

PBM7J002 **ARTIFICIAL ORGANS & REHABILITATION**

Module I (18 Hours)

Introduction to Artificial Organ Design:

Substitutive Medicine, Outlook for replacement, Design Consideration, Evaluation process & basic concepts of Kidney & liver transplant

Cardiac Assist Devices Design: Steps in Engineering Design, Detailed steps in Engineering

Design of artificial heart & circulatory assistive devices.

(Text Book –I – Section VI -Chapter -63 & Text Book III- Chapter 15)

Cardiac Valve Prostheses:

Brief history valve prostheses: Mechanical Valves & Tissue Valves. Current Types of prostheses, Tissue versus Mechanical valves, Medtronic-Hall-Tilting disc valve, St.Jude Medical

Bileaflet valve, Carpentier Edwards Porcine valve (model 2625) , Hancock Modified Orifice Porcine valve (model 250), Carpentier-Edwards pericardial Valve (Model 2900), Implication of Thrombus Deposition, Durability : Wear, Fatigue, Mineralization and Current Trends in Valve Design.

(Text Book –I – Chapter – 64)

Module II (12 Hours)

Artificial Kidney: Brief Review of Structure & Function of Kidney, Changes in the Body Fluids in renal Diseases.

Principle of Dialysis in Artificial Kidney, Dialyzers: Parallel Flow Dialyzer, Coil-Hemodialzer, Hollow-Fiber Hemodialzer. Performance analysis of the dialyzers, Block diagram description of Hemodialysis machine. (Text Book – II –Chapter 30)

Introduction to Design & working of Artificial Liver & Pancreas (Text Book –I)

Module III (10 Hours)

Implants: General concepts of Implants, classification of implants: Soft tissues replacements and Hard tissue replacements. Body Response to Implants: Cellular Response to Implants, Systemic Effects by Implants, Blood Compatibility & Factors affecting blood compatibility. Brief Study of Percutaneous & Skin implants, Ear & Eye Implants like Corneal Implants & Cochlear Implant.

(Text Book –III – Chapter – 10 & 11)

Text Books:

1. Biomedical Engineering Hand Book 3rd Edition (Tissue Engineering & Artificial Organs) – Joseph D. Bronzino- CRC- Tylor & Francis-2006.
2. Hand Book of Biomedical Instrumentation -2nd Ed- R.S.Khandpur - TMH 2003.
3. Biomaterials –An Introduction 3rd Ed– Joon Park & R.S.Lakes- Springer- 2007.