



**Petra University**  
**Faculty of Arts and Sciences**  
**Department of Basic Sciences**  
**Course Outline**

**104103 Physics for Medical Sciences**

**(3-3-0)**

**Prerequisite : None.**

**Course Description:** Vectors, One and Two Dimensional Kinematics of Point Particles, Dynamics of point particles, circular Motion, Work, Energy and Power, Linear Momentum, Elastic Properties of Matter; Stress and Strain, Vibrational Motion; Simple Harmonic Motion, Fluid Mechanics and Viscosity, Static Electricity; Electric Field, Potential and Potential Energy, Direct Current, Magnetism, Wave Motion and Sound Waves, Optics, Wave and Particle Properties of Light, X-Ray.

Instructor's Name	Office No.	Office Phone	Office Hours	E-mail
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**Course Objectives:**

1. To give a solid grounding in basic physics needed for the study of medical sciences such as pharmacology and nutrition,
2. During this course, students should develop qualitative and quantitative understanding of the concepts, aspects and principles of the subjects included in the course description above.

**A-Intended Learning Outcomes (ILO'S) :**

After completing this course, students are expected to achieve the following outcomes:

1. Achieve a good understanding of basic concepts and quantities in physics and how to link and apply these concepts to understand the relevant topics to be taught in pharmacology and nutrition courses,
2. Achieve a good understanding of the fundamental aspects of the physical behavior of energy and matter and apply it to a variety of physical situations in real life,
3. Acquire skills in scientific methods, critical reasoning and problem solving techniques and strategies,
4. Acquire skills needed to read physics literature and to work with tables and physical quantities,
5. Recognize the basic physical principles behind the operation of current technologies especially in the fields of medical sciences.

**B-Intellectual Skills:**

1. Demonstrate knowledge and understanding of the points mentioned above,
2. Develop the ability of solving physics problems logically,
3. Develop the students creativity, deep thinking, reasoning and estimate skills,
4. To be able to understand and to use physical laws governing real physical process and to describe them mathematically.

**C-Subject Specific Skills:**

1. Recognize the basic physical quantities and the units associated with them,
2. Solve motion problems using the properties of vectors in one- and two-dimensions,
3. Apply Newton's Three Laws of Motion to solve a variety of problems for linear and circular motion,
4. Use Conservation Laws of Energy, Momentum to solve problems of motion and collisions,
5. Be familiar with elastic properties of matter and Young's modulus,
6. Analyze a multitude of physical situations that involve waves and oscillations,
7. Understand Archimedes's principle and apply it to fluid mechanics,
8. Get an idea about viscosity and viscous force,

9. Explain simple electrical interactions involving static electric forces and fields. Define and use electric potential (voltage) to understand basic electricity problems. Understand and use the behavior of charge on insulators and conductors,
10. Define the electric current, solve circuit problems and describe the behavior of capacitors in simple electric circuits,
11. Analyze simple DC circuit problems using Kirkhoff's laws,
12. Know and use the definition of magnetic field to solve magnetic force problems,
13. Use Lenz's Law and Faraday's Law to solve electromagnetic induction problems,
14. Understand the description and representation of waves, standing waves, resonance and energy in waves,
15. Understand the nature and intensity of sound, and apply the concepts of waves to analyze problems involving sound,
16. Understand the wave and particle properties of light,
17. Understand X-ray and how to use X-ray diffraction to find the structure of Biological molecules.

**D-Transferable Skills:**

1. Develop cooperative work habits and communication skills,
2. Develop a sense of responsibility,
3. Understand how the scientific method can be used to increase our knowledge of the world and the universe.

**Teaching Methods:**

Method	Contact Hours
Lectures And Discussions	42 50-minute lectures

**Learning Outcomes Achieved By Each Teaching Method:**

Metod	Achieved outcome	Assessed by
Lectures & Discussions	All outcomes	Exams

**Syllabus:**

Chapter &	Content	Page	Selected Problems	No. of 50
<b>1</b>	<b>Motion in a Straight Line</b>	3	pp. 21- 25	4
1. 1	Measurements, Standards & Units	3		
1. 2	Displacement & Average Velocity	6	16, 17, 22, 23	
1. 3	Instantaneous Velocity	10	28, 30	
1. 4	Acceleration	12	34, 36	
1. 5	Finding the Motion of an Object	13	45, 50	
1. 6	The Acceleration of Gravity & Falling	15	53, 58, 59, 63, 66, 70	
<b>2</b>	<b>Motion in two Dimensions</b>	30	pp. 40- 43	4
2. 1	An Introduction to Vectors	30	2, 4, 7, 9, 11, 12	
2. 2	The Velocity in two Dimensions	33	15, 19	
2. 3	The Acceleration in two Dimensions	35	21, 23	
2. 4	Finding the Motion of an Object	36	31, 38	
2. 5	Projectiles	36	41, 42, 45	
<b>3</b>	<b>Newton's Laws of Motion</b>	48	pp. 68- 75	3
3. 1	Force & Weight	48	2, 3	
3. 2	Density	49	11, 16	
3. 3	Newton s First Law	50	29, 31	
3. 5	Newton s Third Law	53	38	
3. 6	Newton s Second Law	54	41, 46, 90, 91, 100, 101,	
3. 7	The Significance of Newton s Laws of	55	-	
3. 8	Some Examples of Newton s Laws	57	52, 53, 55	
3. 9	Gravitational Forces	61	56	
3. 10	Weight	62	66	
3. 11	Effective Weight	63	69, 71	
3. 12	Friction	64	79, 109	
<b>5</b>	<b>Circular Motion</b>	104	pp. 122- 125	2