

INSTITUTE	FACULTY OF PHARMACY
PROGRAM	BACHELOR OF PHARMACY
SEMESTER	1
COURSE TITLE	PHARMACEUTICAL INORGANIC AND ANALYTICAL CHEMISTRY
COURSE CODE	13PH0111P
COURSE CREDITS	1

Objective:

- 1 Gain practical knowledge on various volumetric titration techniques.
- 2 Learn the principles of volumetric analysis.
- 3 Study the preparation and assessment of inorganic compounds.
- 4 Determine the assay of various inorganic compounds in pharmaceutical use.
- 5 Develop analytical skill for the qualitative and quantitative analysis of various inorganic compounds.

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

- 1 Assay of Sodium Chloride by precipitation titration (Modified Volhard's method)
- 2 Prepare various pharmaceutical inorganic compounds following standard procedures.
- 3 Analyze the significance of quality control in pharmaceutical products and raw materials.
- 4 Demonstrate proficiency in titrimetric analysis using different volumetric techniques.
- 5 Competence in applying analytical skills to qualitative and quantitative data.

Pre-requisite of course: 1. Understanding of fundamental analytical chemistry principles. 2. Familiarity with laboratory safety rules and chemical handling practices. 3. Basic skills in using common laboratory apparatus such as burettes, pipettes, flasks, and balances. 4. Basic understanding of titration principles and indicators.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	3	0	0	0	30	20
Contents : Unit	Topics						Contact Hours
Total Hours							

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Limit tests (Any 4 Experiments) Limit test and modified limit test for Chloride as per Indian Pharmacopoeia, Limit test and modified limit test for sulphate as per Indian Pharmacopoeia, Limit test for Iron, Limit test for Lead, Limit test for arsenic	3
2	Preparation of inorganic pharmaceuticals (Any 3 Experiments) Preparation of Aluminium hydroxide, Preparation of potash alum, Preparation of ferrous sulphate, Preparation of Magnesium sulphate from magnesium hydroxide or magnesium carbonate	3
3	Test for Purity (Any 2 Experiments) Assessment of swelling power of bentonite as per Indian Pharmacopoeia, Evaluation of acid neutralizing capacity of aluminium hydroxide gel, Determination of potassium iodate and iodine in potassium Iodide	3
4	Assay of the following inorganic compounds including standardization of titrant (Any 5 Experiments) Assay of ammonium chloride by acid base titration, Assay of Ferrous sulphate by Cerimetry, Assay of Copper sulphate by Iodometry, Assay of Calcium gluconate by Complexometry, Assay of Hydrogen peroxide by Permanganometry, Assay of Sodium benzoate by non-aqueous titration, Assay of Sodium Chloride by precipitation titration (Modified Volhard's method)	3
Total Hours		12

Textbook :

- 1 Pharmaceutical Inorganic Chemistry, G.R. Chatwal, Himalaya Publishing House, 2020
- 2 Inorganic Pharmaceutical Chemistry, M.L. Schroff, CBS Publishers, 2019
- 3 Practical Pharmaceutical Chemistry Part I, A.H. Beckett, J.B. Stenlake, CBS Publishers, 2018
- 4 Vogel's Textbook of Quantitative Chemical Analysis, G.H. Jeffery et al., Pearson Education, 2017
- 5 Bentley and Driver's Textbook of Pharmaceutical Chemistry, R. Bentley, J. Driver, Oxford University Press, 2020
- 6 Pharmaceutical Chemistry (Inorganic), Ashutosh Kar, New Age International, 2021

References:

- 1 Analytical Chemistry Principles, Analytical Chemistry Principles, John H. Kennedy, Saunders College Publishing, 2011
- 2 Indian Pharmacopoeia, Indian Pharmacopoeia, Indian Pharmacopoeia Commission, IPC, Ghaziabad, 2026
- 3 Remington: The Science and Practice of Pharmacy, Remington: The Science and Practice of Pharmacy, Allen Loyd et al., Pharmaceutical Press, 2021
- 4 USP–NF (United States Pharmacopeia), USP–NF (United States Pharmacopeia), USP Convention, USP, 2026

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					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	15.00	35.00	20.00	15.00	5.00

Instructional Method:

- 1 Demonstration of analytical techniques
- 2 Hands-on titration experiments
- 3 Observation-based learning
- 4 Error analysis and result interpretation sessions

Supplementary Resources:

- 1 Indian Pharmacopoeia Commission: <https://ipc.gov.in>
- 2 World Health Organization: <https://www.who.int>
- 3 United States Pharmacopoeia: <https://www.usp.org>
- 4 British Pharmacopoeia: <https://www.pharmacopoeia.com>