C. ABDUL HAKEEM COLLEGE

Melvisharam, Vellore Dist- 632509, TN, India

Telephone : +91 4172 266487, 266987 | **Fax :** +91 4172 266587

Web : www.hakeemcollege.com

SUBJECT LIST

Course B.Sc - Chemistry

Batch 2015-2016

Total Credits 150

S.No	E/D	Cate.	Type	S. Code	S. Name	I.Ma	I.Mi	E.Ma	E.Mi	P M	Cr	Pt
Semester - 1					**Subject Count - 5**			**Total Credits - 20**				
1	E	Theory	Language	U15FTA101	Tamil - I	25	0	75	30	40	4	I
2	E	Theory	Language	U15FUR101	Urdu - I	25	0	75	30	40	4	I
3	E	Theory	English	U15FEN101	English - I	25	0	75	30	40	4	II
4	E	Theory	Main	U15MCH101	General Chemistry - I	25	0	75	30	40	6	III
5	E	Theory	Allied	U15APH101	Physics - I (Allied)	15	0	60	24	30	4	III
6	E	Theory	Environmental Studies	U15CES101	Environmental Studies	10	0	40	16	20	2	IV
Semester - 2					**Subject Count - 8**			**Total Credits - 25**				
1	E	Theory	Language	U15FTA201	Tamil - II	25	0	75	30	40	4	I
2	E	Theory	Language	U15FUR201	Urdu - II	25	0	75	30	40	4	I
3	E	Theory	English	U15FEN201	English - II	25	0	75	30	40	4	II
4	E	Theory	Main	U15MCH201	General Chemistry - II	25	0	75	30	40	5	III
5	E	Practical	Main	U15MCHP21	Practical - I Volumetric Analysis	40	0	60	24	40	3	III
6	E	Theory	Allied	U15APH201	Physics - II (Allied)	15	0	60	24	30	4	III
7	E	Theory	Value Education	U15CVE201	Value Education	10	0	40	16	20	2	IV
8	E	Theory	Soft Skills	U15CSS201	Soft Skills	10	0	40	16	20	1	IV
9	E	Practical	Allied	U15APHP21	Allied Practical - Physics	10	0	40	16	20	2	III

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S.No	E/D	Cate.	Type	S. Code	S. Name	I.Ma	I.Mi	E.Ma	E.Mi	P M	Cr	Pt
Semester - 3					**Subject Count - 6**			**Total Credits - 24**				
1	E	Theory	Language	U15FUR301	Urdu - III	25	0	75	30	40	4	I
2	E	Theory	Language	U15FTA301	Tamil - III	25	0	75	30	40	4	I
3	E	Theory	English	U15FEN301	English - III	25	0	75	30	40	4	II
4	E	Theory	Main	U15MCH301	General Chemistry - III	25	0	75	30	40	3	III
5	E	Theory	Allied Elective	U15ACH302	Biochemistry - I (Allied)	15	0	60	24	30	4	III
6	E	Theory	Allied Elective	U15AMA301	Mathematics - I (Allied)	25	0	75	30	40	4	III
7	E	Theory	Skill Based	U15SCH301	Water Treatment and Analysis (SBS - I)	15	0	60	24	30	3	IV
8	E	Theory	Non Major	U15NUR301	Functional Urdu - I (NME - I)	10	0	40	16	20	2	IV
9	E	Theory	Non Major	U15NTA301	Basic Tamil - I (NME - I)	10	0	40	16	20	2	IV
10	E	Theory	Non Major	U15NHS301	Indian National Movement (NME - I)	10	0	40	16	20	2	IV
11	E	Theory	Non Major	U15NKS301	Services Marketing (NME - I)	10	0	40	16	20	2	IV
12	E	Theory	Non Major	U15NZL301	Poultry Farming (NME - I)	10	0	40	16	20	2	IV
13	E	Theory	Non Major	U15NCM301	Elements of Accountancy (NME - I)	10	0	40	16	20	2	IV
Semester - 4					**Subject Count - 7**			**Total Credits - 31**				
1	E	Theory	Language	U15FUR401	Urdu - IV	25	0	75	30	40	4	I
2	E	Theory	Language	U15FTA401	Tamil - IV	25	0	75	30	40	4	I
3	E	Theory	English	U15FEN401	English - IV	25	0	75	30	40	4	II
4	E	Theory	Main	U15MCH401	General Chemistry - IV	25	0	75	30	40	3	III
5	E	Theory	Allied Elective	U15ACH402	Biochemistry - II (Allied)	15	0	60	24	30	4	III
6	E	Theory	Allied Elective	U15AMA401	Mathematics - II (Allied)	25	0	75	30	40	6	III
7	E	Theory	Skill Based	U15SCH401	Food Chemistry (SBS - II)	15	0	60	24	30	3	IV
8	E	Practical	Main	U15MCHP41	Practical - II Inorganic Qualitative Analysis and Preparation	40	0	60	24	40	3	III
9	E	Practical	Allied Elective	U15ACHP42	Allied Practical - II Biochemistry	10	0	40	16	20	2	III
10	E	Theory	Non Major	U15NUR401	Functional Urdu - II (NME - II)	10	0	40	16	20	2	IV
11	E	Theory	Non Major	U15NTA401	Basic Tamil - II (NME - II)	10	0	40	16	20	2	IV
12	E	Theory	Non Major	U15NHS401	Civil Services and Other Competitive Examinations (NME - II)	10	0	40	16	20	2	IV
13	E	Theory	Non Major	U15NKS401	Project Management (NME - II)	10	0	40	16	20	2	IV
14	E	Theory	Non Major	U15NMA401	Foundation Mathematics foe Competetive Examinations (NME - II)	10	0	40	16	20	2	IV
15	E	Theory	Non Major	U15NZL401	Sericulture (NME - II)	10	0	40	16	20	2	IV
16	E	Theory	Non Major	U15NCM401	General Commercial Knowledge (NME - II)	10	0	40	16	20	2	IV

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SUBJECT LIST

Course B.Sc - Chemistry

Batch 2015-2016

Total Credits 150

S.No	E/D	Cate.	Type	S. Code	S. Name	I.Ma	I.Mi	E.Ma	E.Mi	P M	Cr	Pt
Semester - 5					**Subject Count - 5**			**Total Credits - 21**				
1	E	Theory	Main	U15MCH501	Inorganic Chemistry - I	25	0	75	30	40	5	III
2	E	Theory	Main	U15MCH502	Organic Chemistry - I	25	0	75	30	40	5	III
3	E	Theory	Main	U15MCH503	Physical Chemistry - I	25	0	75	30	40	5	III
4	E	Theory	Elective	U15ECH501	Spectroscopy - I (Elective - I)	25	0	75	30	40	3	III
5	E	Theory	Skill Based	U15SCH501	Data Analysis and Separation Technique (SBS - III)	15	0	60	24	30	3	IV
Semester - 6					**Subject Count - 10**			**Total Credits - 29**				
1	E	Theory	Main	U15MCH601	Inorganic Chemistry - II	25	0	75	30	40	4	III
2	E	Theory	Main	U15MCH602	Organic Chemistry - II	25	0	75	30	40	3	III
3	E	Theory	Main	U15MCH603	Physical Chemistry - II	25	0	75	30	40	3	III
4	E	Theory	Elective	U15ECH601	Polymer Chemistry (Elective - II)	25	0	75	30	40	3	III
5	E	Theory	Elective	U15ECH602	Spectroscopy - II (Elective - III)	25	0	75	30	40	3	III
6	E	Theory	Skill Based	U15SCH601	Agriculture and Leather Chemistry (SBS - IV)	15	0	60	24	30	3	IV
7	E	Practical	Main	U15MCHP61	Practical - III Gravimetric Estimation	40	0	60	24	30	3	III
8	E	Practical	Main	U15MCHP62	Practical - IV Organic Qualitative Analysis and Preparations	40	0	60	24	30	3	III
9	E	Practical	Main	U15MCHP63	Practical - V Physical Chemistry Experiments	40	0	60	24	30	3	III
10	E	Theory	Extension Activities	U15CEA601	Extension Activities	0	0	50	20	20	1	V

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2015-2016

Year: I Year Subject Code : U15MCH101 Semester : I

Major-1 Title: **General Chemistry - I**

Credits: 6 Max. Marks. 75

OBJECTIVE:

Basic concepts regarding atomic structure, periodic properties, bonding concepts, ionic bond, VSEPR and MO theories, nomenclature of organic compounds, hybridization, reaction intermediates, quantum theory, gases, and principles of volumetric analysis, related problems, and applications wherever necessary are to be taught for I-Semester.

UNIT – I

1.1 Atomic structure - Quantum numbers n, l, m and s - Pauli Exclusion Principle - Hund's rule of maximum multiplicity - Aufbau's principle - Electronic configurations of elements - Stability of half-filled and completely filled orbitals.

1.2 Classification of elements – General characteristics of s, p, d and f block elements - Periodicity of properties-

1.3 Definition and periodicity of the following properties- Atomic radii,Ionic radii, Ionization potential, Electron affinity and Electronegativity.

UNIT –II

2.1. Classification of organic compounds – Nomenclature of organic compounds – Functional groups – Homologous series – IUPAC recommendations for naming simple aliphatic – alicylic and aromatic compounds – Polyfunctional compounds – Heterocyclic compounds.

2.2. Basic concepts of bonding in organic chemistry – Hybridisation — geometry of molecules – methane, ethane, ethylene, acetylene and benzene. Electron displacement effects – inductive –electromeric – resonance – hyperconjugation and steric effects.

2.3. Alkanes – Methods of preparation of alkanes –Mechanism of free radical substitution in alkanes. Cycloalkanes – preparation using Wurtz's reaction – Dieckmann's ring closure and reduction of aromatic hydrocarbons – substitution and ring opening reactions – Rearrangements.

UNIT – III

3.1 Quantum chemistry - Planck's Quantum theory - photoelectric effect - Compton effect - Wave mechanical concept of the atom - de Broglie's relationship –Heisenberg's uncertainty principle. Schrodinger wave equation (without derivation) - significance of wave functions, ψ and ψ^2.

3.2 Gaseous state - Kinetic gas equation - derivation - Gas laws from the kinetic gas equation - Types of velocities - mean, rms, most probable velocities - Calculation of molecular velocities.

3.3 Maxwell's distribution of molecular velocities (no derivation) - Effect of temperature on velocity distribution. Equipartition of energy - heat capacity and Virial equation of state.

