

7th Semester	RBM7D005	Artificial Organ & Rehabilitation Engineering	L-T-P 3-0-0	3 Credits
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Module-I:**(10hours)**

Introduction to Artificial Organ Design:Substitutive Medicine, Out Look 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.

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

Module-II:**(08 hours)**

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.

(Book –I – Chapter – 64)

Module-III:**(12hours)**

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-Hemodialyzer,Hollow-FiberHemodialyzer. Performance analysis of the dialyzers, Block diagram description of Hemodialysis machine. (Book – II –Chapter 30) Introduction to Design & working of Artificial Liver & Pancreas (Text Book –I)

Module-IV:

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)

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