



Faculty: Faculty of Science	
Department: Physics	Program: M. Sc. of Physics
Semester: First	Academic year:2024/2025

Course Plan

First: Course Information

Course No. 0302711	Course Name: Advanced Classical Mechanics	Credit Hours: 3
Prerequisite:	Class Number:1	Lecture Time:
Course Nature:	Mandatory Faculty Requirement <input type="checkbox"/> Optional University Requirement <input type="checkbox"/> Mandatory University Requirement <input type="checkbox"/> Faculty Requirement <input type="checkbox"/> Ancillary Course <input type="checkbox"/> Optional Specialty Requirement <input type="checkbox"/> Mandatory Specialization requirement <input checked="" type="checkbox"/>	
Type of Education:	Fully Face-to-Face Education (fully Direct) <input type="checkbox"/> Integrated Education (2 Face-to-Face + 1 Asynchronous) <input checked="" type="checkbox"/> Electronic Education Fully (Asynchronous 1 + Synchronous 2) <input type="checkbox"/>	

Second: Instructor's Information

Name: Dr. Mohammed Shqair	Academic Rank: Associated Professor	
Office Number:369 D	Phone Number:	Email: mshqair@zu.edu.jo
Office Hours:	Monday 3:00:4:30. Wednesday 3:00:4:30	

Third: Short Description of the Course

In this course students are expected to learn about Central forces between two objects, Variation principles, Conservation theorems and Symmetry properties, Hamiltonian-Euler principle, Coriolis force, Rigid motion and the dynamic rotation motion, Angular momentum and kinetic energy of rotating rigid body motion about a point, Canonical transformations, Oscillations

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Fourth: Objectives:

1. To apply Hamiltonian-Euler principle and Canonical transformations in classical motion
2. To Solve different physics problems by finding maximum and minimum values using Hamiltonian-Euler
3. To use Coriolis force in describing the path of an object that moves within a rotating coordinate system
4. To consider Rigid motion and the dynamic rotation motion, Angular momentum and kinetic energy of rotating rigid body motion about a point.

Fifth: Learning Source

Designated Book:	1. Classical Mechanics	
Herbert Goldstein	<i>Print: 3rd edition</i>	<i>Year: 2002</i>
Additional Sources: Website:	1) John R. Taylor, Classical Mechanics, ISBN 978-1-891389-22-1, (2005). 2) A. P. Arya, Introduction to Classical Mechanics (2nd Ed.), Benjamin Cummings, ISBN-10: 135052238, ISBN-13:978-0135052235, (1997) 3) Classical mechanics: a modern introduction, Martin W. McCall. Chichester: John Wiley, (2001).	
Teaching Type:	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> Laboratory <input type="checkbox"/> Workshop <input type="checkbox"/> MS Teams <input type="checkbox"/> Moodle	

Sixth: Learning Outcomes

Number	Course learning output	Associated PILOs Code <i>Choose one PILO for each CILO*</i>	Assessment method** <i>Choose at least two methods</i>	Scores out of 100 State the total score identified for each CILO	Minimum acceptable Score/percentage (%) <i>The percentage should not be less than 50% ***</i>
Knowledge					
K1	To understand the main concepts of Advanced classical mechanics	PK1	Mid-Exam Quiz Final exam	12	6(50%)
K2	Recognize the methodology of solving problems by using Hamiltonian-Euler principle and Canonical transformations	PK2	Mid-Exam Quiz Final exam	12	6(50%)
K3	Convert the physical description of many phenomenon's related to the classical mechanics problems into the mathematical necessary to solve them.	PK3	Mid-Exam Quiz Final exam	10	5(50%)
K4	Applying the knowledge of Coriolis force to understand the nature of the path of an object that moves within a rotating coordinate system	PK4	Mid-Exam Quiz Final exam	8	4(50%)
Skills					
S1	Solving many of classical problems by using the appropriate method.	PS1	Mid-Exam Quiz Final exam	18	9(50%)
S2	Summarizing information in different types of classical mechanical descriptions.	PS2	Mid-Exam Quiz Final exam	12	6(50%)
S3	Apply moral and ethical issues of data handling and recording in the subject of classical mechanics.	PS3	Mid-Exam Quiz Final exam	18	9(50%)
S4	Formulate hypotheses and theories in classical mechanics.	PS4	Mid-Exam Quiz Final exam	10	5(50%)
Competences					
C1	Students should accept full responsibility for their own learning.	PC1			
C2	Working a knew problems and identify the suitable way to solve the problem..	PC2			

Seventh: Course Structure

Lecture r Date	Teaching Outcome	Topics	Teaching Procedures	Teaching Methods	References
	PK1, PK3, PS1, PC1,	Introduction to Advanced Classical Mechanics	Direct	Lecturing, Whiteboard, Data Show	Text Book
	PK1, PK3, PS1, PC1,	Central forces between two objects	Asynchronous	Short videos Assignment	
	PK1, PK3, PS1, PC1,	Variation principles	Direct	Lecturing, Whiteboard, Data Show	Text Book
	PK1, PK3, PS1, PC1,	Conservation theorems	Asynchronous	Short videos Quiz	Text Book
	PK3, PK4, PS1, PS4, PC2	Symmetry properties	Direct	Lecturing, Whiteboard, Data Show	Text Book
	PK3, PK4, PS1, PS4, PC2	Hamiltonian-Euler principle	Asynchronous	Short videos Assignment	Text Book
	PK3, PK4, PS1, PS4, PC2	Coriolis force	Direct	Lecturing, Whiteboard, Data Show	Text Book
	PK3, PK4, PS1, PS4, PC2	Rigid motion	Asynchronous	Short videos Quiz	Text Book
	PK2, PK3, PS1, PS3, PC1, PC2	the dynamic rotation motion,	Direct	Lecturing, Whiteboard, Data Show	Text Book
	PK2, PK3, PS1, PS3, PC1, PC2	Angular momentum	Asynchronous	Short videos Assignment	Text Book
	PK2, PK3, PS1, PS3, PC1, PC2	kinetic energy of rotating rigid body motion about a point	Direct	Lecturing, Whiteboard, Data Show	Text Book

	PK2, PK3, PS1, PS3, PC1, PC2	kinetic energy of rotating rigid body motion about a point	Asynchronous	Short videos Quiz	Text Book
	PK2, PK3, PS1, PS3, PC1, PC2	Canonical transformations	Direct	Lecturing, Whiteboard, Data Show	Text Book
	PK2, PK3, PS1, PS3, PC1, PC2	Oscillations	Asynchronous	Short videos Quiz	Text Book
	Final exam				

Education procedures: (Direct, synchronous, asynchronous). ** Teaching methods: Lecture, video..... ** Reference: Pages of the book, recorded lecture, video

Eighth: Assessment methods

Methods	Fully Electronic Education	Integrated Teaching	Direct Teaching								
				K1	K2	K3	K4	S1	S2	S3	S4
Mid-Exam			30	6		4	2	4	6		8
Quiz			20	2	4	4	2	2	2	4	
Final			50	4	8	2	4	12	4	14	2
Total out of 100			100	12	12	10	8	18	12	18	10

Ninth: Course Polices

- Meeting the deadline for the lecture.
- Commitment to interaction and participation.
- Interactive lectures will be given through a platform (MS Teams).
- Duties and tests will be given through a platform(Moodle).
- Commitment to the right appearance in front of the camera with the proper background.
- University regulations for attendance and absence from lectures and examinations are in force.
- Academic Integrity: Fraud or moral impersonation are unacceptable and are punishable according to university regulations and instructions.

Approval	Name	Date	Signature
Head of Department			
Faculty Dean			