UNIT – IV

4.1 Ionic bond –Lattice Energy – Born-Haber cycle. Fajan's rules - Characteristics of electrovalent compounds - Valence bond theory - General properties - Polarity of bonds - Orbital overlap - Bond lengths and bond energies - hybridization - sigma and pi bonds.

4.2 VSEPR theory - geometries of ClF_3, PCl_5, IF_7, and XeF_6 molecules - partial ionic character of covalent bond - percentage of ionic character.

4.3 Molecular Orbital theory - Bonding, anti-bonding orbitals - MO diagrams of H_2, He_2, O_2, O_2^+, O_2^- and CO - Bond order - stability and magnetic property of the molecules - Comparison of VB and MO theories.

UNIT – V

5.1 Definitions of molarity - normality - molality and mole fraction - their calculations - definition and examples for primary and secondary standards. Calculation of equivalent weight of acid, base, oxidizing agent, reducing agent and salt.

5.2 Principles of volumetric analysis. Theories of acid-base, redox, complexometric, iodometric and iodimetric titrations.

5.3 Theories of indicators - acid-base indicators-choice of indicators - redox - metal ion and adsorption indicators.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2015-2016

Year: I Year Subject Code : U15MCH201 Semester : II

Major -2 Title: **General Chemistry - II**

Credits: 5 Max. Marks. 75

OBJECTIVES:

Basic knowledge on alkanes, alkenes, alkynes, cyclo alkanes, dienes, thermochemistry, basic concepts in thermodynamics, first law, derivation of equations, related problems, s and p block elements, group study, mechanism, applications wherever necessary are to be taught for II-Semester.

UNIT-I

1.1 Alkali metals - Li, Na, K, Rb and Cs - Occurrence - Comparative study of with respect to elements - oxides, halides, hydroxides and carbonates - Exceptional property of Lithium - Diagonal relationship of Li with Mg.

1.2 Alkaline earth metals - Be, Mg, Ca, Sr and Ba - Occurrence - comparative study of the elements with respect to oxides, hydroxides, halides, sulphates and carbonates - Exceptional property of Beryllium - Diagonal relationship of Be with Al - Comparison of alkaline earth metals with alkali metals –

1.3 p-block elements - Boron family - group discussion - anomalous behavior of Boron - diagonal relationship between B and Si - Electron deficiency and electron acceptor behaviour of Boron trihalides– bondingin diborane.

UNIT-II

2.1 Alkenes –Preparation and properties of alkenes – Electrophilic and free radical addition.Addition reactions of alkenes with mechanism- addition of hydrogen, halogens, hydrogen halide (Markownikoff's rule), hydrogen bromide (peroxide effect), hydroboration, ozonolysis, hydroxylation with $KMnO_4$.

2.2 Alkynes – Acidity of alkynes – Addition of hydrogen – Hydroboration – Hydrohalogenation – Addition of hypohalous acid Hydration – Addition of water with $HgSO_4$ catalyst.

2.3 Formation of acetylides – alkylation of alkynes with mechanism – oxidation with $KMnO_4$ – ozonolysis –Polymerisation to benzene – Oxidative coupling – isomerization.

UNIT-II

3.1 Thermodynamics - Definition and explanation of terms - System, boundary, surroundings - Homogeneous and heterogeneous system – Types of system - Intensive and extensive properties - State of a system - Independent state variables - Dependent state variables - Thermodynamic functions - State and path functions.

3.2 Thermodynamic processes - types of processes - cyclic - reversible - irreversible - isothermal - adiabatic. Exact and inexact differentials - concept of heat and work - Zeroth law of thermodynamics.

3.3 First law of thermodynamics - statement and equation - Cp, Cv relationship - calculation of W, Q, ΔE and ΔH for the expansion of ideal gases under reversible - isothermal and adiabatic conditions.

UNIT-IV

4.1 Bayer's strain theory - theory of strainless rings –Chemistry of decalin – Dienes – stability of dienes – conjugated, isolated and cumulative.

4.2 Cleavage of bonds - Homolytic and Heterolytic fission of carbon-carbon bond - Methods for determining reaction mechanism - Reaction intermediates - Structure and stability of Carbocations - Carboanions and Free radicals.

4.3 Examples of 1:2 and 1:4 addition with mechanism –polymerization of dienes – Synthesis of dienes – 1:3 butadiene, Isoprene, chloroprene and allenes.

UNIT-V

5.1 Liquid crystals - classification and molecular arrangements. Surface tension - effect of temperature. Parachor - definition and applications only. Viscosity, Coefficient of viscosity - effect of temperature and pressure.

5.2 Solid State - Crystal lattices - Laws of crystallography - Elements of symmetry - crystal systems - unit cell - space lattice - Bravais' lattices - structure of NaCl - structure of CsCl - Miller's indices.

5.3 Thermochemistry - Heat of reaction - Exothermic and endothermic reaction. Thermochemical equations - bond dissociation energy. Variation of heat of a reaction with temperature - Kirchoff's equation and its significance.

Books for Study:

1. R.D.Madan, Modern Inorganic Chemistry, 2nd Edition, S. Chand & Co, Reprint 2004.
2. B.SBahl and ArunBahl,Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2008.
3. B. R. Puri, L. R Sharma and M.SPathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008.

Books for Reference:

1. P.L Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 20th Edition, Sultan Chand & Sons, Reprint 2001.
2. P.L Soni and H.M Chawla, Textbook of Organic Chemistry, 25th Revised Edition, Sultan Chand & Sons, 1992.
3. K.S Tewari and M.K Vishnoi, A Textbook of Organic Chemistry, 3rd Edition, Vikas Publishing House Pvt. Ltd, 2006.
4. M.K Jain and S.C Sharma, Modern Organic Chemistry, Vishal Publishing Co, 2004.
5. P.L Soni, O.P Dharmarha and U.N Dash, Textbook of Physical Chemistry, 21st Revised Edition, S. Chand & Co, Reprint 2000.
6. P.K Mani and A.O Thomas, A Textbook of Practical Chemistry, Scientific Publication, 1973.
7. O.P. Pandey, D. N. Bajpai and S.Giri, Practical Chemistry, 8th Edition, S. Chand & Co, 2001.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2016-2017

Year:	II Year	Subject Code :	U15MCH301	Semester :	III
Major - 3	Title:	**General Chemistry - III**			
Credits:	3			Max. Marks. 75	

OBJECTIVES

Basic concepts regarding principles of inorganic analysis and applications of qualitative analysis, solvents, p-block elements, group study, aromaticity, electrophilic and nucleophilic substitution reactions, elimination reactions, mechanism, second law of thermodynamics, derivation of equations, related problems, applications wherever necessary.

UNIT-I

1.1 Principles of inorganic qualitative analysis: Acid-base equilibria – common ion effect – solubility product and their applications in qualitative analysis.

1.2 Types of reactions: Flame test, complexation, masking and demasking, sodium carbonate extract, separation of cations into groups.

1.3 Spot test: Experimental methods and advantages of spot test reagents - Aluminon, Cupferon, DMG, Magneson, Alizarin and Nessler's reagent.

UNIT-II

2.1 Carbon family - Comparative study of elements - valencies - oxides - halides - hydrides - oxyacids - catenation - Comparison of properties of carbon and silicon.

2.2 Nitrogen family - Comparative study of N, P, As, Sb and Bi - elements - oxides - oxyacids - halides and hydrides.

2.3 Oxygen family - Comparative study of O, S, Se and Te-elements - catenation - oxides-halides - hydrides and oxy acids - anomalous behaviour of oxygen.

UNIT-III

3.1 Aromaticity - Modern theory of aromaticity - Huckel's (4n +2) rule and its simple applications to benzenoid and non benzenoid systems.

3.2 Electrophilic substitution reactions in aromatic compounds - mechanisms of nitration - halogenation - sulphonation - Friedel-Craft's acylation and alkylation.

3.3 Aliphatic nucleophilic substitutions - Mechanisms of S_N1, S_N2 and S_Ni reactions - effects of structure of substrate - solvent - nucleophile and leaving groups.

UNIT-IV

4.1 Elimination reactions - mechanisms of E_1 and E_2 reactions - Hoffmann and Saytzeff's rules - Cis and trans eliminations.

4.2 Aromatic nucleophilic substitutions - Unimolecular nucleophilic substitution - mechanism - Bimolecular nucleophilic substitution - mechanism.

4.3 Directive influence - Orientation - Ortho/para ratio - Nuclear and side chain halogenations.

UNIT-V

5.1 Second law of thermodynamics - Need for the II law - Spontaneous process - Criteria of spontaneity - different forms of statements of the second law - Cyclic process - Heat engines.

5.2 Carnot's cycle - Efficiency - Carnot's theorem (statement only) - Concept of entropy - Definition and mathematical statement - Randomness and entropy.

5.3 Standard entropy -Derivation of entropy from Carnot cycle - entropy change of an ideal gas during isothermal process - Entropy changes in cyclic - reversible and irreversible processes.

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Syllabus for B.Sc., Chemistry effective from the year 2015-2016

Year:	II Year	Subject Code :	U15ACH302	Semester :	III
Allied - 3	Title:	**Biochemistry - I (Allied)**			
Credits:	4			Max. Marks. 60	

UNIT- I:

Chemistry of Carbohydrates Definition and Classification of carbohydrates, linear and ring forms (Haworth formula) for monosaccharides for glucose and fructose. Disaccharides- Sucrose and lactose. Physical properties-mutarotation and kiliani cynohydrin synthesis. Chemical properties-Oxidation, reduction, osazone formation. Disaccharide- sucrose and lactose-occurrence, structure; Physical and chemical properties. Polysaccharides: starch and cellulose-occurrence, structure, physical and chemical properties.

UNIT -II:

Chemistry of aminoacids: Definition and classification of aminoacids, common properties of aminoacids, amphoteric nature, isoelectric point, isoelectric pH and Zwitter ion. Reaction with ninhydrin, 1-fluoro-2, 4-dinitronitrobenzene (FDNB) and Seig Fried's carbamino reaction.

UNIT III:

Chemistry of Proteins: Classifications–shape and size, solubility and physical properties and functional properties: Physical properties: salting in and salting out, denaturation, Peptide bond. Structure of Protein: Primary, secondary, tertiary and quaternary..N-Terminal determination-Edman's and Dansyl chloride methods. C-terminal determination –Van-Slyke reaction, Phosgene reaction.

