SEMESTER I			
Part III ALLIED BIOCHEMISTRY -I			
Code: 18UBCA11	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

VISION:

Acquire knowledge about the chemical composition of life.

MISSION:

- Understand fundamental biochemical processes.
- Knowledge about vitamins and their deficiency
- Study the functions of hormones.

Course Outcomes

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	Explain about the chemical composition and the elements of life. Differentiate direct and indirect method for the determination of energy requirement of man	1,2	Un
CO 2	Express the importance of bioenergetics	7	Un
CO 3	Compare the biological reaction such as exergonic reaction and endergonic reaction	3	An
CO 4	Demonstrate about the various energy rich compounds such as adenosine triphosphate, guanosine triphosphate, uridinetriphosphate, Cytidinetriphosphate and acyl phosphate.	5	Ap
CO 5	Distinguish water soluble and fat soluble vitamins and analyze their composition, functions and deficiency symptoms.	3	An
CO 6	Interpret the hormones producing organs and their functions, Know about the plant as well as animal hormones.	3,5	Cr,Re
CO 7	Identify the antibiotics which are all responsible for affecting cell wall synthesis, cytoplasmic membrane and enzyme systems.	7	Re
CO 8	Develop knowledge about the antibiotics interfering with nucleic acid function and inhibiting protein synthesis.	5	Ev

SEMESTER I			
Part III ALLIED BIOCHEMISTRY -I			
Code: 18UBCA11	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

UNIT–I Introduction To Biochemistry

Introduction to biochemistry - scope – chemical composition of life – elements of life – water – biological importance – Energy requirements of the body – Measurement of energy value of foods – Determination of energy requirement of man – Direct method, Indirect method, Respiratory quotients (RQ) of food stuffs – Total heat production – Significance of RQ - Basal metabolism – Definition – Conditions for measurement – Factors influencing, Measurement, Significance, Specific dynamic action.

UNIT – II Bioenergetics

Introduction – Importance of bioenergetics - Energy and work – thermodynamic principles - Biological reactions – Exergonic reaction – Endergonic reaction – Energy and its forms - Energy rich compounds – Adenosine triphosphate – Guanosine triphosphate – Uridine triphosphate – Cytidine triphosphate – Acyl phosphate - Energy coupling.

UNIT – II Vitamins

Introduction – definition - Sources of vitamin – Deficiency diseases – provitamins – biological functions - Properties of Vitamins – Classification of vitamins - water soluble (Vitamin B_1, B_2, B_3, B_5, B_6, B_7, B_9 and B_{12}) and fat soluble vitamins (Vitamin – A, D, E and K) and their composition, functions and deficiency symptoms.

UNIT – IV Hormones

Introduction –Definition – Properties – Biological Functions – Chemical Nature – Hormones secreting glands – Hormones producing organs and their functions - Classification of hormones: based on chemical nature – Functions of Hormones – Plant hormones – Animal hormones.

UNIT – V Antibiotics

Introduction – Definition – Antibiotics affecting cell wall synthesis (pencillin, cephalosporin) – Antibiotics affecting the cytoplasmic membrane – Antibiotics interfering with Nucleic acid function – Antibiotics inhibiting protein synthesis (streptomycin, erythromycin, neomycin)– Antibiotics affecting enzyme systems – Drug resistance.

Text Books:

1. Dulsy Fatima, L.M. Narayanan, R.P. Meyyan Pillai, K. Nallasingam, S. Prasanna Kumar and N. Arumugam, *Biochemistry,* Saras Publication, 1996
2. Patricia trueman, *Nutritional Biochemistry* , MJP publisher 2011
3. L.Veerakumari, *Biochemistry* MJP publisher 2010

Book for Reference :

1. Dr. A.C. Deb, *Concepts of Biochemistry*, Books & Allied (P) Ltd., 1999
2. C.B. Powar, G.R.Chatwal, *Biochemistry,* Himalaya Publishing House 2002

SEMESTER II			
Part III	**Allied Biochemistry -II**		
Code: 18UBCA21	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

Vision:

Achieve broad based knowledge in concepts and principles of biochemistry.

Mission:

- Provide an opportunity in acquiring knowledge about nutritional biochemistry.
- Understand the various pathways involved in cell respiration.
- Grasp in-depth knowledge about the biochemistry of blood and respiration.
- Familiarize the learners with the techniques involved in biochemistry.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	Discuss in detail about the nutritional values of milk, egg, meat, fish, vegetable foods, fruits, tea, coffee, cocoa and alcohol. Analyse the physio-chemical interactions between diet ingredients.	1,3	Un,An
CO 2	Categorize energy yielding foods, body building foods and protective foods.Assess effect of drugs on food intake, body weight, nutrient requirements and growth, vitamins and minerals.	1,5	An,Cr
CO 3	Demonstrate the theories of biological oxidation decarboxylation, electron transport system and oxidative phosphorylation.	6	Ap
CO 4	Describe the functions of blood. Discuss in brief about red blood cells, white blood cells, blood platelets, plasma and plasma protein.	1	Un
CO 5	Identify the variation in structure of hemoglobin with reduced solubility and altered oxygen affinity.	2	Re
CO 6	Formulate how the transport of oxygen by blood and carbon-di-oxide in blood taking place.	1	Ev
CO 7	Interpret the role of kidneys in acid-base balance, Relate the physical and chemical transport of blood,	2,6	Cr,Ap
CO 8	Compare the relation between optical and electron microscope, Identify the separated components using paper as well as gel electrophoresis.	1,2	An,Re

SEMESTER II			
Part III	**Allied Biochemistry -II**		
Code: 18UBCA21	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

UNIT – I Nutritional Biochemistry

Nutritive value of Milk – Egg – Meat - Fish – Vegetable food (Cereals, Pulses, Nuts, Roots and Tubers, Green leafy vegetables) – Fruits – Tea – Coffee – Cocoa – Alcohol – Principles in balancing a diet - Bioavailability – absorption – Physico-chemical interactions between diet ingredients and drug ingredients – gastric emptying and drug absorption – transport across membrane – dietary effects on drug function – drug excretion – low protein diets – dehydration and starvation – effect of drugs on food intake, body weight, nutrient requirements and growth, vitamins and minerals – Energy yielding, Body building and Protective foods..

