

# PBM6I102 BIO-MECHANICS

## Module I (14 Hours)

Blood Flow Mechanics: Introduction, Mechanics of Micro Vascular Blood Flow, Mechanics of Micro Vascular wall, Capillary Blood Flow, Arterial & Venous Blood Flow,

Microvascular Network: Structure & Hemodynamics, Regulation Neurohumoral & Local of Blood Flow.

Mechanics of Hematocytes: Introduction, Stress & Strain in 2 Dimensions, Basic Equation of Newtonian Fluid Flow. Red Cells: Size & Shape, Red cell Cytosol, Stress relaxation & Strain Hardening, Bending Elasticity. White cells: Size & Shape,

Mechanical Behavior, Bending Rigidity, Apparent Viscosity.

Soft Tissue Mechanics: Structure of Soft Tissue: Cartilage, Tendon & Ligament.

Muscle: Gross Morphology, Fiber Architecture, Sacromere.

Material Properties: Cartilage, Tendon, Ligament & Muscle

(Text Book –I – Chap – 59 ,Text Book –I – Chapter-60, Text Book –I : Chap- 48)

## Module II (13 hours)

.Muscle: Types of Muscle Models, Muscle Force-Length Relationship, Muscle Force-Velocity Relationship.

Joint Lubrication: Introduction, Tribology, Friction, Wear & Surface damage, Lubrication, Hydrodynamic Lubrication theory, Boundary Lubrication.

Synovial Joint: Overview of structure with some examples. Theories on the lubrication of natural & normal synovial joints BioTribology and Arthritis: Are there connections?

(Text Book –I: Chap- 48, Text Book –I: Chap- 50)

## Module III (13Hours)

Exercise Physiology: Muscle Energetics, Cardiovascular Adjustments, Optimization, Thermal Response & Applications.

Human Mechanical Work: Exercise Biomechanics, Equilibrium, Muscular movement,

Locomotion, Effect of Age, Effect of Exercise Training, Aerobic Exercise Training, Strength Training, Effects of Gender & Effects of Genetics.

Text Book –I : Chap- 65 & 66

## Text Book:

1. Biomedical Engineering Hand Book 3rd Edition (Biomedical Engineering Fundamentals) – Joseph D. Bronzino- CRC- Tylor & Francis-2006.