Physics 2N - Physics for Nursing

Course Information
Course Title: Physics for Nursing
Course Code: Phys 2N
Course Description: Short course in Physics covering the laws of mechanics, heat, sound, electricity, magnetism and optics with special emphasis on the descriptive analysis of physical problems.

Textbook
Title: Physics with Health Science Applications
Author: Paul Peter Urone
Publisher: John Wiley & Sons (ASIA) Pte. Ltd.

Other References
Conceptual Physics by Paul Hewitt, 7th Edition
University Physics by Young and Freedman, 11th Edition

Course Objective
At the end of the semester/course, the student should be able to:
1. understand and appreciate the various concepts of introductory mechanics, thermodynamics, waves, electricity and magnetism, optics and modern physics as applied in the health sciences.
2. apply the basic theories and laws of physics in problems and classroom exercises.
3. consider the application of physics principles to provide safety health care.

Course Content
Module 1 - Motion
Time, Displacement, Velocity and Acceleration
Motion Equations; Problem Solving
Gravity and Falling Bodies

Module 2 - Force
Force, the Cause of Acceleration; Newton’s Laws of Motion
Weight, Friction, Tension, and Other Classes of Forces
Vectors; The Graphical Method of Adding and Projecting Forces
Statics; Torque and Rotation
Rotational Motion and Centripetal Force

Module 3 - Work, Energy, and Power
Work: The Physicist’s Definition
Energy
Conservation of Total Energy; The Concept of a System Revisited
Power and Efficiency
Work, Energy, Power and Efficiency in Humans

**Module 4 - Temperature and Heat**
Temperature and Phases of Matter
Heat: One Cause of Temperature Change
Phase Changes and Latent Heat
Methods of Heat Transfer
Heat and the Human Body

**Module 5 - Fluids and Pressure**
Definition of Pressure
Pascal’s Principle
Measurement of Pressure
Buoyant Force and Archimedes’ Principle
Flow: Poiseuille’s Law, Laminar Flow and Turbulent Flow
The Bernoulli Effect and Entrainment
Cohesion and Adhesion

**Module 6 - Biological and Medical Applications of Pressures and Fluids**
Examples of Pressure in Humans
Molecular Phenomena and Biological Processes
The Cardiovascular System
The Physics of Respiration
Medical Instrumentation and Devices Related to Fluids

**Module 7 - Elasticity and Waves; Sound**
Hooke’s Law and Periodic Motion
Transverse and Longitudinal Waves
Energy in Waves: Intensity
Superposition and Resonance
The Doppler Effect: Moving Sources and Observers

**Module 8 - Sound and Hearing**
The Hearing Mechanism
Sound Perception
Hearing Loss and Correction

**Module 9 - Introduction to Electricity and Magnetism**
Electric Charges and Forces
Voltage: Electrical Potential Energy
Current: the Flow of Charge
Magnetism
Meters, Motors, Generators , and Transformers; Faraday’s Law of Induction

**Module 10 - Simple Electric Circuits**
Resistance and Ohm’s Law
Power in Electric Circuits
Alternating Current
Multiple-Resistance Circuit
The Basics of Electrical Safety

**Module 11 - Geometric Optics**
Light as a Ray: Reflection and Refraction
Lenses and Mirrors: Image Formation
Multiple-Element Systems
Optical Instruments

**Module 12 - Electromagnetic Radiation: Introduction to Modern Physics**
Wave Character of Visible Light
The Electromagnetic Spectrum
Photons
Medical Applications of EM Radiation

**Corresponding Grade**

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