GUJARAT TECHNOLOGICAL UNIVERSITY

Pharm.D

1st year

Subject Name: Pharmaceutical Inorganic Chemistry
Subject Code: 818805

Scope: This course mainly deals with fundamentals of Analytical chemistry and also the study of inorganic pharmaceuticals regarding their monographs and also the course deals with basic knowledge of analysis of various pharmaceuticals.

Objectives:
Upon the completion of the course the student should be able to:

1. understand the principles and procedures of analysis of drugs and also regarding the application of inorganic pharmaceuticals;
2. know the analysis of the inorganic pharmaceuticals their applications
3. appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease

TeachingScheme				EvaluationScheme				Total Marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
2	1	3	6	70	30	70	30	200

Sr. No.	CourseContents	Hours	ModuleWeightage
1	**Errors:** Errorsin Analysis: Error, Accuracy and Precision, Types of Errors, Methods of expressing precision, Test for rejection of data, Significant figures, Rounding of figures, Confidence limits	2	3.5%
2	**Volumetric analysis (Titrimetric analysis)**		
2.1	**Acid-base titrations:** Relative strength and its effect on titration, commonion effect,pH, Henderson-Hessel bach equation, buffers, neutralization curve, acid bas indicators, theory of indicators, back titrations, biphasictitrations, pharmacopoeial applications ,hydrolysis of salts, ion ic products of water and law of mass action.	7	11.5%
2.2	**Redoxtitrations :** Theory of redox titrations, redoxindicators, types of redoxtitrations, iodometry, cerrimetry, mercury metry,diazotizationnitritetitrations,2,6-dichlorophenolindophenoltitrations,titrationcurveandcalculations of potentials during course of titrations.	6	10%
2.3	**Nonaqueoustitrations :** Nonaqueous solvents, titrantsand indicators. Differentiating and leveling solvents.	3	5%
2.4	**Argentometric or precipitationtitrations :** Mohrs, FajansandVolhardmethods	3	5%

2.5	**Complexometrictitrations :** Theory of the titrations, titrant, indicators and pharmacopoeial applications.	**4**	**6.5%**
3	**Gravimetric analysis :** Stability, solubility products, types of precipitations ,precipitation techniques, pharmacopoeial applications	**3**	**5%**
4	**Impurities inPharmaceuticals**:	**4**	**6.5%**
	Sources of impurities, tests for purity and identity,limit tests foriron, arsenic, lead, heavy metals,chloride,sulphate.		
5	**Gases and Vapors**: Oxygen,AnestheticsandRespiratoryStimulants	**2**	**3.5%**
6	**Acidifying agents:** DiluteHCl	**1**	**1.5%**
7	**Antacids:** Types, Ideal characteristics of anantacid, Aluminium compounds, Calcium compounds, Magnesium compounds, Sodium compounds, Combination of Antacids	**2**	**3.5%**
8	**Cathartics:** Classification, Magnesiumhydroxide, Magnesiumsulphate, Sodium Phosphate, Dried Sodium Phosphate, Sodium Potassiumtartarate, Potassium bitartarate, Mercurouschloride	**2**	**3.5%**
9	**Majorintra and extra-cellularelectrolytes**: Physiologicalions, electrolytesused for replacementtherapy,acids-base balance andcombination therapy.	**4**	**6.5%**
10	**Essential and trace elements**: Transition elements and their compounds of pharmaceutical importance: Iron and haematinics, mineral supplements.	**3**	**5%**
11	**Antimicrobials**	**2**	**3.5%**
12	**Pharmaceutical Aids used inpharmaceuticalindustry**:Anti-oxidants,preservatives,Filteraids, Adsorbents, Diluents	**3**	**5%**
13	**Dentalproducts**: Dentifrices, Anti-caries agents.	**2**	**3.5%**
14	**Miscellaneous agents**: Sclerosingagents,Expectorants,Emetics,poisonsandAnti-dotes,Sedatives	**4**	**6.5%**
15	**InorganicRadiopharmaceuticals:** Nuclear radiopharmaceuticals, reactions, Nomenclature, Methods of obtaining their standards and units of activity, measurements of activity, clinical applications and dosage, hazards and precautions.	**3**	**5%**

Course materials: (Latest edition)

Text books

a. A text book Inorganic medicinal chemistry by Surendra N. Pandeya

b. A. H.BeckettandJ. B. Stanlake's Practical Pharmaceutical chemistry Vol-I&Vol-II

c. Inorganic Pharmaceutical Chemistry III-Edition P.GunduRao

Reference books

a. Inorganic Pharmaceutical Chemistry by Anand & Chetwal

b. Pharmaceutical Inorganic chemistry by Dr.B.G.Nagavi

c. Analytical chemistryprinciplesbyJohn H. Kennedy

d. I.P.1985and 1996,Govt. ofIndia, Ministryof health

Pharm.D 1st year

PHARMACEUTICAL INORGANIC CHEMISTRY

Practical (3 Hours/ Week, 6 Credits, 90 Hours)

Sr. No.	Experiments
1	**Limit test (6 exercises)** a. Limit test for chlorides b. Limit test for sulphates c. Limit test for iron d. Limit test for heavy metals e. Limit test for arsenic f. Modified limit tests for chlorides and sulphates
2	**Assays (10 exercises)** a. Ammonium chloride- Acid-base titration b. Ferrous sulphate- Cerimetry c. Copper sulpahte- Iodometry d. Calcilugluconate- Complexometry e. Hydrogen peroxide – Permanganometry f. Sodium benzoate – Nonaqueous titration g. Sodium chloride – Modified volhard's method h. Assay of KI – KIO3 titration i. Gravimetric estimation of barium as barium sulphate j. Sodium antimony gluconate or antimony potassium tartarate
3	**Estimation of mixture (Any two exercises)** a. Sodium hydroxide and sodium carbonate b. Boric acid and Borax c. Oxalic acid and sodium oxalate
4	**Test for identity (Any three exercises)** a. Sodium bicorbonate b. Barium sulphate c. Ferrous sulphate d. Potassium chloride
5	**Test for purity (Any two exercises)** a. Swelling power in Bentonite b. Acid neutralising capacity in aluminium hydroxide gel c. Ammonium salts in potash alum d. Adsorption power heavy Kaolin e. Presence of Iodates in KI
6	**Preparations (Any two exercises)** a. Boric acids b.Potash alum c. Calcium lactate d. Magnesium suphate

Course Materials: (Latest edition)

1. A I Vogel, Text Book of Quantitative Inorganic analysis
2. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
3. Practical's in inorganic and analytical chemistry by Hitesh G Raval
4. Bentley and Drivers Textbook of Pharmaceutical Chemistry
5. Indian Pharmacopoeia

Scheme of Practical Examination

	Internal/Sessional	External
Synopsis	05	15
MajorExperiment	10	25
Minor Experiment	03	15
Viva	02	15
Max.marks	**20**	**70**
Duration	**3 hours**	**4 hours**

Note: Total sessional marks is 30 (20 for practicalsessionalplus 10marksfor regularity,promptness, viva-voceand recordmaintenance)