Course Code	Course Name	L	T	P	C
1152BM115	Robotics in Medicine	3	0	0	3

Course Category:

Program Elective

Preamble:

This course helps the students to learn about the medical robots with their applications. Also this course gives the detail information about the design methodology in health care application.

Prerequisite:

None

Related Course:

Outcome:

1.	**Describe the various types of robot in health care application**	**K2**
2.	**Describe and compare the various types of tracking mechanisms for medical robot**	**K2**
3.	**Analyze how robots actively coordinate in surgical system.**	**K4**
4.	**Choose the appropriate design methodology of medical robots based on their application.**	**K3**
5.	**Explain the working principle of Assistive robots.**	**K3**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO 1	H	M										L
CO 2		L	M		M							
CO 3		L		M		L						H
CO 4			H		M	L						
CO 5	L		M									

Unit I: INTRODUCTION **7**

Types of medical robots - Navigation - Motion Replication - Imaging - Rehabilitation and Prosthetics - State of art of robotics in the field of healthcare.

Unit II: LOCALIZATION AND TRACKING **8**

Position sensors requirements - Tracking - Mechanical linkages - Optical - Sound-based - Electromagnetic - Impedance-based - In-bore MRI tracking - Video matching - Fiber optic tracking systems - Hybrid systems.

Unit III: SURGICAL ROBOTICS **10**

Minimally invasive surgery and roboticintegration – surgicalrobotic sub systems - synergistic control. Control Modes - Radiosurgery - Orthopedic Surgery - Urologic Surgery and Robotic Imaging - Cardiac Surgery – Neurosurgery – case studies.

Unit IV: REHABILITATION & DESIGN OF MEDICAL ROBOTS **14**

Rehabilitation for Limbs - Brain-Machine Interfaces - Steerable Needles – case studies, Characterization of gestures to the design of robots- Design methodologies- Technological choices- Security.

Unit V: ROBOTS IN MEDICAL CARE **6**

Assistive robots –types of assistive robots – case studies.

Total: 45 Periods

TEXT BOOKS:

1. Mark W. Spong, Seth Hutchinson, and M. Vidyasagar, ―Robot Modeling and Control‖, Wiley Publishers, 2006.
2. Paula Gomes, "Medical roboticsMinimally invasive surgery", Woodhead, 2012.

REFERENCES:

1. AchimSchweikard, Floris Ernst, ―Medical Robotics‖, Springer, 2015.
2. JocelyneTroccaz, ―Medical Robotics‖, Wiley-ISTE, 2012.
3. VanjaBonzovic, ‖Medical Robotics‖, I-tech Education publishing,Austria,2008.