



**Jordan University of Science and Technology**  
**Faculty of Science & Arts**  
**Physics Department**

PHY311 Classical Mechanics (1)

First Semester 2017-2018

**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**

<b>Title</b>	Classical Dynamics of Particles and Systems
<b>Author(s)</b>	Marion and Thornton
<b>Edition</b>	4th Edition
<b>Short Name</b>	Classical Physics
<b>Other Information</b>	

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
Mechanics	Mechanics	K. R. Symon	3rd Edition	
2. Analytical Mechanics	2. Analytical Mechanics	G. R. Flowers and G. L. Cassiday	5th Edition	

**Instructor**

Name	Dr. Mohammad Anwar Alibrahim
Office Location	-
Office Hours	
Email	maalibrahim@just.edu.jo

**Class Schedule & Room**

Section 1:

Lecture Time: Mon, Wed : 08:30 - 10:00

Room: M1304

**Prerequisites**

Line Number	Course Name	Prerequisite Type
922810	PHY281 Vibrations And Waves	Prerequisite / Study

**Tentative List of Topics Covered**

Weeks	Topic	References
Week 1	Coordinates transformation, Rotation of axes	From <b>Classical Physics</b>
Week 2	Vector differentiation and integration	From <b>Classical Physics</b>
Week 3	Newton laws of motion, Application of Newton 2nd law to physical problems including retarding forces.	From <b>Classical Physics</b>
Week 4	Conservation theorems and energy method for solving problems.	From <b>Classical Physics</b>
Week 5	Gravitational force, field and potential	From <b>Classical Physics</b>
Week 5	Solving problems on calculating the potential of continuous objects.	From <b>Classical Physics</b>
Week 6	Central force problem: solution and applications	From <b>Classical Physics</b>
Week 7	Orbits and differential equation of the orbit	From <b>Classical Physics</b>
Week 8	The planetary motion: The Kepler problem	From <b>Classical Physics</b>
Week 9	Stability of circular orbits	From <b>Classical Physics</b>
Week 10	Solving problems	From <b>Classical Physics</b>
Week 11	Dynamics of system of particles: the center of mass	From <b>Classical Physics</b>
Week 12	Linear momentum and Angular momentum	From <b>Classical Physics</b>

Week 13	Energy of a system	From <b>Classical Physics</b>
Week 14	Collisions	From <b>Classical Physics</b>
Week 15	Cross sections	From <b>Classical Physics</b>

<b>Mapping of Course Objectives to Program Student Outcomes<sup>1</sup></b>	<b>Assessment method</b>
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. [1(a), 1(k)]	
Employ conservation theorems in solving mechanical problems. Calculate the gravitational field and potential for different mass distributions. [1(a), 1(j), 1(k)]	
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. [1(a), 1(j)]	
Find the linear and angular momentum of a system of particles. Employ conservation of momentum to study collisions. Understand the concept of cross-section. [1(a)]	

<b>Relationship to Program Student Outcomes (Out of 100%)</b>										
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
58.33									20.83	20.83

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