

SARDAR PATEL UNIVERSITY

Programme: B.Sc (Physics)

Semester: IV

Syllabus with effect from: November/December-2012

Paper Code: US04EPHY01	Total Credit: 3
Title Of Paper: Biophysics	

Unit	Description in detail	Weighting (%)
I	Biomechanics Introduction to Biophysics: The paradigm of life, Life feeds on Negative Entropy, The Living Automation, Order out of Chaos, Biostatics: Forces and Torques ,Biophysics of Muscle: Muscle Power, Mass specific Muscle Power; Strength of Bones; Biodynamic: Newton's Laws, Frictional forces and Stokes Law; Locomotion on Land: Walking, Jumping, Propelling; Locomotion in Air: General Aerodynamics, Wind Force, Bird's Aerodynamics, Turbulence, Power of Flight; Locomotion in Water; Role of Gravity	
II	Physics of Vision Wave nature of light: Polarization, Particle nature of light; Geometrical Optics: Refraction, Gradient-index Lens, Spherical Aberration, Chromatic Aberration; Refractive Power: Refractive power of Eye, Reduced Eye model, Accomodation, Refractive errors; Retina and Photoreceptors: Photochemistry of Receptor cells, intensity Sensitivity, Spectral Sensitivity; Photoreceptors and fiber optics: Fiber Optics; Resolving power of Eye, Diffraction; Polarization and Vision: Optical rotation, Birefringence and Dichroism	
III	Light and Electron Microscopy Introduction, Elementary geometrical optics, and The limits of resolution, Different types of microscopy: Bright field microscopy, Dark field microscopy, Phase contrast, Fluorescence microscopy, Polarizing microscopy. Introduction, Electron optics, The transmission electron microscopy (TEM), The scanning electron microscopy (SEM), Preparation of the specimen for electron microscopy, Image reconstruction, Electron diffraction, The tunneling electron microscopy, Atomic electron microscopy.	
IV	Biophysics and Gas Transport The ideal gas: Dalton's law of partial pressure, vapour pressure, Solutions and Henry's law; convective transport of gases: Airway Resistance, Transport of O ₂ in blood, Transport of CO ₂ in blood; Diffusion of gases: Fick's laws: Gas exchange in Lungs, Gas Exchange in Tissues, Physiology of respiration: Physics of Alveoli, Work of breathing.	

Basic Text & Reference Books:-

- Elementary Biophysics
P K Srivastava
Narosa Publishing House
- Biophysics (second edition)
Vasantha Pattabhi, N Gautham
Narosa Publishing House

