

INSTITUTE	FACULTY OF SCIENCE
PROGRAM	MASTER OF SCIENCE (CHEMISTRY)
SEMESTER	3
COURSE TITLE	INDUSTRIAL ANALYSIS
COURSE CODE	02CY0506
COURSE CREDITS	6

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

- 1 To develop and understand the range and theories of instrumental methods available in Food, Pharma and Pesticide analysis.
- 2 To develop knowledge pertaining to the appropriate selection of instruments for the successful analysis of Pharmaceutical products.
- 3 To develop and understand the role of chemist for measurement and problem solving in clinical analysis.
- 4 To provide practical experience in selected instrumental methods for Soil analysis.
- 5 To development skill for detection of food adulterants by various analytical techniques.
- 6 To expand scientific skill for planning, designing, conducting, reviewing and reporting experiments.

Pre-requisite of course: Students should have knowledge about basics of analytical chemistry.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
5	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	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, Deterination of Serum Barbiturates, Determination of Blood pH, Principle and Application of Radioimmuno Assay (RIA).	15

Contents : Unit	Topics	Contact Hours
2	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
3	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
4	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
Total Hours		60

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiments Experiment -1, Experiment -2, Experiment - 3, Experiment -4, Experiment - 5, Experiment - 6, Experiment - 7, Experiment - 8, Experiment - 9, Experiment - 10	
Total Hours		

References:

- 1 Introduction to instrumental analysis, Introduction to instrumental analysis, R.D.Broun, Mc Graw Hill , 1987
- 2 Instrumental Methods of Analysis , Instrumental Methods of Analysis , H.H. Willard, L.L. Merritt Jr, J. A. Dean and F.A. Settle, CBS publishers and distributors, 1986
- 3 Fundamentals of analytical chemistry, Fundamentals of analytical chemistry, Douglas A. Skoog, D.M. West and H.J.. Holler, CBS Publishers, 1992

References:

- Instrumental methods of chemical analysis, In; Introduction to Analytical chemistry, Instrumental methods of chemical analysis, In; Introduction to Analytical chemistry, Sharma BK, Goel Publishing House , 2004
- Handbook of Pesticides Methods of Pesticide Residues Analysis, Handbook of Pesticides Methods of Pesticide Residues Analysis, Leo M.L. Nollet, Hamir S. Rathore, CRC Press, 2020

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as 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 / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

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

Supplementary Resources:

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