

Course Code	Course Title	L	T	P	C
1154BT101	Biomaterials Engineering	3	0	0	3

- Course Category** : *Institute Elective*
- a. Preamble** : *Course will give a broad view towards various types of biomaterials, its properties, manufacturing methods and its applications.*
- b. Prerequisite Courses:** *Nil*
- c. Related Courses** : *Nil*
- d. Course Outcomes** : *Upon the successful completion of the course, students will be able to understand the:*

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Introduction to Biomaterials	K2
CO2	Metallic and Ceramic Biomaterials	K2
CO3	Polymeric Biomaterials	K2
CO4	Failure and Tribology of Biomaterials	K2
CO5	Degradation and Corrosion of Biomaterials	K2

e. Course content

- UNIT-I Biomaterials**
Introduction to Biomaterials, Physical and Chemical properties, performance, response to implants, blood compatibility, Nanoscale phenomena.
- UNIT-II Metallic and Ceramic Biomaterials**
Different implants - Stainless steels, cobalt-based alloys, Titanium-based alloys, shape memory alloy, ceramic implant, nanostructured metallic implants, biodegradable or bioresorbable, bioactive ceramics, nanostructured bio ceramics.
- UNIT-III Polymeric Biomaterials**
Polymer as biomaterials, Polymerization, properties of polymers, biodegradable polymers, Introduction bio polymers: Collagen, Elastin and chitin, Medical Textiles.
- UNIT-IV Failure and Tribology of Biomaterials**
Failure and Tribology of Biomaterials: Deformation Mechanics, Fracture Mechanics, Classification of Fracture, Brittle to Ductile Transition of Biomaterials, Toughness Analysis of Biomaterials

UNIT-V Degradation and Corrosion of Biomaterials

Degradation and Corrosion of Biomaterials: Surface Properties, Degradation of Biomaterials, Corrosion of Biomaterials, Methods of Corrosion Testing, Biocompatibility of Implants.

TEXT BOOKS:

1. Sujata V. Bhatt, —Biomaterials, Second Edition, Narosa Publishing House, 2005.
2. Sreeram Ramakrishna, Murugan Ramalingam, T. S. Sampath Kumar, and Winston O. Soboyejo, —Biomaterials: A Nano Approach, CRC Press, 2010.