UNIT – II Cell Respiration and Biological Oxidations

Introduction – Importance of Biological oxidation – Theories of biological oxidation : oxygen activation theory, hydrogen activation theory – Hydrogen acceptors – Nicotinamide nucleotide – Flavin nucleotide – Cytochrome – Sites – Pathways – Oxidative decarboxylation – Electron transport system – Oxidative Phosphorylation – Energetics of Biological oxidation.

UNIT – III Biochemistry of Blood

Introduction – Functions of Blood – (Homeostatic functions, Blood as transport system) – Types of Blood group, Rh^+ and Rh^-- Red Blood Cells – White Blood Cells– Blood Platelets – Plasma – Plasma proteins – Albumin, Globulin (alpha, beta and gama), Fibrinogen – Functions of plasma proteins - Blood groups – Hemoglobin – Variation in structure - Hemoglobin with reduced solubility, altered oxygen affinity.

UNIT – IV Biochemistry of Respiration

Introduction – Transport of Oxygen by Blood– Oxygen dissociation curve – Factors affecting the dissociation of oxyhemoglobin –Temperature, Electrolytes and Effect of CO_2 – Carboxyhemoglobin – Oxygen toxicity – Transport of Carbon dioxide in blood – Mode of transport of CO_2– Physical and Chemical transport – Chloride shift – Significance of N_2 in respiration – Buffer Systems of the Blood – The hemoglobin buffers – Acid Base balance – Causes of disturbances – Role of kidneys in acid base balance - Hypoxia.

UNIT – V Biochemical Techniques

Introduction – Centrifuge – Principle, types – Hand Centrifuge, High Speed Centrifuge – pH meter – Principle, Electrodes used, Applications – Microscopy: Optical and electron

Microscope – comparison – Ion probe analysis – Electrophoresis – Paper electrophoresis, Gel electrophoresis – Identification of separated components – Applications.

Text Books:

1. Dulsy Fatima, L.M. Narayanan, R.P. Meyyan Pillai, K. Nallasingam, S. Prasanna Kumar and N. Arumugam, *Biochemistry,* Saras Publication, 1996
2. Patricia trueman, *Nutritional Biochemistry* , MJP publisher 2011
3. L.Veerakumari, *Biochemistry* MJP publisher 2010

Book for Reference :

1. Dr. A.C. Deb, *Concepts of Biochemistry*, Books & Allied (P) Ltd., 1999
2. C.B. Powar, G.R.Chatwal, *Biochemistry,* Himalaya Publishing House 2002

SEMESTER I/III			
PART III	**ALLIED CHEMISTRY FOR BIOLOGICAL SCIENCES I**		
Code : 18UCHA11/18UCHA31	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

CO No.	**Course Outcomes** **Upon completion of this course, students will be able to**	**PSOs addressed**
CO 1	Account for the filling of electron in orbitals	PSO1, PSO 3
CO 2	Inscribe the electronic configuration of elements	PSO1, PSO 3
CO 3	Recognize conductors, insulators and semiconductors	PSO1, PSO 3
CO 4	Adapt a method to purify organic compounds	PSO1,PSO 3
CO 5	Estimate the amount of Carbon, Hydrogen and sulphur in a sample	PSO 2, PSO 7
CO 6	Evaluate molecular weight of a chemical compound	PSO 6
CO 7	Correlate the importance of colloids in day to day life	PSO 5
CO 8	Develop a basic understanding of emulsions	PSO 1
CO 9	Classify D-glucose, D-fructose, D-mannose and D-galactose	PSO 1
CO 10	Interconvert glucose into fructose and vice versa	PSO 1
CO 11	Identify protein by their colour reactions	PSO 1
CO 12	Record the steps involved in Hoffmann's exhaustive methylation	PSO 6
CO 13	Explicate isoprene rule and its significance	PSO 1

UNIT-I ATOMIC STRUCTURE AND CHEMICAL BONDING

Quantum numbers and their significance- Paul's exclusion principle – Aufbau principle – Hund's rule – Electronic configuration of elements (atomic number 1 to 36)

Lattice energy – Born-Harber cycle–Factors affecting the dissolution of ionic compounds – M.O. Theory of covalent bond – Bonding, antibonding and non bonding orbital – M.O. Configuration of H_2,N_2 ,O_2-Bond order – Band theory of metallic bond- Conductors, insulators, semi conductors- Hydrogen bonding – types and effects – Vander Wall's London forces.

UNIT-II INTRODUCTION TO ORGANIC CHEMISTRY

Definition and importance-Sources of organic compounds-purification of organic compounds-Crystallisation- Fractional crystallisation-Sublimation-Solvent extraction-Soxhlet extraction

Elemental analysis-qualitative analysis of Carbon, Hydrogen, nitrogen, Sulphur and halogen- estimation of Carbon, Hydrogen, Nitrogen-Calculation of empirical formula-Determination of molecular weight by Victor meyer's method, silver salt, Chloroplatinic salt method- Calculation of molecular formula

UNIT- III – COLLOIDS AND EMULSIONS

Definition- Classification of Colloids –comparison of lyophilic and lyophobic colloidsPreparation of sols-Dispersion method(Bredig's Arc method) –Aggregation method(oxidation , reduction, double decomposition)-Properties – Optical(Tyndall effect) – kinetic(Brownian movement) Electrical (electrical double layer) – Coagulation of colloids – Hardy Schulze law- Hoff meister series – protective colloids – gold number – Gels – classification, preparation , properties(imbibition,synerisis and thixotropy). Emulsion – types and their distinction. Emulsifiers – surfactants– applications of colloids-food, medicine, thixotropic paints, clarification of municipal water, formation of delta.

UNIT-IV BIOMOLECULES AND ENZYMES

Carbohydrates- classification- configurations of D-glucose, D-fructose, D-mannose and D-galactose (structures only) – interconversions of glucose and fructose- interconversions of arabinose and glucose-epimerisation- muta rotation- general study of starch and cellulose

Amino acids-classification-essential amino acids-isolation from proteins- peptide linkage- polypeptides. Proteins- classification- colour reactions- structure

Enzymes—Classification of enzymes-enzyme specificity-factors affecting enzyme reaction-Michaeli's-Menton theory- Inhibition of enzyme action-, competitive, non-competitive and uncompetitive- immobilization of enzymes- industrial and medical application of enzymes.

