

Subject Code: 1PH1010102	Subject Title: PHARMACEUTICAL CHEMISTRY-I (INORGANIC CHEMISTRY)
Pre-requisite Subject	- NONE -

Objectives of course:

1. Discuss the importance of different types of soluble and insoluble impurities in pharmaceutical materials, APIs and other ingredients.
2. Detail study of the method of manufacturing, physical/chemical properties, assay, standardization storage and uses of important inorganic substances used for pharmaceutical purpose. (therapeutic and non therapeutic)
3. Study biological role of inorganic ions and its involvement in various diseases also details of buffer solutions and importance of ion exchangers.
4. Study various aspects of radioactivity, its diagnostics as well as therapeutic usefulness and harmful effects in environment.

Learning outcomes:

At the end of semester student will be able to:

1. Understand learning methods of manufacturing, physical/chemical properties, assay procedure, preparations of standard solution and their storage conditions, uses of important inorganic substances used for pharmaceutical purpose.
2. Learning biological role of inorganic ions, different buffer solutions and its possible involvement in various diseases.
3. Learning about introduction of radio chemical substances, toxic substances, metal poisons, impurities in various pharmaceutical preparations.
4. Learning basic analytical methods for pharmaceutical inorganic substances.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)					
Lecture	Tutorial	Practical	Credit	Theory(T)		Practical(P)		Total Marks	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Theory	Practical

Subject Contents			
Sr. No.	Topic	Total Hours	Weight (%)
1	Introduction to Pharmaceutical Chemistry and pharmacopeia.	1	3
2	Impurities in Pharmaceutical substances: Sources of impurities, limit tests for iron, arsenic, lead, heavy metals, chloride and sulphate.	5	12
3	Pharmaceutical Necessities: a. Acid and bases: Acid -base theories, boric acid, hydrochloric acid, sulphuric acid, nitric acid, phosphoric acid, sodium hydroxide, strong ammonia solution, soda lime. b. Buffers: Theory and mechanism of buffers, official buffers c. Anti-oxidants: Theory of antioxidants, Hypo phosphorus acid, sodium bisulfite, sodium metabisulfite, sodium thiosulfate, sodium nitrite, Nitrogen d. Water: Purified water, water for injection, sterile water for injection.	6	14

4	<p>An outline of methods of preparation, properties [Chemical and physical], test for purity, identity assay principle of the following class of compounds</p> <ol style="list-style-type: none"> 1. Topical agents: Protective, Astringents and Anti-infectives. 2. Gases and Vapours: Oxygen, Anesthetics 3. Dental products: Dentifrices, Anti-carries agents 4. Complexing and Chelating agents used in therapy 5. Inhalants, Anaesthetics and Respiratory stimulants 6. Expectorants, emetics and sedatives 7. Antidotes, Sclerosing agents 	15	34
5	Major intra and extra-cellular electrolytes: physiological ions, electrolytes used for replacement therapy, acids-base balance and combination therapy.	3	7
6	Essential and trace elements: Transition elements and their compounds of pharmaceutical importance: Iron and haematinics, mineral supplements.	2	5
7	Gastrointestinal Agents: Acidifying agents, Antacids, Protectives and Adsorbents, Cathartics.	5	12
8	Pharmaceutical Aids used in Industry: Antioxidants, preservatives, filter aids, adsorbents, diluents, lubricants, suspending agents	5	12
9	Inorganic Radio Pharmaceuticals: Nuclear radio pharmaceuticals, Reactions, Nomenclature, Methods of obtaining their standards and units of activity, measurement of activity, clinical applications and dosage, hazards and precautions.	3	7

List of References:

Reference books:

1. Indian Pharmacopoeia, Latest Edition, Controller of publications, Delhi.
2. Vogel's Qualitative Inorganic Analysis Revised by G. Svehla, Longman, Ltd., 7th Ed.1996.

Text Books:

1. G.R. Chatwal, Pharmaceutical inorganic chemistry, volume-I, Himalaya Publishing house, India
2. Bently and Driver, Textbook of Pharmaceutical Chemistry, Oxford university Press, 8th Edition,1987
3. Practical Pharmaceutical Chemistry edited by A.H. Beckett, J.B. Stenlake, CBS Publication Indian edition

e- Resources:

1. <http://ocw.mit.edu/courses/chemistry/5-04-principles-of-inorganic-chemistry-ii-fall-2008/lecture-notes/>
2. <http://www.unf.edu/~michael.lufaso/chem3610/>
3. http://uotechnology.edu.iq/appsciences/filesPDF/chemistry/Lecture/2c/1-inorganic_chemistry7.pdf

List of Experiments:

Practical exercises should be based on theoretical topics. The practical should broadly cover the following:

1. The background and systematic qualitative analysis of inorganic mixtures of up to four radicals
2. All identification tests for Pharmacopoeial inorganic pharmaceuticals and qualitative tests for cations and anions should be covered.
3. Volumetric analysis of few important compounds covered in theory.
4. Limit tests for Chloride, Sulphate, Iron, Arsenic, Heavy metals and Lead.