



SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25))
Syllabus with effect from the Academic Year 2021-2022

Master of Science (Electronics)
M.Sc. (Electronics) Semester I

Course Code	PS01EELE51	Title of the Course	Analytical and Bio Medical Instruments
Total Credits of the Course	4	Hours per Week	3+1=4 Hours

Course Objective	The course is designed to 1. Introduce the concept of Analytical and Bio Medical Instruments 2. To familiarized about operating principle and operation of Instruments 3. Study various applications.
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Course Content		
UNIT	Description	Weightage* %
1	pH meters, Principle of pH measurements, Electrodes for pH measurements, Principle and working operation of Ultraviolet, Visible Spectrophotometer, Principle and working of Infrared Spectrophotometer.	25
2	Atomic Absorption Spectrophotometers, Nuclear Magnetic Resonance (NMR) - Instrumentation, Applications, Gas Chromatography-Instrumentation, Applications of Gas Chromatography, High Performance Liquid Chromatography (HPLC), Electron Microscope.	25
3	Cardiovascular circulation system, Electrocardiographs, Cardiac Muscle Physiology, Electrocardiogram Machine, Electrocardiogram Leads and Wave configuration, Sphygmomanometer method Pacemakers-Need for Cardiac pacemaker-External Pace makers-Implantable pace makers-recent developments in Implantable Pacemakers.	25
4	Ultrasonic transducers, Properties of Ultrasound, Basic modes of Transmission, Ultrasonic measuring system, Ultrasonographic techniques, Multi elements Transducer system, Applications, Function of Kidneys, Hemodialysis machines, Artificial Kidney, Dialyses.	25

Teaching-Learning Methodology	Traditional Classroom teaching with use of Multimedia facility in the classroom. Use of Computer Tool for live demonstration and problem / design based approach.
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Evaluation Pattern		
Sr. No	Details of Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva Voce, Quizzes, Seminars, Assignments, Attendance (as per CBCS R6.8.3)	15%
3.	University Examination	70%

Course Outcome. Having completed this course, the learner will be able to	
1	Understand the working principle of Ion Selective Electrodes, pH electrodes and conductivity meters
2	Study of different types of Spectroscopy, Instrumentation part and applications.
3	Basic of Chromatography related system and applications
4	Study of NMR Spectrometers and radiations techniques.

Suggested References:	
Sr. No.	References
1	Hand Book of Analytical Instruments R.S.Khandpur. (Tata McGraw Hill Publishing Company Ltd. New Delhi, INDIA)
2	Hand Book of Biomedical Instruments R.S.Khandpur. (Tata McGraw Hill Publishing Company Ltd. New Delhi, INDIA)
3	Biomedical Instrumentation and Measurements Leslie Cromwell, Fred J.Weibll and Frich A. Pfeiffer, (Prentice Hall Of India Pvt.Ltd.New Delhi, INDIA)
4	Instrumentation methods of Chemical Analysis Chatwal, Anand, (Himalaya Publishing House, New Delhi, INDIA)
5	Electronic Instrumentation John A. Allocca and Allen Stuart, (Reston Publishing – A Prentice Hall Co.,Reston, Virginia, USA)
6	Advanced Medical Instrumentation and Equipment S.E.Sutphin, (Prentice Hall, Inc., N.J, USA)
7	Bioelectronics Measurement Dean A.Demarre and David Michaels (Prentice –Hall Inc., N.J., USA)

On-line resources to be used if available as reference material
On line resources.
1. https://www.eecs.umich.edu/courses/bme458/download/bme458_notes1.pdf
2. http://library.abes.ac.in/EBooks/BioMedical%20Book%20Full%20Text%20New.pdf
3. http://webstor.srmist.edu.in/web_assets/srm_mainsite/files/files/IC0309%20Analytical%20Instumentation.pdf

