RKUNIVERSITY

SYLLABUS

Course Title	INSTRUMENTAL ANALYSIS-II
Course Code	PH704
Course Credit	Lecture : 3
	Practical : 3
	Tutorial : 0
	Total : 6

Course Objectives

On the completion of the course, students will be able to:

1. Understand the fundamental concepts of chromatography and other analytical method.
2. Understand the principle, instrument theory and practical, effect and application of various chromatography method like HPLC, GC and HPTLC,
3. Understand the concept of ISO, GLP and validation method

Detailed Syllabus

Sr. No.	Name of Chapter & Details	Hours Allotted
	Section-I	
1	**X-ray spectroscopy** Introduction; Generation of X – rays; X-ray diffraction, Bragg's law; Applications of X- ray diffraction	**04**
2	Overview of Scattering Spectroscopy like Raman spectroscopy, Nephlometry and turbidimetry.	**03**

3	**Gas Chromatography** Introduction; Theory and Principle of Gas-Chromatography; Mobile phase, Stationary phases for GSC and GLC; Instrumentation (including temperature programming and derivatization) and applications of GC; Overview of GC-MS.	**06**
4	Basic principle, theory and applications of partition, adsorption, ion-exchange, size exclusion, Super critical fluid, Affinity chromatography	**06**
5	**Atomic spectroscopy** Basics of atomic spectroscopy; Principle of atomic absorption and atomic emission spectroscopy; Interferences in atomic spectroscopy; Factors affecting atomic spectroscopy like solvents, buffers, other ions, etc; Flame Photometry; Atomic emission spectroscopy with plasma and electrical discharge sources; Instrumentation (including radiation sources like hollow cathode lamp), applications, advantages and limitations of atomic absorption and atomic emission spectroscopy.	**05**
	Section-II	
6	**High Performance Liquid Chromatography** Introduction; Theory, Classification and Principle of HPLC; Mobile phase, Stationary phases for normal and reversed phase HPLC; Instrumentation and applications of HPLC; Comparison of HPLC with GC; Overview of LC-MS, LC-MS/MS. **UPLC :** Introduction, instrumentation and application	**12**
7	**HPTLC** Principle; Comparison with HPLC; Instrumentation, applications, advantages and limitations of HPTLC.	**03**

8	**Radiochemical methods** Introduction; Nuclear reactions and radiation; Interaction of nuclear radiation with matter; Radioactive decay; Units of radioactive decay; Measurement of radioactivity; Activity analysis; Isotopes dilution analyses; Liquid scintillation systems; Applications of radio nuclides	**04**
9	Overview of radio-immuno assay (RIA) and ELISA (Immunochemical techniques).	**03**

Instrumental analysis II (Practical)

1. Separation and identification of drugs/impurities/related substances by TLC methods as per I.P.(Three experiments)
2. Separation and identification of amino acids/flavonoids/sulphonamides by paper chromatography. (min. one experiment)
3. Quantitative analysis of market formulations by HPLC. (Two experiments including Formulation)
4. Potentiometric assay of any two formulations from I.P. (e.g. Sulpha drug, INH, penicillins)
5. Assay of dextrose injection by polarimetry
6. Assay of drugs by aqueous & non-aqueous pH-metry titration. (Two experiments)
7. Simultaneous estimation of Paracetamol & Ibuprofen/any other combination
8. Flame photometric estimation of sodium/potassium ions in urine/ORS.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.

- The course includes language practices such as Group Discussion, Interviews etc to develop the communication skills of the students.

Students Learning Outcomes:

- At the end of the course the students will be able to:

1. Operate the different sophisticated instrument which used in industry level at various analytical purpose
2. Understand the basic principle of chromatography and their application

Text Books:

1. Principles of Instrumental Analysis by skoog, holler, Nieman, 5th edition.
2. Instrumental methods of Analysis, H.H. Willard, L.L. Meritt, J.A. Dean and F.A. Settle Wadsworath, New York

Reference Books:

1. Pharmaceutical Analysis: Modern methods Part A, Part B, James W. Munson.
2. Quality Assurance of Pharmaceuticals – A compendium of guidelines and related materials – Vol. I – WHO Publications.
3. IPR Handbook for Pharma Students and researchers – Parikshit Bansal, Pharma Book Syndicate, Hyderabad
4. Pharmacopoeia of India, Govt. of India, Ministry of Health.
5. British Pharmacopoeia, ministry of health and social welfare, UK.
6. The United States Pharmacopeia–National Formulary (USP–NF)

Additional Resources
▪ Soft copies instrument analysis books are available on http://www.pharmatext.org ▪ Latest information regarding to instrument analysis are available on http://www.pharmainfo.net