

Devi Ahilya University, Indore, India Institute of Engineering & Technology				IV Year B.E. (Electronics and Instrumentation Engg.)			
Subject Code & Name	Instructions Hours per Week			Credits			
8EIRC6	L	T	P	L	T	P	Total
Medical & Analytical Instrumentation	3	1	1	3	1	1	5
Duration of Theory Paper: 3 Hours							

Course Objectives:

1. To provide concepts on the several instrumentation techniques at the structural and chemical level which has become essential tools for chemical research.
2. To develop tools for analysis and methodologies that promotes multidisciplinary research for better understanding of composition-structure-properties correlation.
3. Acquire knowledge about origin of bio-potential, bio-signals and their measurement.

Prerequisites:

Knowledge of basic Electronics and Fundamentals of Chemistry.

COURSE CONTENTS

Unit I

Colorimeters, Visible-Ultraviolet Spectrometers, Infrared Spectrometers, Atomic Absorption Spectrometers

Unit II

Flourimeters, Phosphorimeters, Raman Spectrometer, Photo Acoustic, Photothermal Spectrometers Mass Spectrometers

Unit III

Nuclear Magnetic Resonance Spectrometers, Electron Spin Resonance Spectrometers, Electron and Ion Spectroscopy.

Unit IV

Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyography (EMG),
Computed Tomography (CT)

Unit V

PH Meters, Blood Gas Analyzer, X-ray Spectrometers, Magnetic Resonance Imaging (MRI), Ultrasonography.

Course Outcomes:

CO.No.	CO	PO
CO1	Explain the basic principles of spectroscopy and to interpret spectral data from one or more of these spectral techniques.	PO-1, PO-2, PO-3, PO-4, PO-5, PO-9, PO-10, PO-11
CO2	Understand fundamental principles and applications of spectroscopic methods such as UV, IR, NMR, Atomic Absorption Spectroscopy.	PO-1, PO-2, PO-3, PO-4, PO-5, PO-9, PO-10, PO-11
CO3	Explain the principles of operation and applications of thermal analytical techniques for characterization of molecules as well as materials.	PO-1, PO-2, PO-3, PO-4, PO-5, PO-9, PO-10, PO-11
CO4	To understand and analyze the functioning of various vital organs and systems.	PO-1, PO-2, PO-3, PO-4, PO-5, PO-9, PO-10, PO-11
CO5	Ability to apply physiological concepts in modelling biomedical systems.	PO-1, PO-2, PO-3, PO-4, PO-5, PO-9, PO-10, PO-11

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	3	1	1	1	2	0	0	0	1	2	1	0
CO2	3	1	2	1	2	0	0	0	1	3	2	0
CO3	3	2	3	3	2	0	0	0	1	2	2	0
CO4	1	3	3	2	3	0	0	0	1	2	1	0

CO5	1	3	3	2	3	0	0	0	1	2	1	0
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BOOKS RECOMMENDED:

- [1]. H. H. Williard, L. L. Merrit, J. A. Dean, and F. A. Settle, *Instrumental Methods of Analysis*, 7/e, CBS Publishers and Distributors, India, 1988
- [2]. D. A. Skoog, F. J. Holler, and T. A. Nieman, *Principles of Instrumental Analysis*, 6/e., Thomson Learning, 1998 [3]. R. S. Khandpur, *Handbook of Analytical Instruments*, Tata McGraw Hill, New Delhi
- [4]. R. K. Jain, *Mechanical and Industrial Measurements*, Khanna Publishers, Delhi, 1985
- [5]. G. W. Ewing, *Instrumental Methods of Chemical Analysis*, 5/e., McGraw Hill, Singapore, 1992 [6]. R. E. Sherman and L. J. Rhodes (Eds), *Analytical Instrumentation*, ISA Press, New York, 1996
- [7]. *Handbook of Biomedical Instrumentation* - R.S.Khandpur, 2nd Edition, Tata McGraw- Hill, 2003