SEMESTER: I/III PART: III	22UCHEA01: ALLIED CHEMISTRY-I	CREDIT: 3 HOURS: 45

COURSE OBJECTIVES

1) To impart wide knowledge about Metallurgy.
2) To invoke the knowledge in basic concepts of chemistry.
3) To provide a knowledge on chemical kinetics.
4) To Familiarize the students about Industrial Chemistry.
5) To inculcate interest in Nuclear chemistry.

Unit – I: METALURGY **HOURS: 9**

Metallurgy – Introduction – Metals – Occurrence of Metals – Minerals and Ores – Difference between Minerals and Ores – Minerals of Iron, Aluminium and Copper – Concentration of Ores – Froth Floatation process, Magnetic separation, Calcination, Roasting, Smelting, Flux.

Reduction of Mineral to Metal – Aluminothermic process – Refining of Metals – Electrolysis, Van Arkel and Zone refining.

UNIT – II: FUNDAMENTAL CONCEPTS **HOURS: 9**

Fundamental concepts – Bonding – Nature of bounds – Ionic, Covalent, Coordinate and Hydrogen bonds – Cleavage bonds - Homolytic and Heterolytic Fission – Electrophiles, Nucleophiles and Free Radicals. Types of Organic Reactions – Substitution, Addition Elimination, Rearrangement - Definition & Examples.

Isomerism – Optical Isomerism – Lactic and Tartaric acid – Geometrical Isomerism – Maleic and Fumaric Acid.

UNIT – III: CHEMICAL KINETICS AND PHOTOCHEMISTRY **HOURS: 9**

Chemical Kinetics – Rate of a reaction – Order and Molecularity – Definition & Differences – First Order rate equation – Derivation – Half life period – Catalysis – Catalyst – Autocatalyst – Enzyme Catalyst – Promoters – Catalytic poisons – Homogeneous and Heterogenous Catalysis – Differences – Industrial application of Catalysis.

Photochemistry – Grotthus – Draper law – Stark Einstein's law – Quantum yield – Photosynthesis.

UNIT-IV: FUELS **HOURS:9**

Fuels – Classification of Fuels – Calorific Value of Fuels - Water gas, Semi water gas, Carburetted Water gas and Producer gas – Composition and Uses

Non-Conventional Fuels-Need Of Solar Energy-Bio Fuels-Oil gas,Natural gas and LPG-Uses

UNIT – V: NUCLEAR CHEMISTRY **HOURS: 9**

Nuclear Chemistry-Introduction-Fundamental Particle of Nucleus-Isotopes, Isobars, Isotones and Isomers-Definition and Examples-Nuclear Binding Energy, Mass Defect and N/P ratio-Nuclear Fission and Nuclear Fusion(Elementary Idea)-Applications of Radioisotopes in Medicine, Agriculture and Industries-Carbon dating.

Metallic bond-Band theory-Conductors, Insulators and Semiconductors - types.

COURSE OUTCOMES

1) Acquire thorough Knowledge about Metallurgy and Fundamental concepts in Organic chemistry.
2) Acquire an idea about Chemical Kinetics.
3) Identify the Importance of Nuclear chemistry and Metallic Bond.
4) Acquire Knowledge on Photochemistry
5) Extensive Knowledge about Fuels.

TEXTBOOKS: (IN API STYLE)

1) P.L. Soni, 2014, Text Book of Inorganic Chemistry, Sultan Chand & Sons, 29th edition, New Delhi.
2) P.L.Soni, H.M.Chawla, 2014, Text book Of Organic Chemistry,Sultan Chand & Sons, New Delhi.
3) Arun Bahl, B.S.Bahl, 2019, A Text Book Of Organic chemistry, Sultan &Sons, 22nd Edition, New Delhi.
4) M.K. Jain, S.C.Sharma, 2012, Modern Organic Chemistry, Vishal Publishing Company, 4th Edition, New Delhi.