UNIT IV:

Chemistry of Lipids: Definition, classification and functions. Occurrence, chemistry and biological functions- Simple Lipids: tertiary compounds lipids(e.g. Phospholipids),derived lipids: Steroids (e.g. cholesterol). Saturated fatty acids: arachidic acid. Unsaturated fatty acid: linolenic acids. Physical property-emulsification. Chemical properties-saponification, rancidity, definition of acid number, saponification number, iodine number and Reichert-Meissl Number. Bile Acid and bile salt functions.

UNIT V:

Chemistry of Nucleic acids: Definition, nucleoside, nucleotide and polynucleotide. Double helical model of DNA and its biological functions. Structure of RNA: tRNA, mRNA and rRNA-occurrence, chemistry and its biological functions. Differences between DNA and RNA properties: cot curve and cot value, Tm, hypo and hyper chromicity.

Reference:

1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan worth publishers.
2. Harper – s Biochemistry-Robert K. Murray, Daryl K. Grammer, McGraw Hill, Lange Medical books.25th edition.
3. Fundamentals of Biochemistry-J. L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.
4. Biochemistry Dr. Amit Krishna De, S. Chand & Co., Ltd.
5. Biochemistry Dr. Ambika Shanmugam, Published by Author.
6. Biomolecules – C. Kannan, MJP Publishers, Chennai-5.

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Syllabus for B.Sc., Chemistry effective from the year 2016-2017

Year:	II Year	Subject Code :	U15SCH301	Semester :	III
Skill Based -1	Title:	**Water Treatment and Analysis (SBS - I)**			
Credits:	3			Max. Marks. 60	

Objective:

To learn about various methods of treatment and analysis of water.

UNIT-I

1.1 Introduction - characteristics of water - alkalinity - hardness - unit of hardness - Total solids - Oxidation - transparency - Silica content.

1.2 Purification of water for drinking purpose - potability of water - clarification - coagulation - contact & electro chemical coagulation - sterilization & disinfection of water - precipitation - aeration - ozonisation - Chlorination.

UNIT-II

2.1 Water softening methods - Clark's process - lime soda process - modified lime soda process - permutit or zeolite process - Ion exchange process - demineralization of water.

2.2 Determination of hardness of water - Titration method - complexometric method using EDTA - expressing hardness - equivalents of calcium carbonate - problems to determine temporary & permanent hardness.

UNIT-III

3.1 Hard water and industries - industrial water treatment - boiler feed water method of softening - prevention of plumbo solvency - scales in boilers - consequences - internal conditioning methods.

3.2 Desalination of brackish water - elecrodialysis - Reverse osmosis - removal of Fe, Mn and Silicic acid - effluent treatment of water from paper, fertilizer and Leather industry.

UNIT-IV

Water analysis - sampling of water for analysis - chemical substances affecting potability - colour, turbidity odour, taste, temperature, pH and electrical conductivity.
Analysis of solids present in water - suspended solids - dissolved solids - total acidity - alkalinity - free CO_2 - free chlorine - Ca, Mg, Fe, Mn, Ag & Zn.

UNIT-V

5.1 Analysis of chemical substances affecting health - NH_3, Nitrate, Nitrite, cyanide, sulphate, sulphide, chloride, fluoride - measurement of toxic chemical substances - Dissolved oxygen - Bio Chemical Oxygen Demand (BOD) - Chemical Oxygen Demand (COD)

5.2 Bacteriological examination of water - total count test - E.coli test - E.coli index - most probable number method - Biological examination of water - physical examination of water - radioactivity of water - methods of removing radioactivity from water.

Reference Books:

1. Industrial Chemistry (including chemical - engineering) - B.K. Sharma - Goel publishing house, Meerut.
2. Pollution control in process industries - S.P. Mahajan - Tata McGraw - Hill Publishing Company Ltd., New Delhi.
3. Water pollution and management - C.K. Varashney - Wiley Eastern Ltd., Chennai - 20.

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Syllabus for B.Sc., Chemistry effective from the year 2016-2017

Year:	II Year	Subject Code :	U15NCH301	Semester :	III
Non Major-1	Title:	**Medicinal Chemistry (NME - I)**			
Credits:	2			Max. Marks. 40	

Objectives:

- ✓ To learn the basic idea of drugs and name of common drugs
- ✓ To learn about ailments and medicinal plants

UNIT-I

CLINICAL HEALTH AND BIOCHEMICAL ANALYSIS: Definition of Health, Sterilization of surgical instruments. Biochemical analysis of urine and serum. Blood - Composition, grouping and Rh factor.

UNIT-II

COMMON DRUGS: Antibiotics, Antipyretics, Analgesics, Anti-inflammatory agents, Sedatives, Antiseptics, Antihistamines, Tranquilizers, Hypnotics and Antidepressant drugs - Definition, examples, uses and side effects.

UNIT-III

VITAL AILMENTS AND TREATMENT: Blood pressure - hypertension and hypotension, Diabetes, Cancer, AIDS - Causes, symptoms and medicines.

UNIT-IV

INDIAN MEDICINAL PLANTS: Palak, Vallarai, Kizhanelli, Thumbai, Hibiscus, Adadodai, Thoothuvalai, Nochi, Thulasi, Aloe vera - Chemical constituents and medicinal uses.

UNIT-V

FIRST AID AND SAFETY: Treatment of shock, haemorrage, cuts and wounds. Burns - classification and first aid. Asbestos, silica, lead paints, cement, welding fumes and gases - Hazard alert and precautions for safety.

Reference Books:

1. Jayashree Ghosh - Applied Chemistry - S. Chand and Company Ltd., 2006
2. S.C Rastogi, Biochemistry, Tata McGraw Hill Publishing Co., 1993.
3. Rasheeduz Zafar - Medicinal Plants of India - CBs Publishers and Distributors, 2000.
4. B.L Oser, Hawk's Physiological Chemistry, Tata-McGraw - Hill Publishing Co. Ltd.
5. A.H Beckett and J.B Stenlake - Practical Pharmaceutical Chemistry, Vol.I - CBS Publishers and Distributors, 2000.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2016-2017

Year:	II Year	Subject Code :	U15MCH401	Semester :	IV
Major - 4	Title:	**General Chemistry - IV**			
Credits:	3			Max. Marks. 75	

OBJECTIVES

Noble gases, Solvents, polyhydric alcohol, unsaturated alcohols, phenols, preparation, properties, important name reactions, mechanism, thermodynamics, derivation of equations, partial molar properties, chemical potential, related problems, applications.

UNIT-I

1.1 Noble gases - Electronic configurations - position in the periodic table - Chemical inertness of noble gases - reasons

1.2 Clathrates -definition and applications.

1.3 Compounds of xenon - hybridization and geometries of XeF_2, XeF_4, XeF_6 and $XeOF_4$. (preparation and properties – not necessary)

UNIT-II

2.1 Solvents: Definition – Types of solvents – protic, aprotic and aqueous solvents – characteristics of a solvent – Efficiency, dielectric constant – Protonic acidity or basicity, Auto dissociation, temperature, ionic character and solubility – Ideal solvent.

2.2 Non aqueous solvents: Liquid ammonia and acetic acid. Advantages and disadvantages of non aqueous solvents.

2.3 Green Solvents – Water super critical carbondioxide, ionic liquids and polyethylene glycol. Advantages of green solvents.

UNIT-III

3.1 Phenols – classification and nomenclature - acidic character of phenols - Kolbe's reaction - Reimer - Tiemann reaction - Gattermann - Lederer - Manasse and Houben - Hoesh reactions

3.2 Di - and tri-hydric phenols - preparation, properties and uses of catechol and pyrogallol.

3.3 Preparation and properties of naphthols.

UNIT-IV

4.1 Entropy changes in physical transformations - Calculation of entropy changes with changes in T, V and P - entropy of mixing of ideal gases.

4.2 Free energy and work function - Gibbs free energy - Helmholtz work function - their variations with temperature - pressure and volume - Criteria for spontaneity.

4.3 Gibbs-Helmholtz equations - derivation and applications. Clausius- clapeyron equation – Derivation and Application.

UNIT-V

5.1 Third law of thermodynamics - Entropy at absolute zero - Planck’s formulation of third law - Nernst heat theorem - statement of III law of thermodynamics.

5.2 Evaluation of absolute entropy from heat capacity measurements - exceptions to III law - application of III law.

5.3 Partial molar properties - Chemical potential - Gibbs-Duhem equation - effect of temperature and pressure on chemical potential.

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Syllabus for B.Sc., Chemistry effective from the year 2016-2017

Year:	II Year	Subject Code :	U15ACH402	Semester :	IV
Allied - 4	Title:	**Biochemistry - II (Allied)**			
Credits:	4			Max. Marks. 60	

Objectives:

- ✓ To study about the Enzymes, Metabolism and Molecular Biology
- ✓ To learn the basics of Biotechniques.

UNIT - I: Enzymes:

Definition, classification and Properties of enzymes. Mechanism of enzyme action.. Isoenzyme: Definition with one example. Factors affecting enzyme activity: pH, temperature and substrate concentration. Michaleis- Menton equation. Enzyme inhibition.

UNIT - II: Metabolism:

Glycolysis, TCA cycle, HMP shunt and its energy yield. Deamination, transamination reaction, SGOT and SGPT. Urea cycle, beta oxidation.

UNIT - III: Inborn Errors of Metabolism:

Galactosemia, Von - Gierke's Disease Hemophilia, Albinism, Alkaptonuria, Taysach's Disease definition, causes and symptoms.

UNIT - IV: Molecular Biology:

Replication-Definition, types, mode of action of replication, mechanism of replication. General mechanism of transcription and translation. Genetic code. DNA as genetic material.

UNIT - V: Biochemical Techniques:

Principles and application of: (a)chromatography (paper, and thin layer) , (b) electrophoresis (SDS PAGE,), (c) absorption photometry (colorimetry and spectrophotometry), (d) centrifugation(Differential centrifugation), (e) radio immunoassay.

References: 1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan Worth Publishers.

2. Harper's Biochemistry-Rober K. Murray, Daryl K. Grammer, McGraw Hill, Lange Medical Books. 25th edition.

3. Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.

4. Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.

