

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Medical Physics (0601150)
Course number	MEDI1307
Faculty	
Department	
Course type	Major Needs
Course level	1
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1	- To learn the concept of Biostatics, and the equilibrium of human body
2	- To learn the concept of the mechanical properties of materials
3	- To Learn the concept of thermal energy and its biological effects
4	- To learn the concept of biofluids, and its application in the blood circulation
5	- To learn the concept of bio-electricity and the nerve system model
6	- To learn the concept of waves and their application in medicine

Intended Learning Outcomes

Knowledge and Understanding	* To understand how Physics serves the medical sciences
Intellectual Skills	* Solve real problems and have the ability of analysis

Course Contents

1	- Introduction To Medical Physics, Dimensional Analysis and Scaling Laws
2	- Uses of Dimensional Analysis, Allometric Scaling, Vector algebra
3	- Bio-Static Equilibrium, Basic Concepts of Static (Force, Torques, Rigid Body) equilibrium, center of Gravity, levers, Equilibrium and Stability, Stability of Human Body.
4	- center of Gravity, Equilibrium Consideration for Human Body (The elbow joint, The Back, The Hip)
5	- Elastic Properties of Materials, stress, strain
6	- Elasticity, Young Modulus, Elastic Strain Energy, Bone Fracture
7	- Thermal properties of materials, energy and temperature concept, Ideal gas law
8	- Thermal expansion and application, thermal conduction
9	- Bio-Fluid Mechanics: Fluid Characteristics, Fluid Flow and Continuity Equation, Bernoullis Equation , Applications of Bernoullis Equation
10	- The Role of Gravity in Blood Circulation, Effect of Acceleration on Blood Pressure, Viscous Fluid Flow, Laminar Flow in Tube, Turbulent Flow
11	- Bioelectricity and Nerve conduction: Resistance and capacitance of an axon, Ionic concentration and resting potential, Nernst Equation, Action potential, Applications
12	- Waves and their applications, Sound waves, Ultrasound, Doppler Effect, medical and diagnostic application

Teaching and Learning Methods

- 1 - The courses is given as lecture and discussion, where several problems on the material are solved at the end of each unit. In addition, some assignments are given to the students as homework.

Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
Reports and Homeworks	weekly	10%
mid hour exam	twice	40%
Final exam	Once	50%

Books and References

Course note	course note one of the given sources for the students
Essential books	Physics for medical students, 2011, Hassan Ashour, Naji Al Dahoudi, Amal Al Kahlout, Al Azhar UniversityGaza
Recommended books	Physics for Scientists and engineering, 2010, Serway, Cengage