UNIT-V ALKALOIDS AND TERPENES

Alkaloids: Definition – General methods of structure determination – Hoffmann's exhaustive methylation with conine as example - structure and synthesis of piperline and nicotine.

Terpenes: Definition – Claissification –examples – isoprene rule- general methods of structure determination – structure and synthesis of citral and methol.

BOOKS FOR REFERENCE

1. Arun Bahl and B.S.Bahl,Advanced Organic Chemistry,S.Chand and Company Ltd., Reprint 2005.
2. B.R.Puri, L.R.Sharma,K.C.Kalia, Principles of Inorganic Chemistry, Milestone publishers and distributers, Delhi, 2010.
3. Arun Bahl,B.S.Bahl,G.D.Tuli, Essentials of Physical Chemistry, S.Chand &Company Ltd.,New Delhi,2008.
4. Jerry March, Advanced Organic Chemistry, Reactions Mechanisms and Structure, 4th Edition. 2013
5. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, A Text Book of Organic Chemistry, 2nd Revised Edition, 1998.
6. B.R. Puri. L.R. Sharma, Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2008.
7. M.K.Jain and S.C.Sharma , Modern Organic chemistry, Vishal Publishing Co., 2017-2018

SEMESTER II/IV			
ALLIED CHEMISTRY II	**ALLIED CHEMISTRY FOR BIOLOGICAL SCIENCES**		
Code : 18UCHA21/18UCA41	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

CO No.	**Course Outcomes** **Upon completion of this course, students will be able to**	**PSOs addressed**
CO 1	Differentiate ores and minerals	PSO 1
CO 2	Explain the methods of purification of ores	PSO 1
CO 3	Know the extracting methods, properties and uses of titanium, vanadium, thorium.	PSO 1
CO 4	Explain the preparation of Titanium tetrachloride, Vanadium pentoxide, Thorium nitrate.	PSO1
CO 5	Sketch the preparation of some industrially important organic compounds such as Freon , rayon , polyester , nylon , thiokol Dacron	PSO1, PSO-5
CO 6	Classify fuels and know its industrial uses	PSO1, PSO 4
CO 7	Sterilize water for domestic use	PSO1
CO 8	Basic knowledge of abrasives	PSO1,PSO 7
CO 9	Describe the role of micro and macro nutrients in plant growth	PSO1
CO 10	Identify the implication of biofertilizers on soil	PSO 1,PSO 5
CO 11	Classify fatty acids as saturated, unsaturated, unusual and essential fatty acids.	PSO 1
CO 12	Analyse Cholesterol and know its biochemical significance	PSO 1

UNIT-I METALLURGY

Ores and Minerals- types of ores – methods of ore dressing- roasting –calcination-reduction(aluminothermic)-smelting-purification by electrolysis and ion exchange method-oxidative refining- zone refining- Kroll process- types of furnaces.

Extraction , properties and uses of titanium-vanadium –thorium.

Preparation of Titanium tetrachloride, Vanadium pentoxide and Thorium nitrate

UNIT II– PREPARATION AND USES OF SOME IMPORTANT ORGANIC COMPOUNDS

Preparation and uses of Formalin , choloroform , Freon , rayon , polyester , nylon , thiokol Dacron , silicone, Bakelite , polythene , urethane , Teflon , PVC , BHC

UNIT-III INDUSTRIAL CHEMISTRY

Fuels-classification-gaseous fuels like water gas ,producer gas, liquefied petroleum gas, gobar gas, compressed natural gas.

Water-Hardness of water-temporary and permanent hardness, disadvantages of hard water-softening of hard water-zeolite process, demineralization process and reverse osmosis-sterilisation of water for domestic use by chlorine, ozone and UV light.

Abrasives-Types of electric furnaces-Manufacture and uses of carborundum, calcium carbide, alundum-Industrial uses of lamp black, carbon black, activated charcoal, wood charcoal, animal charcoal, coke, artificial diamond

UNIT IV AGRICULTURAL CHEMISTRY

Fertilizers – role of micro and macro nutrients in plant growth – characteristics and importance of manures – preparation and uses of urea, ammonium sulphate, CAN, DAP, super phosphate and mixed fertilizers – biofertilizers.

Pesticides – insecticides – fungicides – rodenticides – bactericides and herbicides – preparation and uses of lead arsenate, Bordeaux mixture, zineb, epsam and aluminium phosphide.

UNIT-V LIPIDS

Definition and classification of lipids- Types of fatty acids- saturated, unsaturated, unusual and essential fatty acids- triacyl glycerol number-acid number- RM value-acetyl value-Chemistry of phospholipids-lecithin-cephalin- Cholesterol-tests-structure- (structural elucidation not required)-Biochemical functions of cholesterol-physiological significance.

BOOKS FOR REFERENCE

1. Arun Bahl and B.S.Bahl,Advanced Organic Chemistry,S.Chand and Company Ltd., Reprint 2005.
2. B.R.Puri, L.R.Sharma,K.C.Kalia, Principles of Inorganic Chemistry, Milestone publishers and distributers, Delhi, 2010.
3. Arun Bahl,B.S.Bahl,G.D.Tuli, Essentials of Physical Chemistry, S.Chand &Company Ltd.,New Delhi,2008.
4. Jerry March, Advanced Organic Chemistry, Reactions Mechanisms and Structure, 4^{th} Edition. 2013
5. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, A Text Book of Organic Chemistry, 2^{nd} Revised Edition, 1998.
6. B.R. Puri. L.R. Sharma, Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2008.
7. M.K.Jain and S.C.Sharma , Modern Organic chemistry, Vishal Publishing Co., 2017-2018

SEMESTER- I			
Part III Core I	**General Chemistry I**		
Code :18UCHC11	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

Vision:

Inculcating the students the basic principles and concepts in chemistry.

Mission:

- Understand the development of atomic structure and general aspects of inorganic and physical Chemistry.
- Recall the importance of periodic table
- Be familiar with balancing the ionic equations using electron transfer concept.
- Explain the various concepts of acids and bases.