Supplementary Readings

1) 1. B.R. Puri, L.R.Sharma, K.C.Kailia, 2016, Principles of Inorganic Chemistry, Vishal Publishing Company, 33rd Edition, New Delhi.
2) 2.Samuel Glasstone, David Lewis, 1963, Elements Of Physical chemistry, Palgrave Macmillan, New Delhi.

Outcome Mapping

	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	3	3
CO2	2	3	3	3	3
CO3	3	2	3	3	2
CO4	3	3	2	2	3
CO5	3	3	3	3	2

(1-Low, 2-Moderate, 3-High)

SEMESTER: II/IV PART - III	22UCHEA02: ALLIED CHEMISTRY-II	CREDIT: 3 HOURS: 60

COURSE OBJECTIVES

1) Make the students familiar with Coordination Chemistry.
2) To acquire thorough knowledge about Carbohydrates and proteins.
3) Enable the students to acquire knowledge in Electrochemistry.
4) To have an idea about paint and varnishes.
5) To create about knowledge in medicinal chemistry.

UNIT - I **HOURS: 12**

COORDINATION CHEMISTRY

Coordination Chemistry-Introduction-Nomenclature of Coordination Compounds-Ligands, Central Metal Ion, Complex Ion, Coordination Number-Definition and Examples-Werner theory of Coordination Compounds-Biological role of Haemoglobin and Chlorophyll.

Industrial Chemistry- Fertilizers and Manures-Bio fertilizers-Organic Manures and their importance-Role of NPK in Plants-Urea, Potassium Nitrate and Superphosphate of Lime-Preparation and uses.

UNIT – II **HOURS: 12**

CARBOHYDRATES AND AMINOACIDS

Carbohydrates-Classification—Glucose-Preparation and Properties of Glucose-Structure of Glucose (Elucidation Not Necessary)-Starch and Cellulose-Occurrence, Properties and uses.

Amino Acids and Proteins-Classification of Amino Acids-Essential and Non Essential Amino Acids-Preparation of Amino Acid-Gabriel Phthalimide Synthesis – Iso electric Point of Amino Acid-Proteins-Classification of Proteins based on Physical Properties and Biological Functions-Primary and Secondary Structure of Proteins (Elementary treatment only).

UNIT – III **HOURS: 12**

ELECTROCHEMISTRY

Electrochemistry-Specific and Equivalent Conductance-their determination-Variation of Specific and Equivalent Conductance on Dilution-Ostwald's dilution law-Kohlrausch law-Conductivity Measurement-Conductometric Titrations.

pH and Buffer,Importance of pH and Buffers in living systems-Buffer solution and Buffer action-Buffer-Definition-pH determination by Indicator Method.

UNIT – IV **HOURS: 12**

PAINTS AND GLASS

Paint-Component of paint- Requisites of a Good Paint-Varnishes-Definition-Types and Composition-Safety Matches-Introduction-Contents in Match sticks and Match Box-Industrial making of Safety Matches.

Glass-Composition, Manufacture, types and uses.

UNIT- V **HOURS: 12**

DRUG CHEMISTRY

Drugs-Sulpha Drugs-Preparation and Uses of Sulpha pyridine and Sulpha diazine-Mode of action of sulpha Drugs-Antibiotics-Uses of Penicillin, Chloramphenicol and Streptomycin-Drug abuse and their Implication.

Chemotherapy-Definition-Analgesics, Antipyretics, Antiseptics, Tranquilizers and Sedatives-Explanation with two Examples-Anaesthetics-Local and General Anaesthetics.

COURSE OUTCOMES

1) Wide Knowledge about Coordination Chemistry.
2) Identify the importance of Carbohydrates, Amino acids and Proteins.
3) Acquire Knowledge about the action of drugs.
4) Able to understand about Paint and Varnishes.
5) Able to understand the concepts of pH and Buffers in living systems.

