5TH SEMESTER

PBM5I101 **BIOMATERIALS**

Module I (11 Hours)

Biomaterials: Definitions of Biomaterials & Biocompatibility, Classification of materials used in the body, performance of Biomaterials, Brief historical background of Biomaterials.
Characterization of Materials: Mechanical properties: Stress-Strain Behavior, Mechanical Failure: Static & Dynamic Failure, Friction & wear failure, Visco-Elastic material behavior.
(Text Book –I – Chapter I & III)

Module – II (13 Hours)

Properties of Biomaterials: Electrical Properties & Piezoelectricity, Optical Properties, X-ray Absorption, Acoustic & Ultrasound Properties, Density & Porosity Diffusion Properties.
Metallic Biomaterials: Introduction, Stainless steels, CoCr Alloys, Ti Alloys &
Corrosion of metallic Implants
(Text Book –I –Chapter 4. Text Book –II – Chapter 1)

Module III (16 Hours)

Ceramic Biomaterials: Introduction, Non-absorbable materials like Alumina, Carbons & Zirconia . Biodegradable Ceramics like Calcium phosphate, Aluminum-Calcium-Phosphate (ALCAP) Ceramics, Coralline. Bioactive ceramics like Glass ceramics, Ceravital.
Polymeric Biomaterials: Introduction, Polymerization & Basic structure, Polymers used as Biomaterials: Polyvinylchloride (PVC), Polyethylene (PE), Polypropylene (PP), Plolymethylmetacrylate (PMMA) and Ployesters.
Composite Biomaterials: Structure, Bounds & Properties, Anisotropy of Composites, Particulate Composites, Fibrous Composites & Porous Materials.
(Text Book –II – Chapter 2, 3 & 4)

Text Books:

1. Biomaterials –An Introduction, 3rd Ed– Joon Park & R.S.Lakes- Springer- 2007.
2. Biomaterials- Joyce Y.Wong & Joseph D. Bronzino – CRC Press- 2007