SARDAR PATEL UNIVERSITY
Programme & Subject: B.sc (Instrumentation)
Semester: VI
Syllabus with Effect from: November/December - 2013

Paper Code: US06CINS06	**Total Credit: 3**
Title Of Paper: Analytical And Bio – Medical Instrumentation	

Unit	Description in detail	Weighting (%)
I	**UV/Visible spectroscopy:** Introduction, Electromagnetic radiation, Interaction of radiation with matter, Beer Lambert's Law, deviation from the law, Absorption instruments: radiation sources, optical filters: absorption filters, interference filters, monochromators: prism, diffraction gratings, Holographic gratings, Detectors: photovoltaic cells, photo emissive cells, high vacuum photo emissive cells, gas filled photoemissive cells, photomultiplier tubes, silicon diode detector, diode arrays.	25%
II	**IR Spectroscopy:** Introduction, Basic components of IR spectrophoto meters: radiation sources, monochromators, entrance and exit slits, mirrors, Detectors: Photoconductive cells, solid state photo detectors, thermal detectors: thermocouple, bolometer, pneumatic detector, pyro-electric detector. Types of IR spectrophotometers: Optical null method, ratio recording method, Sample Handling techniques : gas cells, liquid cells.	25%
III	**Mass Spectrometer:** Basic mass spectrometer, types of mass spectrometers: magnetic deflection mass spectrometer, time of flight mass spectrometer, Components of a mass sepectrometer: the inlet sample system, ion sources, Electrostatic accelerating system, ion collecting system and recording of mass spectrograph, Vacuum system, applications of mass spectrometry: Gas chromatograph-Mass spectrometer, Liquid chromatograph-Mass spectrometer, NMR Spectroscopy: Principle: Nuclear spin nuclear energy levels resonance conditions, NMR absorption spectra, The chemical shift, construction details of NMR spectrometer: magnetic field, The radio-frequency transmitter, the signal amplifier and detector, The display system, Recording unit, sample holder.	25%
IV	Origin of bio electric signals, Electrocardiogram (ECG), Eletroencephalogram (EEG) Eletromoyogram (EMG), Electrocardiograph: block diagram descripptionof an electrocardiograph, The ECG leads, recorder principle, Electroencephalography: recorder principle and block diagram. Blood pressure measurement: direct methods of monitoring blood pressure, frequency reponse and damping adjustment of the fluid filled catheters, indirect method blood pressure measurement	25%

Basic Text & Reference Books:-

- Handbook of analytical instrumentation by R.S. Khandpur
- Handbook of Bio-medical instrumentation by R.S. Khandpur
- Bio-medical instrumentation and measurement by Cromwell, Weibell and Pfeiffer