Course Outcome :

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	compare Rutherford and Bohr's model of the atom	1, 2	An
CO-2	predict electronic arrangement in orbits	1 , 2 , 3	Ev
CO-3	understand quantum numbers and to Know the rules for filling up of orbitals	1 ,2 ,3,4	Un
CO-4	explain the periodic properties of the different groups of compounds focusing on production methods	1	Un
CO-5	apply methods of balancing redox reactions	1, 2, 3	Ap
CO-6	know the different concepts of acids and bases	1, 3	Re
CO-7	identify different types of bonding in molecules	3, 4	An
CO-8	sketch Molecular orbital diagram and to apply the VSEPR theory to predict the shape of a molecule or polyatomic ion.	3, 4	Ap

SEMESTER- I			
Part III Core I	**General Chemistry I**		
Code :18UCHC11	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

Unit I Atomic Structure I (Classical Approach)

Introduction-Discharge tube experiment–properties of cathode ray and anode rays-measurement of e/m for electrons- Milikan's oil-drop experiment-sub atomic particles-Rutherford nuclear structure of atom-weakness of Rutherford's model-Mosley's experiment- composition of the nucleus- Bohr's model of the atom – derivation of Bohr's radius and energy of the electron-significance of negative value of energy- drawbacks of Bohr atom-origin of hydrogen spectrum-Ritz combination principle-Sommerfeld extension of Bohr's theory–electronic arrangement in orbits-Langmuir scheme-Bohr-Bury scheme.

Unit II Atomic Structure II (Wave mechanical Approach)

de Broglie equation- Heisenberg's uncertainity principle- Postulates of quantum mechanics – derivation of Schrodinger equation – eigen value – eigen function – significance of ψ and ψ^2 – charge cloud concept –radial and angular function - shapes of orbitals-nodal planes- g and u character. Quantum numbers –rules for filling up of orbitals – Aufbau principle – Hund's rule – Pauli's exclusion principle.

Unit III Periodic Table and Atomic Properties

Modern periodic law- long form of periodic table – its merits and demerits– Abundance of elements- cosmic, terrestrial and relative abundance – classification of elements based on their electronic configuration- Major trends in periodic table – Slater's rule- calculation of effective nuclear charge - periodic properties – trends in ionic and covalent radii , ionization energy, electron affinity and electro negativity –factors affecting ionization energy, electron affinity and electro negativity- scales of electro negativity – Alfred-Rochow's scale – Pauling scale – Mulliken approach – applications of electro negativity

Unit IVConcept of Electron Transfer and Acids and Bases

Oxidation and reduction – electronic Concept – Oxidation number – Calculations of Oxidation number of elements in compounds and ions – Redox reaction – Important Oxidants and their reduction half reaction Fe (II) and Potassium permanganate – important reductants and their oxidation half reaction Fe (II) and Oxalic acid. Methods of balancing redox reactions.

Arrhenius concept – limitations – Bronsted - Lowry concept – protocity (Basicity) of an acid – hydroxity (Acidity) of a base –levelling concept, Lewis concept – relative acidity of Hy molecules. Pearson's principle of hard and soft acids and bases (HSAB). Theories of hardness and softness – applications of HSAB theory(relative stabilities of compounds-occurrence of minerals-course of reactions-poisoning of metal catalysts-rate of chemical reactions).

Unit V Chemical Bonding

Ionic bond, factors influencing the formation of ionic bond- covalent bond – overlapping of atomic orbital – σ bond and π bond – co ordinate covalent bond – Fajan's rule –

valence bond theory – limitations – molecular orbital theory – bonding and anti bonding molecular orbital – energy level – bond order – molecular orbital diagram of homo nuclear diatomic molecules H_2, H_2^+, N_2, $.O_2$, F_2 – molecular orbital diagram of hetero nuclear molecules CO and HF – comparison of VB and MO theory.

Hybridization of sp,sp^2,sp^3,sp^3d, sp^3d^2,and sp^3d^3, with example – salient features of concept of hybridization –VSEPR Theory – postulates –VSEPR theory as applied to molecules of regular geometry ($BeCl_2$, BF_3, CH_4, CCl_4, PCl_5, SF_6 and IF_7) and irregular geometry (NH_3, H_2O, and SF_4) – geometry of ions ($CO_3^{2-}$and ClO_4^-)- Hydrogen bonding – nature, type

Text Books

1. ArunBahl, B.S.Bahl, G.D.Tuli, *Essentials of Physical Chemistry*, S.Chand and Company Ltd.,New Delhi-Revised edition-2008
2. B.R.Puri, L.R.Sharma, K.C.Kalia, *Principles of Physical Chemistry*, Milestone publishers and distributers,Delhi, 2010.
3. R.D.Madan, *Modern Inorganic Chemistry*, S.Chand and Company Ltd.,New Delhi, 2005.

Books for Reference

1. B.R. Puri. L.R. Sharma, Madan S. Pathania, *Principles of Physical Chemistry*, Vishal Publishing Co., 2008.
2. Gurdeep Raja, *Advanced inorganic Chemistry*, Goel Publishing house1986.
3. Sathyaprakash and R.D.Madan, *Advanced Inorganic Chemistry* Volume I, S.Chand and Company, New Delhi.2005

SEMESTER- I			
Part III Core I	**General Chemistry II**		
Code :18UCHC12	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

Vision:

Educate the basic characteristics of organic compounds and organic reaction mechanism

Provide students with a sound education in the fundamental concepts of physical chemistry.

Mission:

- Understand the basic mechanism involved in organic reaction,
- Have an idea about the properties of alkenes, alkynes and aromatic substitution
- Know the importance of halogen compounds
- Have a firm foundation in chemical principles as well as higher level of understanding in organic and Physical Chemistry

Course Outcome :

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	know the nomenclature of different class of organic compounds	1	Re
CO 2	associate polarization of a bond with electronegativity	1, 3	Un
CO 3	discuss nucleophillic and electrophilic groups and their properties, Identify Aromatic, antiaromatic& non- aromatic compounds by Huckel's rule	1,3	Re,Un
CO 4	discriminate terminal & non-terminal alkynes, the acidic nature of acetenylic hydrogen	1,3	An,Un
CO 5	predict the mechanism of aromatic substitution reactions and effect of o,m& p directing group	1,6	Cr
CO 6	interpret the reactions and properties of halogen compounds, Distinguish the nuclear and side chain halogen compounds in aromatic ring, Describe the preparation and properties of halogen derivatives such as vinyl chloride, chloroprene	1,2,5,6,7	Un,An,Ap
CO7	classify and compare the types of colloids, Discuss the preparation methods and properties of colloids	1 , 2 , 5	Un
CO 8	enumerate the importance of colloids in day to day life,Know the experimental methods of determining the colligative properties	1, 3,4	Re

SEMESTER- I			
Part III Core I	**General Chemistry II**		
Code :18UCHC12	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

Unit I Basic Concepts of Organic Chemistry

Classification and nomenclature of organic compounds – Open chain and closed chain compounds- systems of naming organic compounds- rules of IUPAC system of nomenclature branched alkanes, cyclo alkanes – alkenes, alkynes and substituents-compounds having functional groups, poly functional groups

Polar effects – Inductive (+I, –I), Electromeric effect-Resonance/Mesomeric effect (+R, -R, +M, –M) – examples- Hyper conjugation (Baker Nathan effect) and steric effect.

