SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Biomedical Science)
Semester: I
Syllabus with Effect from: June - 2014

Paper Code: PT01CBMC01	Total Credit: 4
Title Of Paper: Elements of Physical Sciences	

Unit	Description in Detail	Weightage (%)
I	Introduction and Measurements; Vectors – Kinematics- Newton's Laws of Motion - Equilibrium - Uniform Circular Motion- Gravitationand Satellites. Energy, Momentum Conservations. Rotational Motion- Elasticity, Simple Harmonic Motion-Wave Motion – Fluids. The Principle of Galilean Relativity-The Michelson–Morley Experiment-Einstein's Principle of Relativity-Consequences of the Special Theory of Relativity-The Lorentz Transformation-Equations. Relativistic Linear Momentum and the Relativistic Form of Newton's Laws-Relativistic Energy-Equivalence of Mass and Energy-Relativity and Electromagnetism- The General Theory of Relativity.	25%
II	Temperature and Heat: Thermal Expansion and the Gas Laws , Heat Transfer, Thermodynamics, The Kinetic Theory of Gases, Molecular Model of an Ideal Gas, Molar Specific Heat of an Ideal Gas, Adiabatic Processes for an Ideal Gas, The Equipartition of Energy, The Boltzmann Distribution Law, Distribution of Molecular Speeds, Mean Free Path. Heat Engines and the Second Law of Thermodynamics: Reversible and Irreversible Processes-The Carnot Engine-Gasoline and Diesel Engines-Heat Pumps and Refrigerators. Entropy-Entropy Changes in Irreversible Processes-Entropy on a Microscopic Scale.	25%
III	Applications of Electrostatics: Applications Involving Charged Particles Moving in a Magnetic Field-The Hall Effect, The Biot–Savart Law, The Magnetic Force Between two Parallel Conductors, Ampère's Law, The Magnetic Field of a Solenoid, Magnetic Flux, Gauss's Law in Magnetism, Displacement Current and General Form of Ampère's Law, Magnetism in Matter-The Magnetic Field of the Earth, Faraday's Law of Induction-Induced emf and Electric Fields-Generators and Motors-Eddy Currents. Maxwell's Equations: Maxwell's Equations and Hertz's Discoveries-Plane Electromagnetic Waves- Energy Carried by Electromagnetic Waves-Momentum and Radiation Pressure-Radiation from an Infinite Current Sheet, Production of Electromagnetic Waves by an Antenna-The Spectrum of Electromagnetic Waves. Brief review of plasma state of matter, Plane waves in tenuous plasma.	25%
IV	Semiconductor Physics and Bio-physics: Introduction to semiconductors, energy bands and charge carriers; p -n junction diode; bipolar junction transistors- construction, operation; Photo sensitive devices: photodiodes, photoconductive cells, solar cells, phototransistors, light-activated SCR. Introduction to Molecular modeling: Building protein structure (amino acids and the primary structure, the peptide bond and secondary structure, etc.), nucleic acid structure (the chemical structure, the double helical structure of DNA, etc.).	25%

Basic Text & Reference Books:-

- Fundamentals of College Physics, Dr. Peter J. Nolan, Pearson Custom Publishing.
- Fundamental of Physics, Resnik and Halliday 8th Edition.
- Biophysics, V. Pattabhi and N. Gautham, Narosa, 2nd Edition.
- Solid State Electronic Devices, B. G. Streetman and S. Banerjee.
- Electronic Devices and Circuits Theory, R. L. Boylestad and L. Nashelsky
- Classical Mechanics, H. Goldstein, 3rd Edition.
- Introduction to Electrodynamics, D. J. Griffiths, PHI, 3rd Edition.
- Classical Electromagnetic Theory, J. Vanderlinde, John Wiley & Sons.