



Branch Name:	Bachelor of Pharmacy
Program Code:	PH101
Course Name:	Pharmaceutical Inorganic and Analytical Chemistry (Theory)
Course Code:	1BP106T

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)		
Lecture	Tutorial	Practical	Credit	Theory (T)		Total Marks
				Continuous Assessment	University Assessment	
						Theory
3	-	NA	3	30	45	75

1. Understand the importance of errors, impurities in pharmaceuticals.
2. Comprehend the principles of buffer systems.
3. Develop skills in performing and interpreting limit tests and titrimetric analysis.
4. Emphasize the importance of inorganic compounds and radiopharmaceuticals in Pharmacy
5. Explain synthesis and analysis of inorganic compounds/products of pharmaceutical importance

CO No.	Upon successful completion of this course, the students will be able to:
1	Identify sources and types of errors in pharmaceutical analysis, and impurities products
2	Apply concepts of acid-base chemistry, buffer systems with importance of electrolytes
3	Describe and differentiate various analytical techniques used in pharmaceutical analysis, including titrimetric methods, and their specific applications in quality assessment.
4	Analyze the properties, mechanisms, and therapeutic uses of gastrointestinal agents, radiopharmaceuticals, expectorants, antidotes, and other pharmaceutical compounds, illustrating their roles in therapy and safety considerations.
5	Describe the drugs used in expectorants, emetics, haemintics, poison and antidote and astringents.

Unit. No.	Topic	Total Hours (45 hours)	Weight (%)
1	Introduction to pharmaceutical analysis Different techniques of analysis, Methods of expressing strength of solutions, Primary and secondary standards with examples. Errors	7	16

	Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures. Impurities: Definition, types, contents and regulatory importance. Sources and types of impurities in Pharmaceuticals, limit tests for chloride, sulphate, iron, arsenic, lead, heavy metals, and modified limit test for chloride and sulphate.		
2	Acid-Base Chemistry and Buffer Systems in Pharmacy Definition of acids, bases, buffers, pH Scale and its significance, Buffer equation, calculation of pH for Buffer solution. Isotonicity and its application in IV Fluids and Ophthalmic Solutions. Major extra and intracellular electrolytes Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium chloride and Oral Rehydration Salt (ORS), Physiological acid base balance.	8	17
3	Acid base titrations Theories of acid base indicators, classification of acid base titrations. Preparation and standardization of titrants viz. hydrochloric acid and sodium hydroxide. Theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves. Assay of Ammonium hydroxide. Non-aqueous titrations Types of solvents used, acidimetric and alkalimetric titration using non-aqueous solvents. Preparation and standardization of acidic and basic titrants. Estimation of weakly acidic and basic substances using non-aqueous titrants, estimation of Sodium benzoate. Precipitation titrations and gravimetry Principle and steps involved in gravimetric analysis, Mohr's method, Volhard's, Modified Volhard's, Fajans method. Estimation of barium sulphate by gravimetry. Complexometric titrations Classification, metal ion indicators, masking and demasking reagents, preparation and standardization of disodium EDTA. Estimation of Magnesium sulphate and Calcium gluconate*. Redox titrations Concepts of oxidation and reduction, Types of redox titrations viz. Permanganometry, Cerimetry, Iodimetry, Iodometry and titrations with potassium iodate.	14	32
4	Gastrointestinal agents Acidifiers: Sodium acid phosphate and Dilute Hydrochloric acid. Antacids: Ideal properties of antacids, combinations of antacids, Sodium bicarbonate*, Aluminium hydroxide gel*. Agents promote bowel movements: Magnesium hydroxide, Sodium orthophosphate, Sodium Potassium tartrate and magnesium trisilicate. Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations. Radiopharmaceuticals: Basics of radioactivity, applications of radioisotopes of Sodium	10	22

	Iodide I-131, Technetium-99m, Cobalt-60, Phosphorus-32 including safe handling, storage, and disposal of radiopharmaceuticals, adhering to regulatory guidelines for safety.		
5	Miscellaneous Compounds Expectorants: Potassium iodide, Ammonium chloride*. Emetics: Copper sulphate*, Sodium potassium tartrate. Haematinics: Ferrous sulphate*, Ferrous gluconate. Poison and Antidote: Definition, classification of antidotes, Sodium thiosulphate	6	13

References:

1. Bentley, R. and Driver, J., *Bentley and Driver's Textbook of Pharmaceutical Chemistry*. Oxford: Oxford University Press.
2. Vogel, A.I., *Vogel's Textbook of Quantitative Chemical Analysis*. Essex: Pearson Education Limited.
3. Beckett, A.H. and Stenlake, J.B., *Practical Pharmaceutical Chemistry*. Part I & II. London: The Athlone Press, University of London.
4. Schroff, M.L., *Inorganic Pharmaceutical Chemistry*. New Delhi: Oxford Book Company.
5. Indian Pharmacopoeia Commission, *Indian Pharmacopoeia*. Ghaziabad, India.
6. John H. Kennedy, Analytical chemistry principles
7. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
8. G.R.Chtwal, Pharmaceutical Inorganic Chemistry, Himalaya Publishing House
9. Text Book of Pharmaceutical Analysis – K. A. Connor, John Wiley & Sons, New York.
10. Kasture & Wadodkar, Text Book of Pharmaceutical analysis Vol.I & II.

List of Open Source Software/learning website: Nil