

<b>CODE</b>	<b>COURSE TITLE</b>
<b>18CHUC204</b>	<b>CORE CHEMISTRY - IV</b>

<b>Category</b>	<b>CIA</b>	<b>ESE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
CORE	25	75	41	4	-	4

### Preamble

To enable the students to learn the principles of general methods of metal extraction techniques in Inorganic Chemistry and to gain knowledge of reactions of carbonyl compounds in Organic Chemistry. A comprehensive information about the II law of Thermodynamics is also aimed.

### Course Outcomes

On the successful completion of the course, students will be able to

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1.</b>	Comprehend the principles and steps involved in the extraction of metals	K1,
<b>CO2.</b>	Compare the Physical and Chemical properties of Alkali and Alkaline Earth metals	K2,K3
<b>CO3.</b>	Interpret the reactions of carbonyl compounds- Aldehydes and Ketones	K2,K3
<b>CO4.</b>	Analyse thermodynamic processes and derive expressions for II law of Thermodynamics	K2,K3
<b>CO5.</b>	Apply the concepts of Chemical Equilibrium	K2,K3

### Mapping with Programme Outcomes

<b>COs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	S	S	M	S	S
<b>CO2</b>	S	M	M	S	S
<b>CO3</b>	L	L	M	S	S
<b>CO4</b>	M	M	M	S	S
<b>CO5</b>	M	S	S	S	S

S- Strong; M-Medium; L-Low

## Syllabus

### UNIT I

( 9 hrs.)

**General methods of extraction of metals:** Ores and Minerals – Types of ores – Methods of ore dressing – Concentration – Gravity separation – Froth Floatation – Magnetic separation – Calcination – Roasting – Smelting – Aluminothermic process – Purification of metals – Electrolysis – Refining – Zone Refining – Van Arkel Refining – Electrolytic Refining – Extraction of radioactive elements – Uranium and Thorium only.

### UNIT II

( 9 hrs.)

**Alkali Metals:** Group discussion – Lithium extraction – Properties and uses of Li – Diagonal relationship with Magnesium. **Alkaline earth metals:** Group discussion – Extraction, Properties and Uses of Beryllium and Magnesium).

### UNIT III

( 9 hrs.)

**Reactions of Aldehydes and Ketones:** Nucleophilic addition reactions – Aldol Condensation – Perkins – Knoevenagel – Claisen - Dieckmann – Reformatsky reactions – Reactions with  $\text{LiAlH}_4$  and  $\text{NaBH}_4$  – Wolf-Kishner and MPV reactions – Simple and crossed Cannizzaro reaction.

### UNIT IV

( 9 hrs.)

**II Law of Thermodynamics:** Need for the II law of Thermodynamics – Different Statements of II law – Numerical definition of Entropy – Carnot cycle – Carnot theorem – Derivation of Entropy from Carnot cycle – Entropy change in an irreversible process – Entropy change for an ideal gas with T and V as variables – P and T as variables – Entropy of mixing of Ideal gas – Gibbs Helmholtz equation.

### UNIT V

( 9 hrs.)

**Chemical Potential:** Gibbs Duhem equation – Variation of Chemical potential with P and T – Chemical potential in a system of Ideal gases – Clapeyron-Clausius equation – **Chemical Equilibrium:** Spontaneous reactions – Standard free energy change- Conditions for equilibrium and spontaneity. Law of mass action – Relation between  $K_p$ ,  $K_c$  and  $K_x$  – Vont Hoff Isotherm and Isochore – Statement of III law of Thermodynamics – Exceptions of III law. Zeroth Law-Absolute temperature.

