mechanisms and injury prevention, serving students with a foundation to understand the rationale behind examinations and therapeutic interventions.

## 21. Program Learning Outcomes

### Program Learning Outcomes Descriptors (PLOD)

PLO	National Qualification Framework Descriptors*		
	Knowledge (A)	Skills (B)	Competency (C)
PLO 1. Develop and integrate knowledge from foundational courses; including basic sciences, medical sciences, and research methods to reflect on rehabilitation sciences practice.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLO 2. Demonstrate knowledge of fundamentals of physiotherapy.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLO 3. Apply adequate physiotherapy techniques and skills according to professional standards of physiotherapy practice.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLO 4. Promote healthy lifestyle and convey health messages to clients.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLO 5. Compose effective oral and written communication for clinical and professional purposes including the use of information technology resources.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PLO 6. Operate within interprofessional teams of healthcare providers, clients, communities, and organizations in traditional and emerging practices and illustrate the qualities of a lifelong learner.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



PLO 7. Apply leadership and management skills to advance Jordan and the global community scientifically, socially, and technologically in rehabilitation sciences.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PLO 8. Generate scientific research that advances rehabilitation practices locally and globally.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PLO 9. Implement clinical reasoning, reflection and decision-making to deliver evidence-based physiotherapy practice, adhering to ethical principles to promote inclusion, participation, safety, and wellbeing for all clients.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PLO 10. Exercise autonomy while appreciating the challenges associated with delivering physiotherapy services.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

\*Choose only one descriptor for each PLO; either knowledge, or skills, or competencies.

## 22. Course Learning Outcomes: By the end of this course, the student is expected to achieve the following Learning outcomes:

- CLO 1:** Identify the basic concepts of biomechanics such as statics, dynamics, kinematics, and kinetics
- CLO 2:** Describe human movement through the application of kinematic principles, including the types of motion, direction, and magnitude of movement
- CLO 3:** Explain the different types and characteristics of forces, their effects on the human body through simple machines, and their relationship to human movement.
- CLO 4:** Discuss the types, purpose, and uses of available tools/instrumentations for kinematics and kinetics measurement
- CLO 5:** Describe the normal gait and its deviation, optimum posture and abnormal posture using biomechanical principles
- CLO 6:** Solve biomechanical problems, and perform a relatively low level of analysis for some movements, postures, and exercises through the application of biomechanics principles
- CLO 7:** Discuss the biomechanical properties, behavior and responses of the different body tissue structures to mechanical loading, and relate to common musculoskeletal injuries
- CLO 8:** Search for biomechanics papers and materials and appraise specific biomechanics topics related to rehabilitation field

### Matrix of Course Learning Outcomes according to National Qualification Framework Descriptors

CLO Number	Knowledge		Skills				Competencies
	Remember	Understand	Apply	Analyze	Evaluate	Create	
CLO 1		X					
CLO 2		X					
CLO 3		X					

CLO 4		X							
CLO 5		X							
CLO 6				X					
CLO 7		X							
CLO 8									X

23. Matrix linking Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

PLO* \ CLO	1	2	3	4	5	6	7	8	9	10	**Descriptors
											A B C
1.	X										X
2.	X										X
3.	X										X
4.	X										X
5.		X									X
6.			X								X
7.	X										X
8.								X			X

\*Map each Course Learning Outcome to ONLY one Program Learning Outcome based on Courses Matrix

\*\* Descriptors are assigned based on (PLO) that was chosen and specified in the program learning outcomes matrix in item (21)

### 23. Topic Outline and Schedule:

Week	Lecture	Topic	ILO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1	1.1	Syllabus + Introduction to the course	1	Face to Face	Moo dle	Synchron ous	Throughout this course, these will include:  Theoretical exams  Assignmen t  Quizzes	-----
	1.2	What is Biomechanics?	1	Face to Face	Moo dle	Synchron ous		# 1: chp.1  # 2: chp.1
	1.3	Kinematics- Types and location of motion  Planes and axes activity	2	Blended	Moo dle	Asynchro nous		# 1: chp.1  # 2: chp.1  Instructor's slides and videos will be uploaded on Moodle
2	2.1	Kinematics- direction, magnitude, and rate of change of motion	2	Face to Face	Moo dle	Synchron ous		# 1: chp.1  # 2: chp.1
	2.2	Simple kinematics analysis for selected movements	2	Face to Face	Moo dle	Synchron ous		Instructor's slides and worksheet will be provided
	2.3	Tools and instruments for kinematics analysis	4	Blended	Moo dle	Asynchro nous		Instructor's slides, videos, and assigned articles