Bond fission – homolytic and heterolytic fission. Reaction intermediates – carbocation, carbanion, free radicals and carbenes – their generation, shapes and stability. Types of reaction-substitution- elimination-addition-definition and examples.

Unit – II Hydrocarbons

Alkenes – Mechanism of addition reaction to alkenes – Markownikoff's rule- Peroxide effect epoxidation – ozonolysis. Dienes Classification –Conjugated dienes – (1,2&1,4 – addition)- Diel's Alder reaction. Alkynes – terminal & non-terminal alkynes – acidic nature of acetenylic hydrogen atom. Aromatic hydrocarbon- Concept & Condition – Huckel's Rule-Aromatic, antiaromatic& non- aromatic compounds – Mechanism of aromatic electrophilic &Nucleophilic substitution reactions- Orientation (Electronic concept) – direct influence of substitution o,m& p directing – Benzyne mechanism.

Unit – III Halogen Compounds

Aliphatic halogen compounds – General methods of preparation, reaction of monohalogen compound- Mechanism of S_N1, S_N2, E1, E2, E1CB reaction – Halogen derivatives- Preparation and properties of Vinyl chloride – Allyl chloride – Preparation & uses of Chloroprene- Aromatic halogen compounds – Preparation and reaction of benzyl chloride – Nuclear & Side chain halogen compounds distinction- relative reactivities of alkyl,aryl, vinyl and allyl halides.

Unit –IV Colloids

Definition- Classification of Colloids –comparison of lyophilic and lyophobic colloids-Preparation of sols-Dispersion method(Bredig's Arc method, peptization) –Aggregation method-(double decomposition, reduction, oxidation, Hydrolysis,Change of solvent)-purification of Sols-Dialysis-Properties – Optical(Tyndall effect) – kinetic(Brownian movement) Electrical (electrical double layer) – Coagulation of colloids – Hardy Schulze law-

Hoffmeister series – protective colloids – gold number - Emulsion – types and their distinction. Emulsifiers – surfactants– Gels – classification, preparation ,properties(imbibition,synerisis and thixotropy). Applications of colloids-food, medicine, thixotropic paints, clarification of municipal water, formation of delta.

Unit –V Colligative Properties

Definition- lowering of Vapour Pressure-- Raoult's Law - measurement of vapour pressure lowering-– Ostwald and Walker's Dynamic method – Elevation of boiling point and its determination- Landsberger –walker method. Depression of freezing point and its determination –Rast's Camphor method – Osmotic pressure- isotonic solution- determination of osmotic pressure-Berkely and Hartley's method. Abnormal molecular masses of electrolytes – Relation between Van't Hoff factor and degree of association and dissociation

Text Books

1. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, *A Text Book of Organic Chemistry*, 2nd Revised Edition, 1998.
2. ArunBahl and B.S.Bahl,*Advanced Organic Chemistry*,S.Chand and Company Ltd., Reprint 2005.
3. ArunBahl,B.S.Bahl,G.D.Tuli, *Essentials of Physical Chemistry,*S.Chand&Company Ltd.,New Delhi,2008.

Books for Reference

1. M.K.Jain and S.C.Sharma ,*Modern Organic Chemistry*, Vishal Publishing Co., 2017-2018.
2. Jerry March, *Advanced Organic Chemistry,* Reactions Mechanisms and Structure, 4th Edition. 2013
3. B.R. Puri. L.R. Sharma, Madan S. Pathania, *Principles of Physical Chemistry,* Vishal Publishing Co., 2008.

SEMESTER II			
Part III Core III Inorganic Chemistry- I			
Code :18UCHC21	**Hrs./Week:4**	**Hrs/ Sem:60**	**Credits:4**

Vision

Transforming knowledge into skill through novel metallurgical techniques and periodic properties

Mission

- Recall the basic methods of purification of ores.
- Explain the general characteristics about s and p block elements.
- Have an insight into the theory of practicals.

Course Outcome:

CO No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO 1	Recall the methods of purification of ores	1	R
CO 2	Identify the electronic configurations of the zero, s, p d-and f-block elements	1, 5	An
CO 3	Explain the general characteristics and diagonal relationship of alkali and alkali earth metalsand discuss the preparation and uses of their compounds	1	Un
CO 4	Describe the extraction and uses of various lanthanide and actinide compounds.	1, 5, 7	Un
CO 5	Derive equations for reactions of compounds of the zero group elements	1, 3	Ap
CO 6	Compare the different shapes of compounds of noble gases	3, 4	Ap
CO 7	Apply the knowledge about interfering radicals, common ion effect and solubility product	1, 4, 7, 8	Ap
CO 8	Communicate the concepts and results of their laboratory experiments clearly and concisely to both chemists and non-chemists through effective writing and oral communication skills	1, 2 7, 8	Ev

SEMESTER II			
Part III Core III Inorganic Chemistry- I			
Code :18UCHC21	**Hrs./Week:4**	**Hrs/ Sem:60**	**Credits:4**

Unit I General Principles of Extraction of Metals

Minerals, ores and gangue -different steps of metallurgy – crushing and grinding of the ore – concentration of the ore – hand picking - gravity separation (Hydraulic Washing) - electromagnetic separation – electrostatic separation – froth flotation process - leaching process – calcination – roasting –difference between calcination and roasting – reduction to free metals – reduction by displacement, thermal decomposition, carbon (smelting), heating in air, an electro positive metal (Gold Schmidt's aluminothermic process) – Kroll's process – flux and slag. Refining of impure metals – thermal refining - distillation, liquation – vapour phase refining- Van Arkel process, carbonyl process- electrolytic process- zone refining process- Elingham diagram- Types of furnaces – Fuel fired – blast, reverberatory and blast furnace – Electric furnace – Arc furnaces and resistance furnace.

