Program	Master of Pharmacy (M.Pharm)	**Semester - 1**
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2023-24	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	Tutorial	Lab	Credit	External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	Total Marks
4	-	-	4	75	25	-	-	100

SEE *- Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**UV-Visible spectroscopy:** a. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV- Visible spectroscopy. b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy c. Spectroflourimetry: Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer. d. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications.	11	19
2	**NMR spectroscopy** NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and 13C NMR. Applications of NMR spectroscopy	11	19
3	**Mass spectroscopy** Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy	11	18
4	**Chromatography** Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following: a) Paper chromatography b) Thin Layer chromatography c) Ion exchange chromatography d) Column chromatography e) Gas chromatography f) High Performance Liquid chromatography g) Affinity chromatography	11	18
5	**Electrophoresis and X-ray crystallography**	11	18

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
	a. Electrophoresis: Principle, Instrumentation, working conditions, factors affecting separation and applications of the following: a) Paper electrophoresis M.Pharm Syllabus Faculty of Pharmacy Rajju Shroff ROFEL University, Vapi Page 3 b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Iso electric focusing b. X ray Crystallography: Production of X rays, Different X ray diffraction methods, Bragg 's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of Xray diffraction		
6	**Radioimmune assay** Immunological assays: RIA (Radio immuno assay), ELISA, Bioluminescence assays.	5	8
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze
Weightage	30	30	20	20

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Understanding the concept of the Spectrophotometry and chromatography in Analysis
CO2	Understanding for interpretation of UV, IR, MS and NMR for structure elucidation.
CO3	Understanding of analysis of various drugs in single and combined dosage form
CO4	Understanding the basic instrumentation and Practical skills of the instruments

Reference Books

1.	**Spectroscopy of Organic Compounds (TextBook)** By P. S. Kalsi | 2004 | 6
2.	**Practical Pharmaceutical Chemistry** By A. H. Beckett and J. B. Stenlake | 2005 | 4
3.	**High Performance Liquid Chromatography** By P. D. Sethi | 2006 | 1
4.	**Instrumental Methods of Analysis (TextBook)** By Willard et al | 1986 | 1
5.	**Instrumental Liquid Chromatography (TextBook)** By N. A. Parris | 1984 | 2
6.	**Principles of Instrumental Analysis** By Skoog, Holler | 2016 | III