GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VI

Bio – Medical Engineering

Subject Name: **Diagnostic Instrumentation**
Subject Code: **160301**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
4	0	2	6	70	30	50

Section: A: - Medical Diagnostic Techniques

Sr. No	Course Content	Total Hrs.
1.	**CARDIOVACULAR DISEASES AND THEIR DIAGNOSIS:** ECG, Phonocardiography, Blood pressure & Heart rate measurements, Blood flow measurements, Doppler, echocardiography, cartography, and other non invasive techqniques like trade mill and holter monitoring.	4
2.	**RESPIRATORY DISORDERS AND THEIR DIAGNOSIS:** X-rays, Volumes & capacity (Spirometry), Bronchoscopy, Laryngioscopy, CT scan, Tomograhpy, sonograhpy, MRI, etc.	4
3.	**G. I. TRACT DISORDERS THEIR DIAGNOSIS:** Laparoscopy, Cystoscopy, Upper G. I. Endoscopy, Colonoscopy, Sigmoidoscopy, Protoscopy, X RAY, barium meal studies, capsule endoscopy, ultrasonography,cholecptography.	4
4.	**METABOLIC DISORDERS AND THEIR DIAGNOSIS:** Thermometry, Oxygen & Carbon - dioxide content and pressure, various enzyme assays. Diseases related to Kidney & Urinary system and their diagnosis, x-rays, intravenous pyclography,Ultrasonography.	4
5.	**NERVOUS SYSTEM DISORDERS AND THEIR DIAGNOSIS:** EEG, SER, EMG, Scanning Techniques etc.	4
6.	**OCULAR DISORDERS AND THEIR DIAGNOSIS:** Perimetry, Refractometry, Tonometry, Ophthalmoscopy, Ultrasound, VER, ERG, EOG, ENG, split lamp microscope etc.	4

7.	**AUDITORY DISORDERS AND DIAGNOSIS:** AER, Audiometry etc.	**2**
8.	Obstetric & Gynecological problems and their diagnosis like USG & Endoscopy.	**4**
9.	Biotelemetry and their clinical significance.	**2**

SECTION: - B MEDICAL DIAGNOSTIC EQUIPMENTS

Sr. No	Course Content	Total Hrs.
1.	**ELECTROCARDIOGRAPH:** The ECG waveform, Block-diagram, Front panel, Controls, ECG Pre-amplifier, ECG recorders.	**6**
2.	**ELECTROENCEPHALOGRAPH:** EEG waveform (Frequency range & Amplitude), Multi channel recording system & control panel details, Block - diagram, Pre-amplifier & filter circuits, magneto EEG.	**6**
3.	**INSTRUMENTS FOR MEASUREMENT OF PHYSIOLOGICAL PARAMETERS:** Electronic manometer, Electro-sphygmomanometer, Electronic stethoscope, Blood flow meter, Thermometer, Tonometer, Auto- refractrometer, Spiro meter, Audiometer.	**4**
4.	**DIAGNOSTIC X-RAY MACHINE:** Generation, Fluoroscopy and Image Intensifier, Fundamentals only.	**4**
5.	**Diagnostic Ultrasound:** Principle of measurements, Ultrasound imaging, Foetal monitor, Echocardiograph, Echoencephalograph.MRI, PET SCAN	**4**

The Practical and Term work will be based on the topics covered in the syllabus.

Text Books:

1. Bio-Medical Instrumentals & Measurements –BY Cromwell
2. Bio-Medical Instrumentation -By R. S. Khandpur

References Books:

1. Diagnosis Procedures in Cardiology -By Warren & Lewis
2. Practical Echocardiography -By Setu Raman
3. Advanced Ophthalmic Diagnosis & Therapeutics-By Mckinney
4. Medicine and Clinical Engineering –By Bertil Jocobson& John A webster