					+ Tea ms			will be uploaded on Moodle
3	3.1	Kinetics- types of forces and their effects	3	Face to Face	Moo dle	Synchron ous		# 1: chp.1 # 2: chp.1
	3.2	Kinetics- Newton's laws of motion	3	Face to Face	Moo dle	Synchron ous		# 1: chp.1 # 2: chp.1
	3.3	Kinetics- Force systems and moments	3	Face to Face	Moo dle+ Tea ms	Asynchro nous		# 1: chp.1 # 2: chp.1
4	4.1	Kinetics- stability & equilibrium	3	Face to Face	Moo dle	Synchron ous		# 1: chp.1 # 2: chp.1
	4.2	Kinetics- Simple body machines: levers & pulleys-1	3	Face to Face	Moo dle	Synchron ous		# 1: chp.1 # 2: chp.1
	4.3	Kinetics- Simple body machines: levers & pulleys-2  Activity: Analyzing & Solving Moment and lever system exercises	3, 6	Blended	Moo dle + Tea ms	Asynchro nous		Instructor's slides, and videos, will be uploaded on Moodle
5	5.1	In class: Analyzing & Solving Moment and lever system exercises	3, 6	Face to Face	Moo dle	Synchron ous		-----
	5.2	How to search for biomechanics articles.	8	Face to Face	Moo dle	Synchron ous		Instructor's slides, and assigned articles will be uploaded on Moodle

		<ul style="list-style-type: none"> <li>- Sections of scientific articles.</li> <li>- Selected article.</li> </ul> <p>(Purpose: for a required assignment in the following week)</p>						
	5.3	Tools for kinetic analysis- Force platform	4	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned articles will be uploaded on Moodle
6	6.1	Biomechanics of gait	5	Face to Face	Moodle	Synchronous		<b>#1: chapter 14</b> <b>#2: chapter 15</b>
	6.2	Biomechanics of gait	5	Face to Face	Moodle	Synchronous		<b>#1: chapter 14</b> <b>#2: chapter 15</b>
	6.3	Activity: Gait analysis	5,6	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned articles will be uploaded on Moodle
7	7.1	Biomechanics of gait	5	Face to Face	Moodle	Synchronous		<b>#1: chapter 14</b> <b>#3: chapter 15</b>
	7.2	Biomechanics of gait	5	Face to Face	Moodle	Synchronous		<b>#1: chapter 14</b> <b>#3: chapter 15</b>
	7.3	Biomechanics of Posture	5	Blended	Moodle + Teams	Asynchronous		Assigned readings will be uploaded on Moodle <b>#1: chapter 13</b>
8	8.1	Biomechanics of Posture	5	Face to Face	Moodle	Synchronous		<b>#1: chapter 13</b>
	8.2	Articles discussion	8	Face to Face	Moodle	Synchronous		
	8.3	Activity: Posture analysis	5,6	Blended	Moodle	Asynchronous		Instructor's slides, videos, and assigned articles

					+ Teams			will be uploaded on Moodle
9	9.1	Mechanical behavior of connective tissues	7	Face to Face	Moodle	Synchronous		# 1: chp.2/ <b>General Properties of Connective Tissue</b>
	9.2	Mechanical behavior of connective tissues	7	Face to Face	Moodle	Synchronous		# 1: chp.2/ <b>General Properties of Connective Tissue</b>
	9.3	Bone Biomechanics-1	7	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned readings will be uploaded on Moodle <b># 1: chp.2</b> <b>#3: chp. 2</b>
10	10.1	Bone Biomechanics-2	7	Face to Face	Moodle	Synchronous		<b># 1: chp.2</b> <b>#3: chp. 2</b>
	10.2	Bone Biomechanics-3	7	Face to Face	Moodle	Synchronous		<b># 1: chp.2</b> <b>#3: chp. 2</b>
	10.3	Bone Biomechanics-4	7	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned articles will be uploaded on Moodle
11	11.1	Biomechanics of muscle-1	7	Face to Face	Moodle	Synchronous		<b># 1: chp.3</b> <b>#3: chp. 6</b>
	11.2	Biomechanics of muscle-2	7	Face to Face	Moodle	Synchronous		<b># 1: chp.3</b> <b>#3: chp. 6</b>
	11.3	Hand-held dynamometer	4	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned articles will be uploaded on Moodle
12	12.1	Biomechanics of muscle-3	7	Face to Face	Moodle	Synchronous		<b># 1: chp.3</b> <b>#3: chp. 6</b>
	12.2	Biomechanics of muscle-4	7	Face to Face	Moodle	Synchronous		<b># 1: chp.3</b> <b>#3: chp. 6</b>

