

18BP096 ADVANCED INSTRUMENTATION TECHNIQUES

Hours Per Week :

L	T	P	CP	CL
3	1	-	-	4

Total Hours :

L	T	P	WA/RA	SSH/HS	CS	SA	S	BS
45	1	-						

SCOPE:

This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs	PSOs
1	Understand the advanced instruments used and its application in drug analysis	1,3,4	1,2
2	Understand the chromatographic separation and analysis of drugs	1,3,4	1,2
3	Understand the calibration of various analytical instruments	1,3,4	1,2
4	Know analysis of drugs using various analytical instruments	1,3,4	1,2

UNIT - I **10HOURS**

NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY: Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications

MASS SPECTROMETRY: Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrapole, instrumentation, applications

UNIT - II **10HOURS**

THERMAL METHODS OF ANALYSIS: Principles, instrumentation and applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC).

X-RAY DIFFRACTION METHODS: Origin of X-rays, basic aspects of crystals, X- ray

Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications.

UNIT - III **10HOURS**

CALIBRATION AND VALIDATION: ICH and USFDA guidelines Calibration of following Instruments Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer, Fluorimeter, Flame Photometer, HPLC and GC

UNIT - IV **08HOURS**

RADIO IMMUNE ASSAY: Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay

EXTRACTION TECHNIQUES: General principle and procedure involved in the solid phase extraction and liquid-liquid extraction

UNIT - V **07HOURS**

HYPHENATED TECHNIQUES: LC-MS/MS, GC-MS/MS, HPTLC-MS.

RECOMMENDED BOOKS (LATEST EDITIONS)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I.Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B.Stenlake
6. Organic Chemistry by I. L.Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D.Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