Unit II s-block elements

General characteristics of IA and IIA group elements – diagonal relationship of lithium with magnesium – anomalous behaviour of lithium and beryllium – extraction of lithium beryllium. Sodium carbonate and sodium bicarbonate – manufacture – properties and uses – principle of fire extinguisher. Preparation and uses of basic beryllium acetate, epsum salt, gypsum, plaster of Paris and lithopone.

Unit III p-block elements (boron and carbon)

Boron – classification and nomenclature of boron hydrides – preparation, structures and uses of diborane – boron trihalides as Lewis acid – relative strength of boron trihalides.
Lewis acids – oxo compounds of boron – ortho boric acid – preparation, properties and uses
Borax bead test.

Carbides – Classification with examples – Preparation, Properties, uses and Structure of Calcium Carbide, Boron Carbide, Aluminium Carbide and Silicon Carbide – Per carbonates – Preparation, Properties and Structure of Permonocarbonate , perdicarbonates - Preparation, Properties and uses of Carbonyl Chloride and Carbon disulphide -Fullerenes

Unit IV p-block elements (nitrogen and halogens)

Liquid ammonia as a non-aqueous solvent – Preparation, Properties, Uses and Structures of

hydrazine, hydrazoic acid and hydroxylamine – Structure of oxides of Nitrogen(NO, N_2O, NO_2, N_2O_4, N_2O_5)

Pecularities of fluorine, the first element of the group – manufacture of fluorine – etching on glass. hydrides of halogens (hydrogen halides) - formation – physical state - stability – reducing character - nature of bonds – relative strengths of oxide – Born – Haber cycle. Interhalogen compounds – preparation and structure of interhalogen compounds. Pseudohalogen-polyhalides and basic nature of iodine.

Unit V Theory of practicals II

Inorganic quantitative analysis – Primary and secondary standard. Preparation of a primary standard solution. Methods of expressing the strength of the solution – percentage, normality, molarity, molality and formality, volumetric principle – calculation of strength of solution.

Types of titrations –definition - principle andexamples.Acid-base titrations - Redox titrations involving self, internal and external indicators. Complexometric titrations.

Inorganic qualitative analysis - basic idea Types of radicals - simple and interfering radicals Common ion effect and solubility product -definition -applications in inorganic qualitative analysis.

Analysis of anions: Test for sulphide, sulphate, nitrate (brown ring test), bromide and iodide (silver nitrate test),chloride and chromate (chromyl chloride test), oxalate and fluoride (calcium chloride test), borate (ethyl borate test), phosphate (ammoniummolybdate test).

Need for eliminating interfering radicals –methods of elimination of various radicals.

Analysis of Cations : Test for – lead, copper, cadmium, antimony, bismuth, cobalt, nickel, manganese, zinc, barium, strontium, calcium, magnesium and ammonium.

Principles of gravimetric analysis – precipitation methods – conditions of precipitation – co-precipitation and post precipitation

Text books

1. B.R.Puri, L.R.Sharma, K.C.Kalia, *Principles of InorganicChemistry*, Milestone publishers and distributers, Delhi.
2. R.D.Madan, *Modern Inorganic Chemistry,*S.Chand& Co.,Ltd.New Delhi,2005

Books for Reference

1. Gurdeep Raj, *Advanced inorganic Chemistry*, Goel Publishing house1986.
2. Sathyaprakash and R.D.Madan, *Advanced Inorganic Chemistry* Volume I, S.Chand and Company, New Delhi.2005,
3. S. Giri, D.N. Bajpai and O.P. Pandey, *Practical chemistry*, S. Chand and Company Ltd., New Delhi.6th Edition.

SEMESTER- II			
Part III	**Core IV**	**Organic Chemistry-I**	
Code :18UCHC22	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

Vision

Acquire excellence in Organic Chemistry for educating and graduating students

Mission

- Gain knowledge about the importance of ethers, epoxides, hydroxy, nitro and amino compounds
- Appreciate the applications of organometallic compounds in synthesis
- Understand the concepts of tautomerism & molecular rearrangements

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	Prepare alcohols and summarize their properties, Distinguish between 1^o, 2^o& 3^o alcohols, Recognise the differences between the acidities of alcohols and phenols	1,3,6	Ev,An,Re
CO 2	Reframe the alcohol series,Justify the effect of substituent on the acidity of phenols, Know the preparation and uses of thioalcohols	1,2,3,6	Cr,Re
CO 3	Estimate alkoxy group by ziesel's method	1,2	Cr
CO 4	Compare ethers and alcohols, nitroalkanes and alkyl nitrites, Differentiate 1^o, 2^o&3^o amines by reactions	1,3	An
CO 5	Justify the effect of substituent on the basicity of aromatic amines	1,3	Cr
CO 6	Recall the synthetic importance of organometallic compounds, RecogniseFrankland reagent and its significance	1,6,7	Re
CO 7	Illustrate the theory of resonance and tautomerism	1,3	Un
CO 8	Identify the product of rearrangement reactions such as pinacol-pinacolone, Benzil-Benzilic acid, Curtius, Lossen, Favorskiiand Friesrearrrangement.	1,3	An

SEMESTER- II			
Core IV	**Organic Chemistry-I**		
Code :18UCHC22	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

UNIT – I Hydroxy Compounds

Alcohols – General methods of preparation and properties of mono hydric alcohols – distinction between primary, secondary and tertiary alcohols – (Lucas test, catalytic dehydrogenation, oxidation, Victor - Meyer's test)-Interconversion of primary, secondary and tertiary alcohols. Ascent and descent in the series of alcohols-trihydric alcohol-Glycerol-Preparation, properties – derivatives of glycerol- nitroglycerine-blasting gelatin- Cordite and dynamite-Phenols – classification with example – effect of substitutent on the acidity of phenols – Mechanism of Kolbe's reaction, Riemer- Tiemann- test for phenol – Preparation & uses of Nitrophenol (picric acid only)- Dihydric phenol – Catechol, Resorcinol &Quinol –Thioalcohols-ethyl mercapton.