	12.3	Isokinetic dynamometer	4	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned articles will be uploaded on Moodle
13	13.1	Articles discussion Validity of HHD	8	Face to Face	Moodle	Synchronous		Assigned articles will be uploaded on Moodle
	13.2	Biomechanics of ligaments and tendons	7	Face to Face	Moodle	Synchronous		# 1: chp.2 #3: chp. 4
	13.3	Biomechanics of ligaments and tendons	7	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned articles will be uploaded on Moodle
14	14.1	Biomechanics of articular cartilage	7	Face to Face	Moodle	Synchronous		#3: chp. 3
	14.2	Biomechanics of articular cartilage	7	Face to Face	Moodle	Synchronous		#3: chp. 3
	14.3	EMG	4	Blended	Moodle + Teams	Asynchronous		Instructor's slides, videos, and assigned articles will be uploaded on Moodle
15	15.1	Articles discussion	8	Face to Face	Moodle	Synchronous		
	15.2	Review	---	Face to Face	Moodle	Synchronous		
	15.3	Review	---	Blended	Moodle + Teams	Synchronous & Asynchronous		

## 25. Evaluation Methods:

Evaluation Activity	Mark*	Course Evaluation Plan							
		Course Learning Outcomes							
		1	2	3	4	5	6	7	8
First Exam (mid exam)	30	X	X	X	X		X		
Short Exams									



Final Exam	40	X	X	X	X	X	X	X	X
Classwork									
Evaluation of Semester work	Projects\Reports								
	Research\Worksheets								
	Fieldwork visits								
	Clinical and practical performance								
	Portfolio								
	Presentations								
	Simulation/Modeling								
	Discussion								
	Quizzes	30	X	X	X	X	X	X	X
	Exercises								
	Interviews								
	Conferences								
Any other evaluation activities approved by the faculty committee									
<b>Total Marks (100%)</b>	100								

\* According to the instructions for granting a bachelor's degree

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\*\*According to the instructions of organizing semester work, tests, examinations, and grades for the bachelor's degree.

## 26. Course Requirements

Students should have a computer, internet connection, webcam, and an account on a Microsoft teams. They should regularly check e-learning portal for any announcements, tasks, and learning materials.

## 27. Course Policy

A- Attendance policies:

- Students are expected to be on time.
- Repeated tardiness or leaving early will not be accepted.
- Students who miss class (or any portion of class) are responsible for the content. Online classes will be recorded and uploaded on Microsoft Teams. It is the student's responsibility to review the material of classes they missed.
- Attendance will be taken on every class throughout the semester.
- Absence of more than 15% of all the number of face-to-face classes (which is equivalent to 6 classes) requires that the student provides an official excuse to the instructor and the dean.
- If the excuse was accepted, the student is required to withdraw from the course.
- If the excuse was rejected, the student will not be allowed to sit for the final exam according to the regulations of The University of Jordan.



**B- Absences from exams and submitting assignments on time:**

- The instructor will not do any make-up exams.
- Exceptions for make-up exams and late submission of class assignments will be made on a case-by-case basis for true personal emergencies that are described as accepted in the regulations of the University of Jordan (e.g., documented medical, personal, or family emergency).
- It is the student's responsibility to contact the instructor within 24 hours of the original exam time to schedule a make-up exam.
- Late submission of assignments will result in deduction of 2 points for each day of delay.
- Makeup for the final exam may be arranged according to the regulations of The University of Jordan.

**C- Health and safety procedures:**

- This course is offered using **blended learning** method.