5. Biochemistry-Dr. Ambika Shanmugam, Published by Author.

6. Biomolecules-C. Kannan , MJP Publishers,Chennai-5.

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Syllabus for B.Sc., Chemistry effective from the year 2016-2017

Year:	II Year	Subject Code :	U15SCH401	Semester :	IV
Skill Based -2	Title:	**Food Chemistry (SBS - II)**			
Credits:	3			Max. Marks. 60	

OBJECTIVES

To obtain knowledge about different foods, their nutritive values and food preservation.

UNIT-I

1.1 Cereals definition – Classification - Processing – Milling and Parboiling - Structure of Cereals - Composition and nutritive value. Pulses definition - Classification - Processing - Structure of Pulses - Composition and nutritive value - Toxic Constituents in pulses – Trypsin inhibitors and Lathyrogens - medicinal value of cereals and pulses.

1.2 Sugar and related products. Sugar - Structure and Properties. Nutritive value - Sugar composition in different food items. Sugar related products - Classification & nutritive value. Artificial sweeteners - example - advantages and disadvantages.

UNIT-II

2.1 Vegetables - classification - composition & nutritive values - Fruits- Classification - Composition & nutritive values.

2.2 Fungi and algae as food - enzymatic browning and non enzymatic browning - Nutritive value of some common foods - milk, egg, soyabeans

UNIT-III

3.1 Beverages - definition and examples - Classification of beverages, Fruit beverages - Milk based beverages - malted beverages - examples. Alcoholic and non alcoholic beverages - examples.

3.2 Appetizers - definition - classification - examples - Water - functions and deficiency.

UNIT-IV

4.1 Food Preservatives - definition - classification - Food Spoilage - definition - Prevention.
4.2 Methods of preservation - classification - Low and high temperature - preservatives examples - Dehydration - osmotic pressure - food irradiation.

UNIT-V

5.1 Food additives –Antimicrobial agents, Antioxidants, Enzymes, Flavoring agents and adjuvants, Sweeteners (nutritive and non-nutritive), Clarifying agents and Nutritive additives- Definition – classification - their functions - chemical substance.
5.2 Packaging of foods - classification- Materials used for packaging.

REFERENCE BOOKS

1. Food Science - III Edition - B. Sri Lakshmi. New Age International Publisher, 2005.
2. Food Chemistry - Lilian Hoagland Meyer CBS Publishers & Distributors, 2004.
3. Food Science, Nutrition and Health - Brian.A.Fox, Allan G.Cameron Edward Arnold, London.
4. Fundamentals of Foods and Nutrition - Mudambi. R.Sumathi, and Raja gopal, M.V. - Wiley Eastern Ltd., Madras.
5. Handbook of Food and Nutrition - M. Swaminathan - Bangalore Printing and Publishing Co. Ltd., Bangalore.

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Syllabus for B.Sc., Chemistry effective from the year 2016-2017

Year:	II Year	Subject Code :	U15NCH401	Semester :	IV
Non Major -2	Title:	**Chemistry in Every Day Life (NME- II)**			
Credits:	2			Max. Marks. 40	

Objectives:

- ✓ To know the basics of chemistry in our life
- ✓ To know about the food colours, Plastics, drugs etc

UNIT: I

1.1 General Survey of Chemicals used in everyday life.

1.2 Cosmetics: Talcum Powder, Tooth pastes, Shampoos, Nail Polish, Perfumes, Soaps, and detergents - General formulations and preparation - possible Hazards of cosmetics use.

UNIT-II

2.1 Food and Nutrition: Carbohydrates, Proteins,Fats,Minerals and Vitamins, definitions,sources and their physiological importance - balanced diet.

2.2 Adulterants in milk, ghee, oil, coffee powder, tea, asafoetida, chilli powder, pulses and turmeric powder - identification.

UNIT-III

3.1 Colour chemicals used in food - soft drinks and its health hazards.

3.2 Food preservatives-Definition-Examples-Methods of preservation-Low and high temperature-Dehydration-Osmotic pressure-Food irradiation.

UNIT-IV

4.1 Plastics, polythene, PVC, bakelite, polyesters, resins, and their applications.

4.2 Natural Rubber-Synthetic rubbers-Vulcanization - definition and its applications.

UNIT-V

5.1 Chemicals in food production - fertilizers used in natural sources - Fertilizers urea, NPK and Super phosphates need - uses and hazards.

5.2 Pesticides – definition and examples.

Reference Books:

1. Chemical Process Industries - Norris Shreve Joseph A.Brine .Jr.

2. Perfumes, Cosmetic and Soaps - W.A. Poucher (Vol 3).

3. Environmental Chemistry - A .K. DE.

4. Industrial Chemistry, B.K. Sharma- Goel publishing house Meerut.

5. Food Science - B. Srilakshmi - III Edition - New Age International Publishers 2005.

6. Food Chemistry Lillian Hoagland Meyer - CBS publishes & distributors - 2004.

7. Fundamental concepts of Applied Chemistry - Jayashree Ghosh - S.Chand & Co Ltd., New Delhi.

8. Applied chemistry - K.Bagavathi Sundari - MJP Publishers.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year:	III Year	Subject Code :	U15MCH501	Semester :	V
Major - 5	Title:	**Inorganic Chemistry - I**			
Credits:	5			Max. Marks. 75	

Objectives:

- To understand the principle of gravimetric analysis.
- To give students a firm grounding in Co-ordination chemistry.
- To study about the halogens and related compounds.

UNIT-I

1.1 Principles of gravimetric analysis - Characteristics of precipitating agents - choice of precipitants - conditions of precipitation - specific and selective precipitants - DMG, cupferron, salicylaldehyde, ethylene diamine - use of sequestering agents.

1.2 Co-precipitation - post precipitation - differences - minimization of error - precipitation from homogeneous solution - calculation in gravimetric methods - use of gravimetric factor.

1.3 Thermo analytical methods - principle involved in thermo gravimetric analysis and differential thermal analysis - characteristics of TGA and DTA - thermo grams – factors affecting TGA and DTA curves - discussion of various components of the instrument with block diagrams - Applications of thermogravimetry - Applications of DTA - thermometric titration. Electrogravimetry - principle and applications.

UNIT-II

2.1 Coordination Compounds: Introduction - Ligands- monodentate, bidentate and polydentate ligands, Coordination Sphere, Coordination Number - Chelation And Effect Of Chelation - Applications Of EDTA.

2.2 Nomenclature of mononuclear, dinuclear and bridged complexes.

2.3 Isomerism in complexes - Ionisation Isomerism, hydrate Isomerism, linkage Isomerism, ligand Isomerism, Co-ordination Isomerism, polymerization Isomerism, geometrical and optical Isomerism in 4 and 6 coordinated complexes.

UNIT-III

3.1 Werner theory - EAN rule - theory of bonding - valence bond theory - hybridisation - geometry and magnetic properties - failure of VBT

3.2 Crystal field theory - spectrochemical series - splitting of d - orbitals in octahedral, tetrahedral and square planar complexes - crystal field stabilisation energy - calculation of CFSE in octahedral and square planar complexes.

3.3 Low spin and high spin complexes – explanation of magnetic properties, colour and geometry using CFT

UNIT-IV

4.1 Comparison of VBT and CFT.

4.2 Application of Co-ordination compounds in qualitative and quantitative analysis - Detection of potassium ion, separation of Cu and Cd ions, Estimation of Ni using DMG and Al using oxine.

4.3 Pi-acceptor ligands - bonding, hybridisation, structure and properties of carbonyls of Ni, Cr, Fe, Co, Mn, W and V - compounds of P and As as acceptor ligands.

UNIT-V

5.1 Halogen-comparative study of F, Cl, Br and I - elements - reactivities - comparison of F and O - hydracids - oxides.

5.2 Classification of halide - fluorides of oxygen - exceptional properties of fluorine.

5.3 oxy acids of halogens - Structure. Interhalogen compounds – pseudohalogens - basic properties of halogens- positive iodine – evidences.

REFERENCE BOOKS:

1. Inorganic Chemistry - P.L. Soni - Sultan Chand (2006).

2. Inorganic Chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia - Vallabh Publications (2003).

3. Selected Topics in Inorganic Chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications (2003).

4. Inorganic Chemistry - J.E. Huheey, Harper and Collins - NY IV edition (1993).

5. Concise Inorganic Chemistry - J.D. Lee - III edition - Von Nostrand.

6. Industrial Chemistry - B.K Sharma - Goel Publications (1983).

7. Industrial Chemistry R.K. Das - Kalyani Publications, New Delhi (1982).

8. Coordination Chemistry - S.F.A. Kettle - ELBS (1973).

9. Coordination Chemistry - K. Burger - Butterworthy (1973).

10. Vogel's Handbook of Quantitative Inorganic Analysis - Longman.

11. Text Book of Qualitative Inorganic Analysis - A.I. Vogel - III edition (1976).

12. Source Book on Atomic Energy – S. Glasstone- East-West Press Pvt. Ltd. (1967).

13. Nuclear and Radiochemistry - John Wiley and Sons (1964).

14. Nuclear Chemistry - H.J. Arnikar - Wiley Eastern Co., - II edition (1987).

15. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons.

5. Concise Inorganic Chemistry - J.D. Lee - III edition - Von Nostrand.

6. Industrial Chemistry - B.K Sharma - Goel Publications (1983).

7. Industrial Chemistry R.K. Das - Kalyani Publications, New Delhi (1982).

8. Coordination Chemistry - S.F.A. Kettle - ELBS (1973).

9. Coordination Chemistry - K. Burger - Butterworthy (1973).

10. Vogel's Handbook of Quantitative Inorganic Analysis - Longman.

11. Text Book of Qualitative Inorganic Analysis - A.I. Vogel - III edition (1976).

12. Source Book on Atomic Energy – S. Glasstone- East-West Press Pvt. Ltd. (1967).

13. Nuclear and Radiochemistry - John Wiley and Sons (1964).

14. Nuclear Chemistry - H.J. Arnikar - Wiley Eastern Co., - II edition (1987).

15. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year:	III Year	Subject Code :	U15MCH502	Semester :	V
Major - 6	Title:	**Organic Chemistry - I**			
Credits:	5			Max. Marks. 75	

Objectives:

- To effectively impart knowledge about Carbohydrate chemistry, Stereochemistry, Heterocyclic chemistry and polynuclear hydrocarbons.
- To make the students more inquisitive in learning the mechanistic details in Organic Chemistry through the teaching of the named reactions.
- To learn the synthetic applications of certain organic compounds.