**Text Books**

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bhal B.S. & Arunbahl	Advanced of Organic Chemistry	S. Chand & Co, New Delhi	2016, 1 <sup>st</sup> Edition
2.	Kheterpal S.C.	Physical Chemistry Vol. I & II	Pradeep Publications, Jalandhar	2011, 2 <sup>nd</sup> Edition
3..	Madan R.D.	Modern Inorganic Chemistry	S. Chand & Co, New Delhi	2011, 3 <sup>rd</sup> Revised Edition
4.	Puri B.R., Sharma L.R. & Pathania M.S.	Principles of Physical Chemistry	Sobanlal Nagin chand & co., New Delhi	2016, 47 <sup>th</sup> Edition

**Reference Books**

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Puri B.R., Sharma L.R.	Principles of Inorganic Chemistry	Vishal Publishing Company, Jalandhar	2016, Revised Edition
2.	Soni P.L.	Text Book of Inorganic Chemistry	Sultan chand & sons, New Delhi	2003, 20 <sup>th</sup> Edition
3.	Bahl B.S. & Tuli G.D.	Essentials of Physical Chemistry	S. Chand & Co., New Delhi	2014, 27 <sup>th</sup> Edition
4.	Soni P.L.& Dharma Rao D.P.	Text Book Of Physical Chemistry	S. Chand & Co., New Delhi	2000, 21 <sup>st</sup> Edition

**Pedagogy**

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

CODE	COURSE TITLE
18CHUCP01	Core Chemistry Practical I INORGANIC QUALITATIVE SEMI MICRO ANALYSIS

Category	CIA	ESE	L	T	P	Credit
CORE	40	60	-	-	45	3

### Preamble

The course aims to impart analytical skills by learning to analyze mixtures of inorganic substances containing four ions and provide skills to eliminate interfering anions from mixtures.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Perform systematic semi micro qualitative analysis	K1
CO2.	Interpret the nature of various inorganic anions and cations	K2 K3
CO3.	Identify and detect various anions and cations through their reactions	K2
CO4.	Eliminate interfering anions from the inorganic mixtures	K2 K3
CO5.	Identify and cations group according to their properties	K1 K3

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	L	S	S	S
CO3	M	M	M	S	S
CO4	M	M	M	S	S
CO5	M	L	S	S	S

S- Strong; M-Medium; L-Low

### Syllabus

**Cations To Be Analysed:** Lead – Copper – Iron - Zinc- Manganese – Cobalt – Nickel – Barium – Strontium - Magnesium - Ammonium.

**Anions To Be Analysed:** Carbonate – Sulphate – Nitrate – Chloride- Bromide –Fluoride - Oxalate - Borate - Phosphate.

### Pedagogy

Demonstration, PPT, Experimental work

Category	CIA	ESE	L	T	P	Credit
CORE	25	75	41	4	-	4

CODE	COURSE TITLE
18CHUCP01	Core Chemistry Practical I INORGANIC QUALITATIVE SEMI MICRO ANALYSIS

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CORE	40	60	-	-	45	3

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CO1.	Perform systematic semi micro qualitative analysis	K1
CO2.	Interpret the nature of various inorganic anions and cations	K2 K3
CO3.	Identify and detect various anions and cations through their reactions	K2
CO4.	Eliminate interfering anions from the inorganic mixtures	K2 K3
CO5.	Identify anions and cations group according to their properties	K1 K3

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	L	S	S	S
CO3	M	M	M	S	S
CO4	M	M	M	S	S
CO5	M	L	S	S	S

S- Strong; M-Medium; L-Low

### Syllabus

**Cations To Be Analysed:** Lead – Copper – Iron - Zinc- Manganese – Cobalt – Nickel – Barium – Strontium - Magnesium - Ammonium.

**Anions To Be Analysed:** Carbonate – Sulphate – Nitrate – Chloride- Bromide –Fluoride - Oxalate - Borate - Phosphate.

### Pedagogy

Demonstration, PPT, Experimental work

CODE	COURSE TITLE
18CHUA002/ 18CHUA404	ALLIED CHEMISTRY II (FOR B.Sc N&D,BOTANY and ZOOLOGY

Category	CIA	ESE	L	T	P	Credit
ALLIED	20	55	55	5	-	4

### Preamble

To enable the students to acquire knowledge about the concepts of Coordination and Bio inorganic chemistry, sources of carbohydrates and vitamins, chemistry of amino acids, proteins and drugs and understand the chemistry of PCPs.

### Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Realize the concepts of chemistry of coordination compounds and Bio inorganic chemistry	K1
CO2.	Classify and identify the sources of carbohydrates and vitamins	K2 K3
CO3.	Interpret the properties of amino acids and proteins and acquire skills in first aid.	K2
CO4.	Familiarize the nature of various therapeutic drugs	K2 K3
CO5.	Categorize the chemistry of different cosmetics and soaps	K1 K3

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	M	S	S
CO3	M	M	M	S	S
CO4	M	M	M	S	S
CO5	M	L	S	S	S

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### Syllabus

UNIT I

( 12 hrs.)

**Coordination Chemistry:** Co-ordination Number - Ligands – Monodentate – Bidentate - Nomenclature Of Complexes - Theories – Werner – Sidgwick - Pauling. Analytical applications. Haemoglobin and Chlorophyll.

**Bio inorganic Chemistry:** Role of alkali and alkaline earth metal ions in biological systems-biological functions and toxicity of elements like Cr, Mn, Co, Ni, Cu, As, Se, Cd, Hg, Pb, Fe, Zn and Mo.

**UNIT II ( 12 hrs.)**

**Carbohydrates :** Classification - Glucose And Fructose - Preparation – Properties - Open Chain Structure - Glucose - Fructose. Interconversions-Glucose to Fructose and vice versa.

**Vitamins:** Classification-sources and deficiency diseases of Vitamin A, B, C, D, E and K

**UNIT III (12 hrs.)**

**Amino Acids:** Classification - Preparation - Properties – Peptides – Dipeptide Synthesis.

**Proteins:** Classification – Characteristics – Colour Reactions – Biological Functions.

**First Aid:** First aid box-First aid for accidents-cuts, abrasions and Bruises-Bleeding-Fractures-Burns-Fainting-Poisonous bites.

**UNIT IV (12 hrs.)**

**Chemotherapy:** Biological classification-Sulpha drugs-Preparation of Sulphanamide-Sulphapyridine Mode of Action -Therapeutic uses-Antibiotics- Definition- Structure and uses of Penicillin G – Chloramphenicol - Paracetamol preparation and therapeutic uses-Antimalarial-Life cycle of malarial parasites-uses of Chloroquine as antimalarial.

**UNIT V (12 hrs.)**

**Chemistry of Cosmetics:** Skin Care - Hair Care - Deodorants and Antiperspirants - Colour Cosmetics – Mascara - Eyeshadow and Eyebrow Pencils - Sun screen lotions. Shampoo- Perfumes.

**Soaps:** Preparation -Properties-Cleansing action-Advantages-Disadvantages-Difference between soaps and detergents.

**Text Books**

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Veeraiyan V.	Allied Chemistry Paper I & II	Highmount Publishing House	2005, 2 <sup>nd</sup> Edition
2.	B.K.Sharma	Industrial Chemistry	Goel publishing House	2013, 17 <sup>th</sup> Edition

**Reference Books**

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bhal B.S. &	Advanced of	S. Chand & co., New	2016, 1 <sup>st</sup> Edition

	Arunbahl	Organic Chemistry	Delhi	
2.	Bahl B.S. & Tuli G.D.	Essentials of Physical Chemistry	S. Chand & co., New Delhi	2014, 27 <sup>th</sup> Edition
3.	Jayashree Ghosh	Applied Chemistry	Sultan chand & sons, New Delhi	2006, 1 <sup>st</sup> Edition
4.	Puri B.R., Sharma L.R. & Pathania M.S.	Principles of Physical Chemistry	Sobanlal Nagin chand & co., New Delhi	2016, 47 <sup>th</sup> Edition
5.	Jain and Jain	Engineering Chemistry	Dhanpat Rai Publishing Company	2010, 15 <sup>th</sup> Edition
6.	Soni P.L.	Text Book of Inorganic Chemistry	Sultan chand & sons, New Delhi	2003, 20 <sup>th</sup> Edition
7.	Sivakumar R. & Sivakumar N.	Engineering Chemistry I & II	Tata McGraw-Hill Publishing Company Limited, New Delhi	2013, 3 <sup>rd</sup> Edition

### **Pedagogy**

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar