



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Pharmacy College
Semester-2(B.Pharm.)

Subject: Pharmaceutical Inorganic Chemistry (BPHBP12306)

Type of course: Major

Prerequisite: NA

Rationale: Study of pharmaceutical applications of the inorganic compounds led to the establishment of a new avenue called pharmaceutical inorganic chemistry. It deals with the study of preparation, standards of purity, limit test for determining quality, purity and storage conditions of all inorganic compounds.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
CI	T	P		C	Theory Marks		Practical Marks	
			ESE		MSE	VP	ALA	
3	1	4	6	75	25	35	15	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Chapter No.	Course content	Hrs	% Weightage
1.	Impurities in pharmaceutical substances: History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate General methods of preparation, <u>assay for the compounds superscripted with asterisk (*)</u> , properties and medicinal uses of inorganic compounds belonging to the following classes	10	22



2.	<p>Acids, Bases and Buffers: Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.</p> <p>Major extra and intracellular electrolytes: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.</p> <p>Dental products: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.</p>	10	22
3.	<p>Gastrointestinal agents</p> <p>Acidifiers: Ammonium chloride* and Dil. HCl</p> <p>Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture</p> <p>Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite</p> <p>Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations.</p>	10	22
4.	<p>Miscellaneous compounds</p> <p>Expectorants: Potassium iodide, Ammonium chloride*.</p> <p>Emetics: Copper sulphate*, Sodium potassium tartarate</p> <p>Haematinics: Ferrous sulphate*, Ferrous gluconate</p> <p>Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite³³³</p> <p>Astringents: Zinc Sulphate, Potash Alum</p>	8	18
5.	<p>Radiopharmaceuticals: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I¹³¹, Storage conditions, precautions & Pharmaceutical application of radioactive substances.</p>	7	16



Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1.	Identification: Faculty will provide name or class of compounds and students have to find and list out marketed products of each compound and upload on portal.	5
2.	Think – Pair – Share (Structural configuration of compounds) Faculty will give topic to think and present themselves in class and shares their ideas to class within given period of time and also can upload on portal.	10
Total		15

Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	25%	45 %	20%	05%	05 %	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Determine the level of specific impurities in the given inorganic compounds by performing different limit tests.
CO2	Deal with the study of preparation, standards of purity, limit test for determining quality, purity and storage conditions of all inorganic compounds.
CO3	Familiar with Gastrointestinal agents like Acidifiers and their functions.
CO4	Understand Expectorants, Emetics and haematinics with suitable examples.
CO5	Handle Radiopharmaceuticals, determine radio activity, Measurement of radioactivity, Properties of α , β , γ radiations, Half life, radio isotopes and study of radio isotopes like Sodium iodide I^{131}

List of Practical

Sr. No	Descriptions	Chapter No	Hrs
1.	To carry out limit test for Chlorides.	1	4
2.	To carry out limit test for Sulphates.	1	4
3.	To carry out Modified limit test for Chlorides and Sulphates.	1	4
4.	To carry out Limit test for Iron.	1	4
5.	To carry out Limit test for Heavy metals like arsenic.	1	4
6.	To carry out Limit test for Heavy metals like lead.	2	4
7.	To perform identification test for Magnesium hydroxide	2	4
8.	To perform identification test for Ferrous sulphate.	3	4
9.	To perform identification test for Sodium bicarbonate.	3	4
10.	To perform identification test for Calcium gluconate.	3	4
11.	To perform identification test for Copper sulphate.	3	4
12.	To carry out Test for purity as Swelling power of Bentonite	4	4
13.	To determine potassium iodate and iodine in potassium Iodide.	4	4
14.	Preparation of inorganic pharmaceuticals Boric acid.	5	4
15.	Preparation of inorganic pharmaceuticals Potash alum and ferrous sulphate.	5	4
		Total	60

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.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.



Reference Books:

- [1] A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition.
- [2] A.I. Vogel, Text Book of Quantitative Inorganic analysis P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
- [3] M.L Schroff, Inorganic Pharmaceutical Chemistry Bentley and Driver's Textbook of Pharmaceutical Chemistry
- [4] Anand & Chatwal, Inorganic Pharmaceutical Chemistry
- [5] Indian Pharmacopoeia