UNIT- I

1.1. **Carbohydrates :** classification - reactions of glucose and fructose - osazone formation, muta rotation and its mechanism - structural elucidation of glucose and fructose - pyranose and furanose forms.

1.2 Determination of ring size- Haworth projection formula - configuration of glucose and fructose - epimerization - chain lengthening and chain shortening of aldoses - inter conversion of aldoses and ketoses

1.3 **Disaccharides and poly saccharides:** reactions and Structural elucidation of sucrose. Structural elucidation and properties of cellulose

UNIT- II

2.1 **Stereoisomerism:** definition-classification into optical and geometrical isomerism. Projection formulae : Fischer, Flying Wedge, Sawhorse and Newmann projection formulae - rotation of optical isomers - Cahn - Ingold - Prelog rules - R, S notation of optical isomers with one and two asymmetric carbon atoms - D, L notations.

Optical activities in compounds not containing asymmetric carbon atoms: biphenyl, allenes and spiranes.

2.2. **Geometrical isomerism :** cis - trans, syn - anti and E, Z notations - geometrical isomerism in maleic and fumaric acids and unsymmetrical ketoximes - methods of distinguishing geometrical isomers using melting points, dipole moment, solubility, dehydration, cyclisation, heat of hydrogenation and combustion.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year: III Year Subject Code : U15MCH503 Semester : V

Major - 7 Title: **Physical Chemistry - I**

Credits: 5 Max. Marks. 75

Objectives:

To impart knowledge about the Solutions, Phase Rule and its Applications, Colligative properties, Chemical Equilibrium, Phase Rule and its Applications, Electrochemistry and its Applications.

Unit-I Solutions

1.1 Solutions of liquids in liquids - Raoult's law – Vapour pressure of ideal solutions – Activity of a component in an ideal solution – Gibbs-Duhem-Margules equation – Thermodynamics of Ideal Solutions.

1.2 Vapour pressure of Non-ideal solutions – Fractional distillation of Binary liquid solutions – Azeotropic mixtures - Distillation of immiscible liquids - Partially miscible liquids - Phenol - Water, Triethylamine – Water and Nicotine – Water systems.

1.3 Nernst distribution law – Definition - Thermodynamic derivation – Applications.

Unit-II Phase rule

2.1 Definition of the terms - Phase, Components and Degrees of freedom – Derivation of Gibbs phase rule

2.2 Applications of phase rule - One component system - Water and Sulphur system – Reduced phase rule - Two components system - Simple eutectic system – Lead-silver system, KI-water system - Freezing mixtures.

2.3 Thermal analysis and cooling curves, Compound formation with congruent melting point – Zn-Mg, $FeCl_3$- Water system - Compound formation with incongruent melting point - Na-K System.

Unit-III Colligative properties and Chemical Equilibrium

3.1 Colligative properties - Lowering of vapour pressure - Osmosis and osmotic pressure - Thermodynamic Derivation of Elevation of boiling point and Depression of freezing point – Determination of molar mass – Van't Hoff factor.

3.2 Chemical Equilibrium - Law of Chemical Equilibrium - Thermodynamic derivation of Law of Chemical Equilibrium.

3.3 Van't Hoff Reaction Isotherm - Temperature Dependence of Equilibrium Constant – Van't Hoff Isochore - Le Chatelier's Principle and Its Applications.

UNIT-IV Electrochemistry – I

4.1 Specific conductance and Equivalent conductance - Measurement of equivalent conductance - Variation of Equivalent Conductance and Specific Conductance with Dilution – Ostwald's Dilution Law and Its Limitations.

4.2 Debye-Huckel's theory of Strong Electrolytes - Onsagar equation (No derivation) - Verification and Limitations - Kohlrausch law and its Applications.

4.3 Migration of ions - Ionic Mobility - Ionic Conductance - Transport Number and its determination – Hittorff's method and Moving Boundary method.

UNIT- V Electrochemistry – II

5.1 Applications of Conductometric Measurements - Determination of Degree of Dissociation of Weak Electrolytes, Ionic Product of water - Solubility Product of sparingly soluble salt - Conductometric Titrations.

5.2 Concept of pH - Buffer solutions, Buffer action - Henderson equation - Applications of Buffer Solutions.

5.3 Hydrolysis of Salts - Expressions for Hydrolysis Constant, Degree of Hydrolysis and pH of aqueous salt solutions.

REFERENCE BOOKS

1. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishnal Publishing Co., - 2013.
2. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., – 2006.

3. Physical Chemistry - Negi and Anand – Eastern Wiley Pvt.Ltd..
4. Physical Chemistry - Kundu and Jain - S. Chand & Co.
5. Physical Chemistry - K. L. Kapoor - Macmillan - 4 volumes.
6. Elements of Physical Chemistry - Glasstone and Lewis - Macmillan.
7. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd.
8. Fundamentals of Physical Chemistry - Maron and Landor - Colier - Macmillan.
9. Physical Chemistry - G. W. Castellan - Narosa publishing house - 2004.
10. Physical Chemistry - Walter J. Moore - Orient Longman – 1972.
11. Numerical Problems on Physical Chemistry, Gashal - Books and Allied (P) Ltd.,
12. Universal General Chemistry, C.N.R. Rao, Macmillan.
13. Group Theory and its Chemical Applications - P. K. Bhattacharya - Himalaya Publishing House.
14. Text book of Physical Chemistry – M. V. Sangaranarayanan, V. Mahadevan, Universities Press - 2011.
15. General and Physical Chemistry – Dr. A. Arunabhasan, Books of Allied (P) Ltd., - Ghosal – 2009.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year:	III Year	Subject Code :	U15ECH501	Semester :	V
Elective - 1	Title:	**Spectroscopy - I (Elective - I)**			
Credits:	3			Max. Marks. 75	

Objective:

To impart knowledge about different spectroscopic techniques.

UNIT-I

1.1. Definition of spectrum - Electromagnetic radiation - quantization of different forms of energies in molecules (translational, rotational, vibrational and electronic) - Born Oppenheimer approximation.

1.2. Microwave Spectroscopy - theory of microwave spectroscopy - selection rule - Calculation of moment of inertia and bond length of diatomic molecules.

UNIT-II

2.1. UV - Visible Spectroscopy- theory - Absorption laws, Calculations involving Beer Lambert's law - types of electronic transitions- chromophore and auxochromes - Absorption bands and intensity -factors governing absorption maximum and intensity.

2.2. Instrumentation - Photo colorimeter and spectrophotometer- Working principle, block diagrams with description of components.

UNIT-III

3.1. IR Spectroscopy – Principle - Selection rules. Expression for vibrational frequency (derivation not needed).

3.2. Types of vibrations, IR activity of diatomic, triatomic linear (CO_2) and nonlinear triatomic molecules (H_2O).

UNIT-IV

4.1. IR Spectroscopy - Instrumentation - sampling techniques. Applications of IR Spectroscopy.

4.2. Spectral interpretation of alcohols, aldehydes, ketones and esters – aliphatic and aromatic. Hydrogen bonding.

UNIT-V

5.1. Raman Spectroscopy : Rayleigh and Raman scattering, stokes and antistokes lines. Differences between Raman and IR Spectroscopy.

5.2. Rotational Raman spectra of Noncentrosymmetric molecules (HCl). Mutual exclusion principle (CO_2 and N_2O)

Reference Books:

1. Elements of Analytical Chemistry - R. Gopalan, P.S. Subramanian, K. Rengarajan - S. Chand and sons (1997).
2. Fundamentals of Analytical Chemistry - D.A. Skoog and D.M. West - Holt Reinhard and Winston Publication - IV Edition (1982).
3. Principles of Instrumental Methods of Analysis - D.A Skoog and Saunders - College publications - III edition (1985).
4. Analytical Chemistry - S.M. Khopkar - New Age International.
5. Instrumental Methods of Chemical Analysis - Chatwaal - Anand -Himalaya Publishing House - (2000).
6. Analytical Chemistry - R.Gopalan - Sultan Chand.
7. Analytical Chemistry S.Usharani, Macmillan.
8. Instrumental Methods of Analysis - Willard Merit Dean and Settle – Saunders College Publication.
9. Physico Chemical Techniques of Analysis - P.B. Janarthanam-Vol- I & II - Asian Publishing.
10. Instrumental Methods of Chemical Analysis – B.K. Sharma - Goel Publications.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year:	III Year	Subject Code :	U15SCH501	Semester :	V
Skill Based -3	Title:	**Data Analysis and Separation Technique (SBS - III)**			
Credits:	3			Max. Marks. 60	

Objectives:

- To learn the data analysis, significant figure and error
- To learn Chromatographic separation techniques

UNIT-I

1.1 Data analysis – theory of errors – idea of significant figures and its importance with examples – precision – accuracy – methods of expressing accuracy .

1.2 Error analysis – minimizing errors – method of expressing precision – average deviation – standard deviation and confidence limit.

UNIT-II

2.1 Purification of solid organic compounds – extraction – use of immiscible solvents – soxhlet extraction – crystallization – use of miscible solvents – fractional crystallization – sublimation.

2.2. Purification of liquids – experimental techniques of distillation – fractional distillation – vacuum distillation – steam distillation – tests for purity.

UNIT-III

3.1 Chromatography-principles and techniques of column, paper and thin layer chromatography-Rf value - applications.

3.2 Ion exchange chromatography-principle-experimental techniques and applications.

UNIT-IV

4.1 HPLC and GC- Principle, instrumentation and applications

4.2 GC-MS and LC-MS-Principle, instrumentation and applications

UNIT-V

5.1 Introduction to computer and its application in chemistry – characteristics of a computer – types of computer – block diagram of a digital computer – the art of programming – general features of a programming language – algorithm and flow charts.

5.2 Introduction to C – structure of a C programme – character set of C data types – identifiers – reserved words – variables – constants – keywords – escape sequence – type conversion C

operation (basic aspects only). Application of computer in chemistry – determination of molarity, normality and molality of solutions – calculation of pH.

Reference Books:

1. Elements of Analytical Chemistry - R. Gopalan, P.S. Subramanian, K. Rengarajan - S. Chand and sons (1997).

2. Fundamentals of Analytical Chemistry - D.A. Skoog and D.M. West - Holt Reinhard and Winston Publication - IV Edition (1982).