UNIT-II Ethers and Epoxides

Classification- Preparation by Williamson's synthesis and alkoxymercuration-demercuration methods.- Ziesel's method for the estimation of alkoxy groups-comparison of ethers and alcohols- Phenolic ethers- preparation and properties of anisole, guaicol-

Ethers- ethers of industrial importance – Preparation properties and uses of oxirane, and dioxane

UNIT – III Nitro Compounds and Amino Compounds

Preparation and reaction of nitrile and isonitrile – distinction between nitroalkane and alkyl nitrites – reduction reaction of nitroalkane – NEF reaction.

Preparation of o, p,m-dinitrobenzene- trinitrobenzene.

Aliphatic amine – separation of mixture of amine –(Hoffmann, Heisenberg method)-Comparison of 1^o, 2^o&3^o amines- Mustard oil reaction- Mannich reaction – ascending and descending of amines.

Aromatic amines – effect of substitutents on the basicity of aromatic amines-preparation and properties of phenylenediamine

Diazonium compounds- Preparation of diazonium chloride and its synthetic applications.

UNIT -IV Organometallic Compounds

Definition – examples- Organomagnesium compound (Alkyl magnesium halides) – preparation, general characteristics and synthetic applications (Nucleophilic substitution reactions , addition reaction and miscellaneous reactions.) Organo zinc compounds(Diethyl

Zinc-Frankland reagent)- preparation, properties and synthetic applications (Nucleophilic substitution and addition reactions). Organo Lithium compounds (alkyl lithium) –preparation and synthetic applications- Organo Silicon compounds- Preparations and reactions- Preparation and uses of TEL.

UNIT – V Tautomerismand Molecular Rearrangements

Resonance – definition – resonance energy – resonance theory.

Tautomerism – Definition – Types of tautomerism – Keto-enol, Nitro -acinitro, Lactam - lactim, p-Nitrosophenol- Quinone monoxime and amido-imidotautomerism.

Molecular Rearrangement

a) Rearrangement involving migration to electron deficient carbon- Pinacol-pinacolone rearrangement, Benzil-benzilic acid rearrangement
b) Rearrangement involving migration to electro deficient nitrogen-Curtius rearrangement, Lossen rearrangement
c) Rearrangement involving carbanion intermediate – Favorskiirearrrangement
d) Rearrangement involving migration from oxygen to aromatic ring-Fries rearrangement

Text Books

1. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, *A Text Book of Organic Chemistry,* 2nd Revised Edition, 1998.
2. ArunBahl and B.S.Bahl, *Advanced Organic Chemistry,* S.Chand and Company Ltd., Reprint 2005.
3. M.K.Jain and S.C.Sharma , *Modern Organic chemistry,* Vishal Publishing Co., 2017-2018

Books for Reference:

1. Jerry March, Advanced Organic Chemistry, Reactions Mechanisms and Structure, 4th Edition. 2013
2. I.L Finar, *Organic Chemistry,* Volume 1, The Fundamental Principles, 6th Edition, 1973.

SEMESTER I			
Part III	**ALLIED CHEMISTRY FOR PHYSICAL SCIENCE -I**		
Code :18UCPA11	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

CO No.	**Course Outcomes** **Upon completion of this course, students will be able to**	**PSOs addressed**
CO 1	Account for the filling of electron in orbitals	PSO1, PSO 4
CO 2	Inscribe the electronic configuration of elements	PSO1, PSO 4
CO 3	Recognize conductors, insulators and semiconductors	PSO1, PSO 4
CO 4	Adapt a method to purify organic compounds	PSO1,PSO 4
CO 5	Estimate the amount of Carbon, Hydrogen and sulphur in a sample	PSO 3 , PSO 7
CO 6	Evaluate molecular weight of a chemical compound	PSO 1, PSO 2
CO 7	Correlate the importance of colloids in day to day life	PSO 1 , PSO2 , PSO 3
CO8	Develop a basic understanding of emulsions	PSO 1 , PSO2 , PSO 3
CO 9	Understand different types of molecular velocities and its significance	PSO-1 , PSO 4
CO10	Know basic terms associated with gaseous state and an insight into degrees of freedom and law of equipartition of energies	PSO-1.PSO-2, PSO-3
CO11	To be familiar with **f**undamental particles of nuclear isotopes	PSO1, PSO-3,PSO 4
CO12	To learn the basic principles behind nuclear fusion and fission and enumerate its application	PSO1, PSO 2

Unit I ATOMIC STRUCTURE AND CHEMICAL BONDING

Quantum numbers and their significance- Paul's exclusion principle – Aufbau principle – Hund's rule – Electronic configuration of elements (atomic number 1 to 36)

Lattice energy – Born-Harber cycle–Factors affecting the dissolution of ionic compounds – M.O. Theory of covalent bond – Bonding, antibonding and non bonding orbital – M.O. Configuration of H_2,N_2 ,O_2-Bond order – Band theory of metallic bond- Conductors, insulators, semi conductors- Hydrogen bonding – types and effects – Vander Wall's London forces.

UNIT-II INTRODUCTION TO ORGANIC CHEMISTRY

Definition and importance-Sources of organic compounds-purification of organic compounds-Crystallisation- Fractional crystallisation-Sublimation-Solvent extraction-Soxhlet extraction

Elemental analysis-qualitative analysis of Carbon, Hydrogen, nitrogen, Sulphur and halogen- estimation of Carbon, Hydrogen, Nitrogen-Calculation of empirical formula-Determination of molecular weight by Victor meyer's method, silver salt, Chloroplatinic salt method- Calculation of molecular formula

UNIT- III – COLLOIDS AND EMULSIONS

Definition- Classification of Colloids –comparison of lyophilic and lyophobic colloidsPreparation of sols-Dispersion method(Bredig's Arc method) –Aggregation method(oxidation , reduction, double decomposition)-Properties – Optical(Tyndall effect) – kinetic(Brownian movement) Electrical (electrical double layer) – Coagulation of colloids – Hardy Schulze law- Hoff meister series – protective colloids – gold number – Gels – classification, preparation , properties(imbibition,synerisis and thixotropy). Emulsion – types and their distinction. Emulsifiers – surfactants– applications of colloids-food, medicine, thixotropic paints, clarification of municipal water, formation of delta.

