Jordan University of Science and Technology

Faculty of Science & Arts

Physics Department

PHY311 Classical Mechanics (1)

First Semester 2020-2021

Course Catalog
3 Credit Hours. Newton Mechanics. Motion in one, two, and three dimensions, Motion of a system of particles. Motion of rigid bodies. Moving coordinate systems, gravitation.

Text Book	
Title	Classical Dynamics of Particles and Systems
Author(s)	Marion and Thornton
Edition	5th Edition
Short Name	Marion
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Symon	Mechanics	K. R. Symon	3rd Edition	
Fowles	Analytical Mechanics	G. R. Fowles and G. L. Cassiday	7th Edition	

Instructor	
Name	**Dr. EMAD ALMAHMOUD**
Office Location	-
Office Hours	
Email	eaalmahmoud@just.edu.jo

Class Schedule & Room

Section 1:
Lecture Time: Mon, Wed : 08:30 - 10:00
Room: منصة الكترونية

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
922810	PHY281 Vibrations And Waves	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Coordinates transformation, Rotation of axes	From **Marion**, From **Symon**, From **Fowles**
Week 2	Vector differentiation and integration	From **Marion**, From **Symon**, From **Fowles**
Week 3	Newton laws of motion, Application of Newton 2nd law to physical problems including retarding forces.	From **Marion**, From **Symon**, From **Fowles**
Week 4	Conservation theorems and energy method for solving problems.	From **Marion**, From **Symon**, From **Fowles**
Week 5	Gravitational force, field and potential	From **Marion**, From **Symon**, From **Fowles**

Week 5	Solving problems on calculating the potential of continuous objects.	From **Marion**, From **Symon**, From **Fowles**
Week 6	Central force problem: solution and applications	From **Marion**, From **Symon**, From **Fowles**
Week 7	Orbits and differential equation of the orbit	From **Marion**, From **Symon**, From **Fowles**
Week 8	The planetary motion: The Kepler problem	From **Marion**, From **Symon**, From **Fowles**
Week 9	Stability of circular orbits	From **Marion**, From **Symon**, From **Fowles**
Week 10	Solving problems	From **Marion**, From **Symon**, From **Fowles**
Week 11	Dynamics of system of particles: the center of mass	From **Marion**, From **Symon**, From **Fowles**
Week 12	Linear momentum and Angular momentum	From **Marion**, From **Symon**, From **Fowles**

Week 13	Energy of a system	From **Marion**, From **Symon**, From **Fowles**
Week 14	Collisions	From **Marion**, From **Symon**, From **Fowles**
Week 15	Cross sections	From **Marion**, From **Symon**, From **Fowles**

Mapping of Course Outcomes to Program Student Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**
Setup rotation matrices and use Levi-Sivita symbol to prove some vector properties 2- Understand Newton?s laws of motion and apply the 2nd law to different physical problems. [31]	25%	
Employ conservation theorems in solving mechanical problems. Calculate the gravitational field and potential for different mass distributions. [31]	25%	
Solve the two body central force problem and prove Kepler laws of orbital motion. Find the center of mass of different objects of different geometries. [31]	25%	
Find the linear and angular momentum of a system of particles. Employ conservation of momentum to study collisions. Understand the concept of cross-section. [31]	25%	

Relationship to Program Student Outcomes (Out of 100%)					
1	2	3	4	5	6
100					

Evaluation	
Assessment Tool	**Weight**
First Exam	15%
Second Exam	35%
Final Exam	40%
Quizes	10%

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