3. Principles of Instrumental Methods of Analysis - D.A. Skoog and Saunders - College publications - III edition (1985).

4. Analytical Chemistry - S.M. Khopkar - New Age International.

5. Instrumental Methods of Chemical Analysis – Chatwal - Anand-Himalaya Publishing house - (2000).

6. Analytical Chemistry - R.Gopalan - Sultan Chand.

7. Analytical Chemistry S.Usharani, Macmillan.

8. Instrumental Methods of Analysis - Willard et al - c x B S.

9. Physico Chemical Techniques of Analysis - P.B.JanarthanamVol- I & II - Asian Publishing.

10. Instrumental Methods of Chemical Analysis – B.K. Sharma - Goel publication

11. Gini Courter and Annette Marquis, Microsoft Office 2000, BPB Publications, New Delhi, 1999.

12. Julia Kelly, Using Microsoft Excel 2000, Prentice-Hall of India, New Delhi, 1999.

13. Robert de Lavie, A spreadsheet workbook for Quantitative Chemical Analysis, McGraw-Hill, Inc. New Delhi, 1997.

14. K.V. Raman, Computers in Chemistry, Tata McGraw-Hill Ltd., New Delhi, 1993.

15. V.K. Srivastava and K.K. Srivastava, Introduction to Chromatography: Theory and Practice, S. Chand and company, New Delhi, 1987.

16. R.M. Roberts, J.C. Gilbert, L.B. Rodewald, and A.S. Wingrove, Modern Experimental Organic Chemistry, 4th edition, Holt Saunders International Edition.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year:	III Year	Subject Code :	U15MCH601	Semester :	VI
Major - 8	Title:	**Inorganic Chemistry - II**			
Credits:	4			Max. Marks. 75	

Objectives:

- To impart knowledge about radioactivity and nuclear chemistry.
- To understand the metallic bond and bio-inorganic chemistry.
- To learn about'd' and 'f' block elements.
- To provide knowledge about industrial chemistry.

UNIT-I

1.1 Nuclear Chemistry: Introduction - composition of nucleus - nuclear forces operating between the nucleons - N/P ratio, curves, stability belts - the whole number rule and packing fraction - isotopes, isobars, isotones and isomers.

1.2 Nuclear binding energy - Mass defect - simple calculations involving mass defect and binding energy per nucleon - magic numbers - liquid drop model - shell model.

UNIT-II

2.1 Natural radioactivity - Detection and measurement of radioactivity - radioactive series including neptunium series - group displacement law - Rate of disintegration and half - life period - Average life period.

2.2 Artificial radioactivity - induced radioactivity - uses of radioisotopes - hazards of radiations - nuclear fission - nuclear energy - nuclear reactors - nuclear fusion - thermo nuclear reactions - energy source of the sun and stars.

UNIT-III

3.1 Metallic bond - theories - electron pool theory - valence bond theory - MO theory - semiconductors - n and p type semiconductors.

3.2 Bioinorganic chemistry - Biological aspects of Fe, Zn, Mg, Co, Cu and Mo – Biological functions of Na, K, Ca, and P - toxicity of some heavy metals like Cd, Hg and Cr.

UNIT-IV

4.1 Comparative study of Ti, V, Cr, Mn and Fe group metals - occurrence, oxidation states, magnetic properties and colour - preparation and uses of ammonium molybdate, V_2O_5 and UF_6

4.2 Comparative study of lanthanides and actinides, occurrence, elements, oxidation states, magnetic properties, colour and spectra - lanthanide contraction - causes, consequences and uses - comparison between lanthanides and actinides.

UNIT-V

5.1 Industrial chemistry - Fuel gases - calorific value - composition and sources - formation of water gas, semi water gas, carburetted water gas, producer gas, oil gas, natural gas, LPG and bio gas (manufacture not required)

5.2 Composition and setting of cement - manufacture of cement - examples for pigments - constituents of paints and their functions - type of glasses - manufacture of glass.

REFERENCE BOOKS:

1. Inorganic Chemistry - P.L. Soni - Sultan Chand (2006).

2. Inorganic Chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia - Vallabh Publications (2003).

3. Selected Topics in Inorganic Chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications (2003).

4. Inorganic Chemistry - J.E. Huheey, Harper and Collins - NY IV edition (1993).

5. Concise Inorganic Chemistry - J.D. Lee - III edition - Von Nostrand.

6. Industrial Chemistry - B.K Sharma - Goel Publications (1983).

7. Industrial Chemistry R.K. Das - Kalyani Publications, New Delhi (1982).

8. Coordination Chemistry - S.F.A. Kettle - ELBS (1973).

9. Coordination Chemistry - K. Burger - Butterworthy (1973).

10. Vogel's Handbook of Quantitative Inorganic Analysis - Longman.

11. Text Book of Qualitative Inorganic Analysis - A.I. Vogel - III edition (1976).

12. Source Book on Atomic Energy – S. Glasstone- East-West Press Pvt. Ltd. (1967).

13. Nuclear and Radiochemistry - John Wiley and Sons (1964).

14. Nuclear Chemistry - H.J. Arnikar - Wiley Eastern Co., - II edition (1987).

15. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons (1988).

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year:	III Year	Subject Code :	U15MCH602	Semester :	VI
Major - 9	Title:	**Organic Chemistry - II**			
Credits:	3			Max. Marks. 75	

Objectives:

- To understand the basic concepts organic photochemistry.
- To kindle interest in students in learning bio-organic chemistry through the introduction of topics such as Proteins, Nucleic acids, Terpenes, Alkaloids etc.
- To generate keen interest and thinking in understanding the mechanisms of Molecular Rearrangements.

UNIT- I

1.1 Organic photochemistry: Types of photochemical reactions- photo dissociation- gas phase photolysis - isomerisations- cyclisation- dimerisation and oxetane formation.

1.2 Norrish-I and II reactions. Barton reaction- photo Fries rearrangement -photochemical formation of smog.

1.3 Mechanism of reduction with sodium borohydride, lithium aluminium hydride, Wolf Kishner reduction, MPV reduction and Rosenmund reduction.

UNIT-II

2.1 Amino acids : Classification of amino acids - preparations and properties of alpha amino acids - with special reference to Gabriel phthalimide synthesis, Strecker synthesis, Erlenmeyer synthesis- zwitter ion , isoelectric point.

2.2 Poly peptides and proteins: Classification of proteins based on physical and chemical properties and physiological functions -peptide synthesis - Bergmann synthesis – Solid phase synthesis.

2.3 Primary structure of proteins - end group analysis - Edman method, Sanger's method secondary structure of protein - helical and sheet structures - Denaturation of proteins

UNIT-III

3.1 Nucleic acids: Nucleoside, nucleotide, degradation of nucleotide chain - structure of nucleic acids - RNA and DNA - elementary idea about protein synthesis.

3.2 Synthesis of pyrimidine and purine bases - guanine, adenine, uracil, cytosine and thymine.

3.3 Terpenes - isoprene rule –structural elucidation of menthol and Citral.

UNIT-IV

4.1 Vitamins – Classification-Structural elucidation of Vitamin A.

4.2 Antibiotics - Structural elucidation of Chloramphenicol.

4.3 Alkaloids - General methods of isolation and structural elucidation of quinine and nicotine.

UNIT-V

5.1 Molecular rearrangements: Classification – anionotropic and cationotropic, inter molecular and intra molecular rearrangements – Mechanisms, evidences, migratory aptitude, inter or intra molecular rearrangements.

5.2 Pinacol-pinacolone, Benzilic acid, Cope, oxy Cope Beckmann, Hoffmann, Curtius, Baeyer-Villiger, Claisen (sigmatropic) and Fries (Two mechanisms) rearrangement.

5.3 Preparation and uses of the following oxidizing agents: DMSO, SeO_2, Lead Tetraacetate, O_3 and peracids.

REFERENCE BOOKS:

ORGANIC CHEMISTRY:

1. Organic Chemistry - R. T. Morrison and Boyd - Pearson Education.

2. Organic Chemistry - I. L Finar - Volume I and II - Pearson Education.

3. Text Book of Organic Chemistry - P.L.Soni - Sultan Chand & Sons.

4. Advanced Organic Chemistry - Bahl and Arun Bahl - Sultan Chand and Co. Ltd.

5. Stereochemistry, Conformations and Mechanisms - Kalsi - New Age.

6. Organic Chemistry of Natural Products - Volume I and II- O.P. Agarwal - Goel Publishing House

7. A Guide Book to Mechanisms in Organic Chemistry - Peter Sykes - Pearson Education.

8. Stereo Chemistry of Organic Compounds - D. Nasipuri - New Age.

9. Chemistry of Natural Products - Gurdeep Chatwal- Himalaya Publishing House.

10. Reactions and Reagents - O.P. Agarwal- Goel Publishing House.

11. Organic Reaction Mechanisms - Gurdeep Chatwal- Himalaya Publishing House.

12. A Text Book of Organic Chemistry K.S.Tewari,N.K.Vishol,S.N.Mehrotra-Vikas Publishing House.

13. Organic Chemistry- M.K.Jain and S.C.Sharma-Shoban Lal and Nagin Chand.

14. Reaction, Mechanism and Structure- Jerry March- John Wiley and Sons.

15. Organic Chemistry - Bruice - Pearson Education.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year: III Year Subject Code : U15MCH603 Semester : VI

Major - 10 Title: **Physical Chemistry - II**

Credits: 3 Max. Marks. 75

Objectives:

To impart Knowledge about Electrochemistry, Surface Chemistry, Photochemistry, Chemical Kinetics and Theories of reaction rates.

UNIT- I Electrochemistry - III

1.1. Galvanic cells - Daniel cell - Reversible and Irreversible Cells – EMF of a Cell and its Measurement - Standard Weston Cadmium Cell – Evaluation of Thermodynamic Quantities.

1.2. Derivation of Nernst equation for Electrode Potential and Cell emf –Types of reversible electrodes - Electrode reactions - Electrode potentials.

1.3. Reference electrodes - Standard Hydrogen Electrode - Standard Electrode Potential - Sign conventions - Electrochemical Series and its Applications.

UNIT- II Electrochemistry - IV

2.1. Liquid Junction Potential - Concentration cells With Transference and Without Transference.

2.2. Applications of Concentration cells - Valency of ions, Solubility and Solubility Product - Activity Coefficient of electrolytes - Determination of pH using Hydrogen, Quinhydrone and Glass electrodes – Potentiometric titrations.

