(B. Pharm)
(Semester - I)

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Course Code	BP104T
Course Title	Pharmaceutical Inorganic Chemistry – Theory

Scope: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

Objectives:
Upon completion of course student shall be able to
1. Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
2. Understand the medicinal and pharmaceutical importance of inorganic compounds

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –
1. Remember biological functions of ions and trace elements
2. Understand basic concepts and principles of inorganic chemistry and radiopharmaceuticals
3. Discuss various sources of impurities and methods to analyze the impurities in pharmaceuticals
4. Explain mechanisms of action of selected inorganic therapeutic and diagnostic agents
5. Describe method of preparation, properties, assay principle and uses of selected inorganic compounds

Syllabus: **Teaching hours**: 45 Hours
UNIT I   **10 Hours**
- **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, assay for the compounds superscripted **with asterisk (*),** properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II   **10 Hours**
- **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.
- **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.

- **Dental products:**

  Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III   10 Hours

- **Gastrointestinal agents**

  Acidifiers: Ammonium chloride* and Dil. HCl

  Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture

  Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite

  Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations

UNIT IV   08 Hours

- **Miscellaneous compounds**

  Expectorants: Potassium iodide, Ammonium chloride*

  Emetics: Copper sulphate*, Sodium potassium tartarate

  Haematinics: Ferrous sulphate*, Ferrous gluconate

  Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite333

  Astringents: Zinc sulphate, Potash alum

UNIT V   07 Hours

- **Radiopharmaceuticals:**

  Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I^{131}, Storage conditions, precautions & pharmaceutical application of radioactive substances.

Tutorials   **Teaching hours: 15 Hours**

Tutorials will be based on above syllabus

Suggested Readings^: (Latest edition)

1. Beckett, A. H., & Stenlake, J. B. (Eds.). Practical Pharmaceutical Chemistry: Part II (Vol. 1 & 2). A&C Black.
2. Vogel, A. I. A Text-book of Quantitative inorganic analysis: including elementary instrumental analysis. London: Longmans.
3. Rao, P. G. Inorganic Pharmaceutical Chemistry. Vallabh Prakashan.
4. Schroff, M. L. *Pharmaceutical chemistry*. Calcutta: National Book Centre.
5. Bentley, A., Driver, J., & Atherden, L. Bentley and Driver's textbook of pharmaceutical chemistry. Oxford: Oxford University Press.
6. Chatwal, G. R. Pharmaceutical Chemistry: Inorganic, Volume I. Himalaya Pub. House.
7. Indian Pharmacopoeia, Indian Pharmacopoeia Commission

L= Lecture, T= Tutorial, P= Practical, C= Credit

^ this is not an exhaustive list