

Objectives:

- To understand the scope and principle of Food, Pharma and Pesticide analysis and various electroanalytical. The emphasis is placed on physico-chemical principles of these methods and their application in analysis of Pharma, Food and Pesticides.

Credits Earned: 6 Credits

Course Outcomes: After completion of this course, student will be able

- To develop an understanding of the range and theories of instrumental methods available in Food, Pharma and Pesticide analysis.
- To develop knowledge pertaining to the appropriate selection of instruments for the successful analysis of complex mixtures.
- To develop an understanding of the role of the chemist in measurement and problem solving in chemical analysis.
- To provide practical experience in selected instrumental methods of analysis.
- To extend skills in procedures and instrumental methods applied in analytical tasks.
- To expand skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments.

Pre-requisite of course: NA.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	CSE/Internal (I)	Viva (V)	Term work (TW)	
4	0	3	6	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	Food Analysis and Food Adulteration: Introduction, Determination of moisture, Ash, Crude protein, True protein, Starch, Crude fibre in food materials, Test for proteins, Colour tests for proteins, Test for carbohydrates, Analysis of sugars (Carbohydrates), Estimation of sugar from cane sugar, Estimation of glucose and sucrose from Gur sample, Determination of Phosphorus in plant or food material, Determination of total Na, K, Ca, and Mg, in food materials, Qualitative and quantitative analysis of organic substances present in Food material. Food adulteration – Introduction, Common Food adulteration, Detection of Microscopic adulterants in some common Foodstuffs, Food additives and Contamination of foodstuff.	15
2	Pesticides and Soil Analysis: Introduction, Pesticide analysis– Analysis of BHC residue in food stuffs, Determination of DDT in Food grains, Determination of Methyl Parathion residues in Food grains and Vegetables, Determination of Malathion residue in Food grains, Soil Analysis - Determination of moisture from soil sample, Determination of total nitrogen in soil, Determination of Phosphorus in soil, Mechanical analysis of soil, Determination of Lime and Liming material in soil.	15
3	Drug Analysis: Introduction, Pharmacological classification and Chemical classification, Method of screening an investigating the drugs, Determination of vitamins (Thiamine and Riboflavin), Determination of Amino acids, Biological methods of analysis.	15
4	Clinical Analysis: Introduction, Composition of blood, Collection and preservation of blood sample, Determination of Blood glucose, Determination of Blood urea and Blood urea nitrogen, Determination of Serum uric acid, Determination of total protein – Albumin, Globulin, Determination of Serum Barbiturates, Determination of Blood pH, Principle and Application of Radioimmuno Assay (RIA).	15
	Total Hours	60

References:

1. Introduction to instrumental analysis –R.D.Broun, McGraw Hill (1987)
2. Instrumental methods of chemical analysis – H. Willard, L.Merrit, J.A. Dean and F.A. Settle. Sixth edition CBS (1986)
3. Thermal analysis –W.W. Wendlandt, John Wiley, (1986)
4. Fundamentals of analytical chemistry –D.A.Skoog, D.M. West and H.J. Holler sixth edition (1992)
5. Cyclic Voltammetry and frontiers of electrochemistry –N.Noel and K.I. Vasu IBH, New delhi (1990)
6. Nuclear Analytical Chemistry – J. Tolgyessy and S. Verga vol. 2, university Park press, (1972)
7. Radiochemistry and Nuclear methods – W.D. Ehmann and D.E. Vance, John Wiley and Sons.
8. Instrumental methods of chemical analysis, In; Introduction to Analytical chemistry: Sharma BK. Goel Publishing House Meerut, 23th edition; 2004

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
30%	25%	15%	15%	10%	5%

Suggested List of Experiments:(Any six)

To determine the active ingredient of Dichlorovos.

- 2) To determine the active content of Phosphamidone.
- 3) To determine the amount of Ca-gluconate in the given sample.
- 4) To determine the saponification value of the given sample of oil.
- 5) To determine amount of Nitrite (NO_2^-) in the given sample.
- 6) To determine the amount of Cu and Ni in the given sample of German silver.
- 7) To analysis the given sample of Brass alloy for its Cu and Zn content.
- 8) To determine the amount of Aspirin in the given sample.
- 9) To determine the peroxide value in the given sample.
- 10) To determine the % purity of Isoniazide.
- 11) TO determine the % purity of Paracetamol by titrimetric method.
- 12) To determine the % of given sample of Cephalexin.

Reference Books:

1. Vogel's Textbook of Quantitative Chemical Analysis 6th edition, Pearsons Education.
2. Practical clinical Biochemistry, Harold Varley (4th Edition), CBS publishers and Distributers. New Delhi -110002.
3. R. Ikan; natural products.
4. Peach and Tracy; Methods of Plant analysis Vol- VII.
5. Pavia and others; Orgaic Laboratory Techniques, (Second Edition, 1995), Sannders Series (Harcofst Brace).

Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.
- e. Use of hazardous/toxic chemicals should be avoided as far as possible in laboratory.
- f. All students in the laboratory must wear safety goggles and lab coats during lab session.

Supplementary Resources:

- 1. <http://www.nptel.ac.in/courses/104103069/#>
- 2. <http://ocw.mit.edu/courses/chemistry/>
- 3. <http://vlab.amrita.edu/index.php?sub=2>
- 4. http://www.vlab.co.in/ba_labs_all.php?id=9