2.3. Polarisation - Overvoltage – Storage Cells - Decomposition potential - Lead Storage Battery - Fuel Cells (H_2-O_2 Cell) - Mechanism of Discharging and Recharging Fuel Cells.

UNIT- III Chemical Kinetics

3.1. Definitions of the terms – Order and Molecularity – Rate of the reaction - Derivations of expressions for Zero, First, Second and Third order rate equations - Study of kinetics by Volumetric, Polarimetric and Spectrophotometric methods - Methods of Determination of Order of a reaction.

3.2. Effect of Temperature on reaction rate - Arrhenius equation - Theories of reaction rates – Bimolecular Collision Theory – Lindmann's theory of Unimolecular Reactions.

3.3. ARRT - Thermodynamic treatment of ARRT – Eyring equation - Comparison of Collision Theory and ARRT.

UNIT- IV Surface Chemistry

4.1. Adsorption – Characteristics of adsorption – Physisorption and Chemisorption –Applications of Adsorption – Adsorption of Gases by Solids – Different Types of Isotherms - Freundlich adsorption isotherm - Langmuir theory of adsorption – Derivation.

4.2. Catalysis – Definition - General Characteristics of Catalytic Reactions – Acid-Base catalysis – Enzyme catalysis – Michaelis-Menton Equation – Effect of Temperature and pH on Enzyme Catalysis.

4.3. Homogeneous catalysis – Function of a catalyst in terms of Gibb's free energy of activation - Heterogeneous catalysis - Mechanism - Kinetics of Unimolecular Surface Reactions.

UNIT- V Photochemistry

5.1. Laws of photochemistry - Grothus-Draper law, Stark-Einstein's law – Primary and Secondary processes – Quantum yield.

5.2. Qualitative description of Fluorescence, Phosphorescence, Chemiluminescence and Photosensitized Reactions.

5.3. Kinetics of Photochemical Reactions - H_2-Cl_2 and H_2-Br_2 reactions - Photodimerisation of Anthracene

REFERENCE BOOKS

1. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishnal Publishing Co., - 2013.
2. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., – 2006.
3. Physical Chemistry - Negi and Anand – Eastern Wiley Pvt.Ltd..
4. Physical Chemistry - Kundu and Jain - S. Chand & Co.
5. Physical Chemistry - K. L. Kapoor - Macmillan - 4 volumes.
6. Elements of Physical Chemistry - Glasstone and Lewis - Macmillan.
7. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd.
8. Fundamentals of Physical Chemistry - Maron and Landor - Colier - Macmillan.
9. Physical Chemistry - G. W. Castellan - Narosa publishing house - 2004.

10. Physical Chemistry - Walter J. Moore - Orient Longman – 1972.
11. Numerical Problems on Physical Chemistry, Gashal - Books and Allied (P) Ltd.,
12. Universal General Chemistry, C.N.R. Rao, Macmillan.
13. Group Theory and its Chemical Applications - P. K. Bhattacharya - Himalaya Publishing House.
14. Text book of Physical Chemistry – M. V. Sangaranarayanan, V. Mahadevan, Universities Press - 2011.
15. General and Physical Chemistry – Dr. A. Arunabhasan, Books of Allied (P) Ltd., - Ghosal – 2009.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year: III Year Subject Code : U15ECH601 Semester : VI

Elective - 2 Title: **Polymer Chemistry (Elective - II)**

Credits: 3 Max. Marks. 75

OBJECTIVE:

To know about the polymers, polymerization techniques, properties and their applications.

UNIT-I

1.1. Polymers: Basic Concept, classification of polymers on the basis of structures and applications. Distinction among plastics, elastomers, and fibers, Homo and hetero polymers, copolymers,

1.2. Properties of polymers- Glass transition temp. (*Tg*) - Definition, factors affecting *Tg*, Relationship between *Tg* and molecular weight.

UNIT-II

2.1. Molecular weight of polymers, Number average, Weight average, Sedimentation and viscosity - Average molecular weights, Molecular weights and degree of polymerization.

2.2. Reactions - Hydrolysis, Hydrogenation, Addition, Substitution, Cross linking - Vulcanization and Cyclisation.

UNIT-III

3.1. Polymerization techniques: Bulk, Solution, Suspension & Emulsion Polymerization - Melt Polycondensation.

3.2. Polymer Processing - Calendaring, Die casting, Rotational casting.

UNIT-IV

4.1. Chemistry of Commercial Polymers - Preparation, Properties and Uses of the following – Polytetrafluoroethylene (Teflon), Polyurethane, Polyethylene, Polystyrene, Polycarbonates and PVC.

4.2. Natural and Synthetic Rubber-Preparation, Properties and Uses.

UNIT-V

5.1. Advances in Polymers - Bio-Polymers and Flame retardant polymers and their applications.

5.2. Advances in Polymers - Conducting polymers and Silicones and their applications.

Reference Books:

1. Text Book of Polymer Science, Bill Meyer F.W. Jr. John Wiley & Sons 1984.

2. Polymer Science, Gowarikar. V.R. Viswanathan, N.V. Jayader Sreedhar. Wiley Eastern Ltd., New Delhi, 2005

3. Polymer Chemistry, Sharma. B.K Goel Publishing House, Meerut- 1989.

4. Polymer Chemistry. Arora M.G. Vadar M.S. - Anmol publications (p) Ltd., New Delhi 1989.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year:	III Year	Subject Code :	U15ECH602	Semester :	VI
Elective - 3	Title:	**Spectroscopy - II (Elective - III)**			
Credits:	3			Max. Marks. 75	

Objective:

To impart knowledge about different spectroscopic techniques.

UNIT-I

1.1. NMR Spectroscopy – Principle, Instrumentation and Working.

1.2. Chemical shift, TMS as NMR standard, Shielding and Deshielding, Number of signals, Spin spin coupling and coupling constants.

UNIT-II

2.1. Interpretation of NMR spectra of simple aliphatic organic compounds such as Acetone, Ethyl acetate, Ethylamine and Ethyl Bromide.

2.1. Interpretation of NMR spectra of simple aromatic organic compounds such as Anisole, Benzaldehyde, Toluene and Isopropyl phenyl ketone.

UNIT-III

3.1. Mass spectroscopy – Principles, Instrumentation and Working - Molecular ion peak, Base peak, Metastable peak, Isotopic peak their uses.

3.2. Fragmentation – Nitrogen rule - determination of molecular formulae – Mass spectrum of simple organic compounds – identification – alcohols, aldehydes, aromatic hydrocarbons, Mac-Lafferty Rearrangement.

UNIT-IV

4.1. Interpretation of mass spectra of simple aliphatic organic compounds such as Acetone, Ethyl acetate, Ethylamine and Ethyl Bromide.

4.1. Interpretation of mass spectra of simple aromatic organic compounds such as Anisole, Benzaldehyde, Toluene and Isopropyl phenyl ketone.

UNIT-V

5.1. ESR Spectroscopy – Theory of ESR spectra, Instrumentation - Hyperfine splitting.

5.2. ESR spectra of simple radicals - CH_3, CD_3, Naphthalene radical ions only.

Reference Books:

1. Basic concept of Analytical Chemistry- S. M. Khopkar.
2. Analytical Chemistry - R. Gopalan.
3. Chemical Analysis: An Instrumental Approach- A.K. Srivastava and P.C. Jain.
4. Spectroscopic Identification of Organic Compounds - R. M. Silverstein, G. C. Basseler & T. C. Morill.
5. Organic Spectroscopy - W. Kemp.
6. Spectroscopic Methods in Organic Chemistry – D Williams & I. Fleming.
7. Fundamentals of Molecular Spectroscopy - C. N. Banwell.
8. Applications of Absorption Spectroscopy of Organic Compounds – Dyer.
9. Introduction to Molecular Spectroscopy – Barrow.
10. Spectroscopy of Organic Compounds – P.S. Kalsi.
11. Instrumental Methods of Chemical Analysis – B.K. Sharma.
12. Analytical Chemistry: An Introduction - D.A. Skoog, D.M. West and F.J. Holler.
13. Analytical Chemistry: Theory and Practice - U.N. Dash.

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Syllabus for B.Sc., Chemistry effective from the Batch 2015-2016

Year: III Year Subject Code : U15SCH601 Semester : VI

Skill Based -4 Title: **Agriculture and Leather Chemistry (SBS - IV)**

Credits: 3 Max. Marks. 60

Objective:

To learn about the Agriculture and Leather Chemistry.

UNIT-I: Soil Chemistry

1.1. Introduction: Formation of Soil. Classification of soil and properties of soil - soil Acidity - Causes of acidity - soil alkalinity.

1.2. Determination of soil pH - Buffering of soils - Amending the soil - Reclamation of acid soil - Liming agents.

UNIT-II: Soil Fertility and Productivity

2.1. Organic Manures - Farmyard Manure - Compost - Oil cakes - Bone meal - Meat meal - Fish meal - Blood meal and green Manures.

2.2. Fertilizers - Classification of fertilizers - Requisites of a good fertilizers - Nitrogenous fertilizers - Phosphatic fertilizers - super Phosphate of lime - Triple super phosphate - NPK fertilizers - ill effects of fertilizers.

UNIT-III: Pesticides

3.1. Classification of Insecticides - Stomach poisons - Contact poisons and Fumigants - Insecticides - Organic Insecticides - DDT - Gammexane - Malathion – Parathion.

3.2. Fungicides - Herbicides - Rodenticides - Pesticides in India - Adverse environmental effects of pesticides.

UNIT-IV: Leather Chemistry

4.1. Introduction - Constituents of Animal Skin - Preparing skins and hides - Cleaning and soaking - Liming and degreasing.

4.2. Manufacture of Leather - Leather Tanning - Vegetable Tanning - Chrome Tanning and Mineral Tanning - Dyeing and Fat liquoring - Leather finishing - oil tanning - by products.

UNIT-V: Tannery effluents Treatment

5.1. Tannery effluents - Pollution and its control - Water pollution and Air pollution – Composition of Tannery effluents.

5.2. Treatment – Screening – Primary and Secondary treatment – Filtration, Ultra filtration – RO – Evaporation - Waste management – Effluent waste management.