**D- Honesty policy regarding cheating, plagiarism, and misbehavior:**

- Students are expected to observe all University guidelines pertaining to academic misconduct.
- Any work submitted by a student for academic credit must be the student's own work. Submission of work taken directly from another source (e.g., book, journal, internet, or another student work) will be considered plagiarism and the student/group will get a zero grade on that homework. In addition, if copying occurred, both the student who copied the work and the student who gave material to be copied (if applicable) will receive a zero for the assignment.
- All submitted work will be checked for the use of Artificial Intelligence resources. Usage of such resources should not exceed the percentage set in the homework guidelines.
- Students are expected to do work required for homework on their own. Asking other instructors at the University, staff, or other students to assist in or do any part of the assignment will negatively affect their grade on that assignment. The course instructor is the person the student needs to talk to if she/he has any difficulties pertaining to an assignment or project and is strongly encouraged to schedule an appointment with the instructor if such difficulties arise during the semester.
- Course materials prepared by the instructor, together with the content of all lectures and review sessions presented by the instructor are the property of the instructor. Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited.
- Any forms of academic misconduct will be handled according to the University of Jordan guidelines.

**E- Grading policy:**

- Grading for this course will be determined based upon the accumulation of points for variety of assignments and exams.
- All work will be evaluated on completeness, organization, clarity of information, and the integration and application of the material.

**F- Available university services that support achievement in the course:**

- The University of Jordan provides many services to support social, health, and mental well-being of students in general and students with disabilities in specific. Students are advised to visit the Deanship of Students Affairs to learn more about those services.
- If you are a student with a disability for which you may request accommodations, please notify the instructor as soon as possible (email is acceptable) so the appropriate accommodations for this



course can be made. Also, notify the staff of Services for Student with Disabilities (Deanship of Students Affairs) as soon as possible.

## 28. References

### A- Required book(s), assigned reading and audio-visuals:

1. Levangie PK, Norkin CC, & Lewek. (2019). Joint Structure and Function: A Comprehensive Analysis. FA Davis, Philadelphia, 6th Edition
2. Neumann D.A. 2016. Kinesiology of the musculoskeletal system: foundations for rehabilitation, 3rd ed. Elsevier
3. Nordin M. and Frankel V. (2021). Basic biomechanics of the musculoskeletal system. 5th edition. Lippincott Williams and Wilkins.
4. Selected biomechanics articles will be allocated to students for Journal club part.

### B- Recommended books, materials, and media:

1. Hall S. (2012). Basic Biomechanics. Sixth edition. McGraw Hill.
2. Richards J. (2008). Biomechanics in clinic and research. Elsevier

## 29. Additional Information

### Students with disabilities:

- If you are a student with disability, please contact the course coordinator at the beginning of the term to inform them of any needs or adjustments you might have.
- According to University regulations, some students with disabilities can be allowed additional time during exams. This extra time is granted by an official letter from the University administration. Please discuss with the course coordinator your need for such extra time at the start of the term.
- All information you provide to the course coordinator will be dealt with confidentially.

### Course material and copy rights:

- All material prepared by the course coordinator for the purposes of this course are the intellectual property of the course coordinator. It is only intended for the personal use of students for their individual learning.
- Sharing of course content with other people or via different platforms other than those used by the course coordinator is prohibited. The permission of the course coordinator must be sought before sharing of content.



This course builds upon knowledge students obtained in the **following courses**:

- **General physics:** knowledge related to force resolution, simple machines such as pulleys and levers and their types.
- **General biology:** knowledge related to different body tissues, their structures and composition.
- **Anatomy of lower extremities:** knowledge related to anatomy of muscles and joints
- This course forms the basis of other physiotherapy core courses, like musculoskeletal physiotherapy I & II. Students will use knowledge and experience obtained through this course to inform their patient management process.

The course material will be uploaded on the e-learning website so make sure you have access to the website. Independent study is essential part of this course. You are required to read the selected chapters from the reference textbook and prepare some materials prior to the lecture.

Name of the Instructor or the Course Coordinator:	Signature:	Date:
..... Sumayeh Abujaber .....	.....S.A.....	...8/10/2025.....
Name of the Head of Quality Assurance Committee/ Department	Signature:	Date:
Dr. Mayis Aldughmi	MD	.....
Name of the Head of Department	Signature:	Date:
Dr. Mayis Aldughmi .....	...MD.....	.....
Name of the Head of Quality Assurance Committee/ School or Center	Signature:	Date:
.....Dr. Lara Khlaifat.....	...LK.....	2/11/2025
Name of the Dean or the Director	Signature:	Date:
... Dr. Lara Khlaifat.....	...LK.....	2/11/2025