SBM1602	MEDICAL OPTICS & LASER APPLICATIONS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To enable the student to understand the basics of tissue properties, instrumentation principles in medical optics and the the therapeutic applications thereof

UNIT 1 OPTICAL PROPERTIES OF THE TISSUES 9 Hrs.

Refraction, Scattering, Absorption, Light transport inside the tissue, Tissue properties, Laser Characteristics as applied to medicine and biology-Laser tissue Interaction-Chemical-Thermal Electromechanical – Photoabalative processes.

UNIT 2 INSTRUMENTATION IN PHOTONICS 9 Hrs.

Instrumentation for absorption, Scattering and emission measurements, excitation light sources – high pressure arc lamp, LEDs, Lasers, Optical filters, - optical detectors – Time resolved and phase resolved detectors.

UNIT 3 SURGICAL APPLICATIONS OF LASERS 9 Hrs.

Lasers in ophthalmology- Dermatology – Types of lasers used in dermatology – Dentistry- Types of Dental lasers - Urology – Surgical therapy in urology - Otolaryngology - Tissue welding – Specifications

UNIT 4 NON THERMAL DIAGNOSTIC APPLICATIONS 9 Hrs.

Optical coherence tomography, Elastography, Laser Induced Fluorescence (LIF)-Imaging, FLIM Raman Spectroscopy and Imaging, FLIM – Holographic and speckle application of lasers in biology and medicine.

UNIT 5 THERAPEUTIC APPLICATIONS 9 Hrs.

Phototherapy, Photodynamic therapy (PDT) - Principle and mechanism - Oncological and nononcological applications of PDT - Biostimulation effect – applications-Laser Safety Procedures.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the basic concepts of optical properties and their interaction with tissues.
CO2: Discuss about the instrumentation and detectors involved in photonics.
CO3: Acquire knowledge about various kinds of lasers used in medicine.
CO4: Analyse the application of lasers in diagnosis.
CO5: Explore the laser techniques in therapy
CO6: Identify the use of lasers that can be used for specific medical applications.

TEXT / REFERENCE BOOKS

1.Leon Goldman, M.D., & R.James Rockwell, Jr., Lasers in Medicine, Gordon and Breach Science Publishers Inc., 1975.
2.Abraham Katzir, Lasers and Optical Fibers in Medicine, Academic Press Edition,1998.
3.Tuan Vo Dirh, Biomedical Photonics – Handbook, CRC Press, Bocaraton, 2003.
4.Glasser, O., Medical Physics -- Vol 1, 2, 3 Adam Hilgar Brustol Inc, 1987.
5.G.David Baxter, Therapeutic Lasers – Theory and practice, Churchill Livingstone Publications Edition-2001.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80 **Exam Duration : 3 Hrs.**

PART A : 10 questions of 2 marks each - No choice **20 Marks**
PART B : 2 questions from each unit of internal choice; each carrying 12 marks **60 Marks**