Reference Books:

1. Industrial Chemistry by B.K. Sharma. Goel Publishing House, Meerut, 2014.
2. Applied Chemistry by K. Bagavathi - Sundari, MJP Publishers.
3. Fundamental concept of Applied Chemistry by Jayashree Ghosh, S. Chand & Company Ltd.,
4. Chemical treatment of hides a leather by J. Partridge Noyes, Park Ridge,N.J.
5. Agricultural Chemistry Vol I & Vol II edited by B.A. Yagodin - New Century books (P) Ltd.,
7. The nature and properties of soils - IX Edition - Nyle.C.Bready - S.Chand. and Company Ltd.,
8. Soils and soil fertility - Louis M.Thompson - and Frederick. R.Troch – Tata Mc. Graw hill.
9. Text book of Soil Science - T.D. Biswas and S.K. Mukerijee - II Edition.
10. Soil Science - A. Sankara.
11. Fundamental of Leather Science - Wood roffe Publications of CLRI - Chennai.
12. Nature and properties of soils - Harry, O. Buckman.

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Syllabus for B.Sc., Physics effective from the year 2015-2016

Year: I Year Subject Code : U15ACH201 Semester : II

Allied - 2 Title: **Chemistry - II (Allied)**

Credits: 4 Max. Marks. 60

UNIT - I: INORGANIC CHEMISTRY - II

1.1 Coordination chemistry: Werner Theory of coordination compound – Chelation – Function and structure of Haemoglobin and Chlorophyll.

1.2 VSEPR Theory: Shapes of simple molecules BF_3, PCl_5, SF_6 and XeF_6.

1.3 Interhalogen compounds: Definition, Types (AX, AX_3, AX_5 and AX_7), Preparation, Structure and Properties.

UNIT - II: ORGANIC CHEMISTRY - II

2.1 Carbohydrates: Classification – structure of glucose – properties and uses of starch – uses of Cellulose Nitrate and Cellulose acetate.

2.2 Amino acid and protein: preparation and properties of Glycine – Classification of Protein based on physical properties and biological functions.

2.3 Primary and secondary structures of protein (Elementary treatment only) Composition of DNA and RNA and their biological role.

UNIT - III: PHYSICAL CHEMISTRY - II

3.1 Electrochemistry: Specific and Equivalent conductance – their determination – effect of dilution on conductance.

3.2 Kohlrasch's law – Determination of dissociation constant of weak electrolyte using conductance measurement – Conductometric Titrations.

3.3 pH definition - Buffer solutions – Importance of buffer in living system.

UNIT - IV: INDUSTRIAL CHEMISTRY - III

4.1 Paints – Pigments – Components of Paint – Requisites of a good Paint. Colour and Dyes – Classification based on constitution and application.

4.2 Fertilizers – Bio-fertilizers – Organic manures and their importance – Role of NPK in plants – preparation and uses of Urea, Ammonium Nitrate, Potassium Nitrate and Super phosphate of lime.

4.3 Contents in match sticks and match box – Industrial making of safety matches. Preparation and uses of chloroform, DDT, gamhexane and Freon.

UNIT - V: MEDICINAL CHEMISTRY

5.1 Drugs – Sulpha drugs – Uses and Mode of action of Sulpha Drugs – Antibiotics – Uses of Penicillin, Chloramphenicol, and Streptomycin. Drug abuse and their implications – alcohol – LSD.

5.2 Anaesthetics – General and local Anaesthetics – Antiseptics – Example and their application. Definition and one example each for Analgesics, Antipyretics, Tranquilizers and Sedatives.

5.3 Causes, prevention and controlling measures of Diabetes, Cancer and AIDS.

Books for Study:

1. R.D.Madan, **Modern Inorganic Chemistry,** 2nd Edition, S. Chand & Co, Reprint 2004.
2. B.S Bahl and Arun Bahl, **Advanced Organic Chemistry**, Sultan Chand and Co., Ltd, Reprint 2008.
3. B. R. Puri, L. R Sharma and M.S Pathania, **Principles of Physical Chemistry**, 43rd Edition, Vishal Publishing Co., 2008.

Books for Reference:

1. P.L Soni and Mohan Katyal, **Textbook of Inorganic Chemistry,** 20th Edition, Sultan Chand & Sons, Reprint 2001.
2. P.L Soni and H.M Chawla, **Textbook of Organic Chemistry,** 25th Revised Edition, Sultan Chand & Sons, 1992.
3. K.S Tewari and M.K Vishnoi, **A Textbook of Organic Chemistry,** 3rd Edition, Vikas Publishing House Pvt. Ltd, 2006.
4. M.K Jain and S.C Sharma, **Modern Organic Chemistry,** Vishal Publishing Co, 2004.
5. P.L Soni, O.P Dharmarha and U.N Dash, **Textbook of Physical Chemistry,** 21st Revised Edition, S. Chand & Co, Reprint 2000.
6. P.K Mani and A.O Thomas, **A Textbook of Practical Chemistry,** Scientific Publication, 1973.
7. O.P. Pandey, D. N. Bajpai and S.Giri, **Practical Chemistry,** 8th Edition, S. Chand & Co, 2001.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Physics effective from the year 2015-2016

Year: I Year Subject Code : U15ACH101 Semester : I

Allied - 1 Title: **Chemistry - I (Allied)**

Credits: 4 Max. Marks. 60

UNIT - I: INORGANIC CHEMISTRY - I

1.1 Extraction of Metals - Minerals and Ore - Minerals of Iron and Copper - Ore dressing - Froth floatation and Magnetic separation.

1.2 Refining of metals - Electrolytic, Van Arkel and Zone Refining.

1.3 Extraction of Uranium and Thorium.

UNIT - II: ORGANIC CHEMISTRY - I

2.1 Cycloalkanes - Preparation and properties of Cyclohexane - Bayer's angle strain theory.

2.2 Polarization - Inductive effect, mesomeric effect and steric effect.

2.3 Stereo isomerism - Types, causes of optical activity of lactic acid and tartaric acid - Racemisation - Resolution – Geometrical Isomerism – maleic and fumaric acid.

UNIT - III: PHYSICAL CHEMISTRY - I

3.1 Chemical kinetics – Distinction between Order and Molecularity – derivation of first order rate equation – half life period of first order reaction.

3.2 Catalysis – Catalyst- Types - promoters – catalytic poisoning – Active center – Distinction between homogeneous and heterogeneous catalysts – Industrial application of catalysts.

3.3 Photochemistry - Grothus Draper's law, Stark Einstein's law – quantum yield.

Phosphorescence, fluorescence, chemiluminescence and photosensitization.

UNIT - IV: INDUSTRIAL CHEMISTRY – I

4.1 Fuels – Calorific value of fuels – Non conventional fuels – need of solar energy – applications – Bio-fuels.

4.2 Crude oil – Petroleum – Petroleum Refining – Cracking – Applications of Cracking. Naphthalene – Preparation properties and uses of naphthalene – Structure of Naphthalene.

4.3 Osmosis – Osmotic pressure – reverse osmosis – desalination of sea water.

UNIT - V: INDUSTRIAL CHEMISTRY – II

5.1 Energy resources and applications: Sources of energy: renewable (solar, wind, tidal) and non-renewable (coal, lignite, petroleum and natural gas)

5.2 Liquid fuels: Fractional distillation of petroleum, thermal and catalytic cracking - Octane number.

5.3 Nuclear chemistry – definition of half life period – Group displacement law – Radioactive series – Nuclear fission and fusion – Application of nuclear chemistry in medicine , agriculture and industries – C14 dating.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Physics effective from the year 2015-2016

Year: I Year Subject Code : U15ACH201 Semester : II

Allied - 2 Title: **Chemistry - II (Allied)**

Credits: 4 Max. Marks. 60

UNIT - I: INORGANIC CHEMISTRY - II

1.1 Coordination chemistry: Werner Theory of coordination compound – Chelation – Function and structure of Haemoglobin and Chlorophyll.

1.2 VSEPR Theory: Shapes of simple molecules BF_3, PCl_5, SF_6 and XeF_6.

1.3 Interhalogen compounds: Definition, Types (AX, AX_3, AX_5 and AX_7), Preparation, Structure and Properties.

UNIT - II: ORGANIC CHEMISTRY - II

2.1 Carbohydrates: Classification – structure of glucose – properties and uses of starch – uses of Cellulose Nitrate and Cellulose acetate.

2.2 Amino acid and protein: preparation and properties of Glycine – Classification of Protein based on physical properties and biological functions.

2.3 Primary and secondary structures of protein (Elementary treatment only) Composition of DNA and RNA and their biological role.

UNIT - III: PHYSICAL CHEMISTRY - II

3.1 Electrochemistry: Specific and Equivalent conductance – their determination – effect of dilution on conductance.

3.2 Kohlrasch's law – Determination of dissociation constant of weak electrolyte using conductance measurement – Conductometric Titrations.

3.3 pH definition - Buffer solutions – Importance of buffer in living system.

UNIT - IV: INDUSTRIAL CHEMISTRY - III

4.1 Paints – Pigments – Components of Paint – Requisites of a good Paint. Colour and Dyes – Classification based on constitution and application.

4.2 Fertilizers – Bio-fertilizers – Organic manures and their importance – Role of NPK in plants – preparation and uses of Urea, Ammonium Nitrate, Potassium Nitrate and Super phosphate of lime.

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5.1 Drugs – Sulpha drugs – Uses and Mode of action of Sulpha Drugs – Antibiotics – Uses of Penicillin, Chloramphenicol, and Streptomycin. Drug abuse and their implications – alcohol – LSD.

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3. B. R. Puri, L. R Sharma and M.S Pathania, **Principles of Physical Chemistry**, 43rd Edition, Vishal Publishing Co., 2008.

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2. P.L Soni and H.M Chawla, **Textbook of Organic Chemistry,** 25th Revised Edition, Sultan Chand & Sons, 1992.
3. K.S Tewari and M.K Vishnoi, **A Textbook of Organic Chemistry,** 3rd Edition, Vikas Publishing House Pvt. Ltd, 2006.
4. M.K Jain and S.C Sharma, **Modern Organic Chemistry,** Vishal Publishing Co, 2004.
5. P.L Soni, O.P Dharmarha and U.N Dash, **Textbook of Physical Chemistry,** 21st Revised Edition, S. Chand & Co, Reprint 2000.
6. P.K Mani and A.O Thomas, **A Textbook of Practical Chemistry,** Scientific Publication, 1973.
7. O.P. Pandey, D. N. Bajpai and S.Giri, **Practical Chemistry,** 8th Edition, S. Chand & Co, 2001.