Unit IV GASEOUS STATE

Maxwell's law of distribution of velocities (no derivation) –types of molecular velocities – graphical representation and its significance- Collision diameter – collision number – collision frequency – mean free path – viscosity of gases-calculation mean free path and collision diameter from Chapman equation-law of equipartition of energies- Degrees of freedom-molecular basis of heat capacities.

Unit V NUCLEAR CHEMISTRY

Fundamental particles of nuclear isotopes, isobars,isotones and isomers-Differences between chemical reactions and nuclear reactions-fusion and fission and its applications —radioactive series ,group displacement law- mass defect- Applications of radio isotopes-carbon dating-rock and medicinal applications.

BOOKS FOR REFERENCE

1. Arun Bahl and B.S.Bahl,Advanced Organic Chemistry,S.Chand and Company Ltd., Reprint 2005.
2. B.R.Puri, L.R.Sharma,K.C.Kalia, Principles of Inorganic Chemistry, Milestone publishers and distributers, Delhi, 2010.
3. Arun Bahl,B.S.Bahl,G.D.Tuli, Essentials of Physical Chemistry, S.Chand &Company Ltd.,New Delhi,2008.
4. Jerry March, Advanced Organic Chemistry, Reactions Mechanisms and Structure, 4th Edition. 2013
5. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, A Text Book of Organic Chemistry, 2nd Revised Edition, 1998.
6. B.R. Puri. L.R. Sharma, Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2008.
7. M.K.Jain and S.C.Sharma , Modern Organic chemistry, Vishal Publishing Co., 2017-2018

SEMESTER II			
PART III	**ALLIED CHEMISTRY FOR PHYSICAL SCIENCE - II**		
Code :18UCPA21	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

CO No.	**Course Outcomes** **Upon completion of this course, students will be able to**	**PSOs addressed**
CO 1	Differentiate ores and minerals	PSO-1
CO 2	Explain the methods of purification of ores	PSO1
CO 3	Know the extracting methods , properties and uses of titanium, vanadium ,thorium.	PSO-1
CO 4	Explain the preparation of Titanium tetrachloride, Vanadiumpentoxide, Thorium nitrate.	PSO1
CO 5	Sketch the preparation of some industrially important organic compounds such as Freon , rayon , polyester , nylon , thiokol Dacron	PSO-1, PSO-5
CO 6	Classify fuels and know its industrial uses	PSO1, PSO 4
CO 7	Sterilize water for domestic use	PSO1, PSO 4
CO 8	Basic knowledge of abrasives	PSO-1,PSO-4
CO 9	Know the principles of volumetric analysis	PSO-1,PSO-3 , PSO-4
CO 10	Learn about error analysis	PSO-1
CO 11	Principles and applications of column, paper, thin layer and lon exchange chromatography	PSO-1, PSO-3
CO 12	Knowledge about the basic concepts of photochemistry and its laws	PSO 1,PSO-3
CO 13	Identify different types of conductance and aware of the importance of pH in biological system	PSO 1, PSO3

CO 14	Have an idea about corrosion and its prevention	PSO 1, PSO 4

UNIT-I METALLURGY

Ores and Minerals- types of ores – methods of ore dressing- roasting –calcination-reduction(aluminothermic)-smelting-purification by electrolysis and ion exchange method-oxidative refining- zone refining- Kroll process- types of furnaces.

Extraction , properties and uses of titanium-vanadium –thorium.

Preparation of Titanium tetrachloride, Vanadium pentoxide and Thorium nitrate

UNIT – II PREPARATION AND USES SOME ORGANIC COMPOUNDS

Preparation and uses of Formalin , choloroform , Freon , rayon , polyester , nylon , thiokol Dacron , silicone, Bakelite , polythene , urethane , Teflon , PVC , BHC

UNIT-III INDUSTRIAL CHEMISTRY

Fuels-classification-gaseous fuels like water gas ,producer gas, liquefied petroleum gas, gobar gas, compressed natural gas.

Water-Hardness of water-temporary and permanent hardness, disadvantages of hard water-softening of hard water-zeolite process, demineralization process and reverse osmosis-sterilisation of water for domestic use by chlorine, ozone and UV light.

Abrasives-Types of electric furnaces-Manufacture and uses of carborundum, calcium carbide, alundum-Industrial uses of lamp black, carbon black, activated charcoal, wood charcoal, animal charcoal, coke, artificial diamond

UNIT-IV ANALYTICAL CHEMISTRY

Introduction to Qualitative and Quantitative analysis Principles of volumetric analysis – Error analysis –types of errors minimizing errors – accuracy and precision – Methods of expressing precision, mean, median, mean deviation, standard deviation and confidence limit.

Chromatographic separations- Principles and applications of column, paper, thin layer and lon exchange

UNIT V PHOTOCHEMISTRY AND ELECTROCHEMISTRY.

Photochemistry-Introduction to photochernistry-Statement of Grothus —Draper law, Beer-Lambert law -Stark Einstein's law, Quantum yield-Photosynthesis — Phosphorescence-Fluorescence- Chemiluminescence- Definition with examples.

Electrochemistry-Specific conductance-ionic conductance-molar conductance — equivalent conductance-Definition of pH and its determination by colorimetric method- Buffer solution-Henderson's Equation-Applications of pH and buffer in biological systems-Galvanic cells —EMF and electrode potential-reference electrodes- Electrochernical series and its Applications-different types of cells- primary cell , secondary cell and fuel cells.

BOOKS FOR REFERENCE

1. Arun Bahl and B.S.Bahl,Advanced Organic Chemistry,S.Chand and Company Ltd., Reprint 2005.
2. B.R.Puri, L.R.Sharma,K.C.Kalia, Principles of Inorganic Chemistry, Milestone publishers and distributers, Delhi, 2010.
3. Arun Bahl,B.S.Bahl,G.D.Tuli, Essentials of Physical Chemistry, S.Chand &Company Ltd.,New Delhi,2008.
4. Jerry March, Advanced Organic Chemistry, Reactions Mechanisms and Structure, 4th Edition. 2013
5. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, A Text Book of Organic Chemistry, 2nd Revised Edition, 1998.
6. B.R. Puri. L.R. Sharma, Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2008.

7. M.K.Jain and S.C.Sharma , Modern Organic chemistry, Vishal Publishing Co., 2017-2018