TEXTBOOKS: (IN API STYLE)

1) R.Gopalan, 2012, Text book Of Inorganic Chemistry, Universities Press, 1st Edition, Hyderabad.
2) P.L.Soni, H.M.Chawla, 2014, Text Book Of Organic Chemistry, Sultan Chand and Sons, 29th Edition, New Delhi.
3) Arun Bahl, BS.Bahl, 2019, A Text Book Of organic Chemistry, Sultan Chand and Sons, 22nd Edition, New Delhi.
4) P.C.Jain, M.Jain, 2019, Engineering Chemistry, Dhanpat Rai& sons, 17th Edition, New Delhi.
5) Jayashree Ghosh, 2015, A Text Book Of Pharmacuetical Chemistry, Sultan Chand and Sons, New Delhi.

Supplementary Readings

1) R.Gopalan, P.S.Subramanian, K.Rengarajan, 1991, Elements of Analytical Chemistry, Sultan Chand and Sons, 2nd Edition, New Delhi.
2) B.R.Puri, L.R.Sharma, K.C.Kailia, 2016, Principles Of Inorganic Chemistry, Vishal Publications, 33rd Edition, New Delhi.

Outcome Mapping

	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	3	3
CO2	2	3	3	3	3
CO3	3	2	3	3	2
CO4	3	3	2	2	3
CO5	3	3	3	3	2

(1-Low, 2-Moderate, 3-High)

SEMESTER: II/IV PART: III	22UCHEAP1 ALLIED CHEMISTRY PRATICALS	CREDIT:3 HOURS: 45

COURSE OBJECTIVES

1) To help the students to develop the skills in Titrimetric Analysis.
2) To learn the basic analytical method.
3) To know about various indicators and their significance.
4) To impart knowledge about primary standard solution.
5) To enhance knowledge about stoichiometric relationship for standardization.

VOLUMETRIC ANALYSIS

A. Acidimetry and alkalimetry

1) Strong Acid Vs Strong Base.
2) Weak Acid Vs Strong Base.
3) Strong Acid Vs Weak base.
4) Determination of hardness of Water.

B. Permanganometry

5) Estimation of Oxalic acid.
6) Estimation of Ferrous Sulphate.

C. Iodometry

7) Estimation of Potassium dichromate.
8) Estimation of Potassium Permanganate.

COURSE OUTCOMES

1) Able to understand the techniques of Titrimetric Analysis.
2) Acquire knowledge in Analytical skills.
3) Analyse the given unknown solution and assess its normality.
4) Evaluate the amount of substance from the normality.
5) Predict the hardness of water samples using EDTA.

TEXTBOOKS: (IN API STYLE)

1) V.Venkateswaran, R.Veeraswamy, A.R.Kulandaivelu, 1997, Basic principles of Practical Chemistry, Sultan Chand and Sons, 2nd edition, New Del
2) Anbusrinivasan.P, 2021 Allied Chemistry Practicals – Volumetry and Organic Analysis, Shri Publications, 1st Edition, Chidambaram, Tamil Nadu, India.
3) A.O.Thomas, 1999, Practical Chemistry, Scientific book Centre,7th Edition, Cannanore, Kerala

Supplementary Readings

1) Sundaram, Krishnan, Raghavan, 1999, Practical Chemistry (Part III), S.Viswanathan Co. Pvt Ltd, 2nd Edition, Kannur.
2) B.S.Furniss, A.J.Hannaford, P.W.G.Smith, A.R.Tatchell, 2005, Vogel's Text Book of Practical Chemistry, 5th Edition, Pearson Education, New Delhi.

Outcome Mapping

	PO1	PO2	PO3	PO4	PO5
CO1	**2**	**3**	**2**	**3**	**3**
CO2	**2**	**3**	**3**	**3**	**3**
CO3	**3**	**2**	**3**	**3**	**2**
CO4	**3**	**3**	**2**	**2**	**3**
CO5	**3**	**3**	**3**	**3**	**2**

(1-Low, 2-Moderate, 3-High)