



ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN

(Autonomous)

(Re-Accredited with 'A' Grade by NAAC)

**(A Government Aided College - Affiliated to Mother Teresa Women's University,
Kodaikanal)**

CHINNAKALAYAMPUTHUR (PO), PALANI -624 615.

DEPARTMENT OF CHEMISTRY



SYLLABUS

2013-2017

DEPARTMENT OF CHEMISTRY (2013-2014)
TANSICHE-SYLLABUS

Semester	Title of paper	Hours	Marks/Grade			Credits
			CI A	C E	Total	
I	Part-I Tamil Paper –I	6	40	60	100	3
	Part II English Paper –I	6	40	60	100	3
	Part III Paper- Theory Core Paper –I Inorganic Chemistry-I	5	40	60	100	4
	Paper II Organic Chemistry-I	5	40	60	100	4
	Major Practicals –I Volumetric Analysis	2	-	-	-	-
	Allied- Theory	5	40	60	100	4
	Paper IV-Value Education (V.E)	1	40	60	100	3
	Total	30			600	21
II	Part –I Tamil Paper-II	6	40	60	100	3
	Part –II English Paper-I	6	40	60	100	3
	Part- III Core Paper -3 Physical Chemistry	6	40	60	100	4
	Major Practical –I Inorganic Quantitative Analysis & Volumetric Analysis	5	40	60	100	4
	Allied Theory/Practicals	5	40	60	100	4
	Part IV –Environmental Science(ES)	2	40	60	100	2
	Total	30			600	20
III	Part-I Tamil Paper III	6	40	60	100	3
	Part-II English Paper I	6	40	60	100	3
	Part- III Core Paper -4 Organic, Inorganic & Physical Chemistry	5	40	60	100	4
	Allied Theory	5	40	60	100	4
	Elective –I Industrial Chemistry	4	40	60	100	3
	Part-IV SBS-1 Dairy Chemistry	2	40	60	100	2
	N.M.E.-1-Health chemistry	2	40	60	100	2
	Total	30			600	21
	Part –I Tamil Paper IV	6	40	60	100	3
	Part –II English Paper I	6	40	60	100	4

IV	Part –III Core Paper V Organic & Physical Chemistry	4	40	60	100	4
	Major practical	4	40	60	100	4
	Allied Practical	3	40	60	100	3
	Elective II Polymer Chemistry	3	40	60	100	3
	Part-IV SBS Lab Analytical Chemistry	2	40	60	100	3
	N.M.E.-2 Lifestyle Changing Chemicals In Modern Home Appliances	2	40	60	100	3
	Total	30			800	25
V	Core Paper -6 Organic Chemistry-II	5	40	60	100	4
	Core Paper -7 Inorganic Chemistry-II	5	40	60	100	4
	Core Paper -8 Applied Chemistry	5	40	60	100	4
	Core Paper -9 Analytical Chemistry & Organic Spectroscopy	5	40	60	100	4
	Elective III	3	40	60	100	3
	SBS- Renewable Energy Resources	2	40	60	100	2
	Practical: Gravimetric Analysis & Organic Compound Preparation	5	40	60	100	4
	Total	30			700	25
VI	Core Paper -10 Organic Chemistry-III	5	40	60	100	4
	Core Paper -11 Physical Chemistry-II	5	40	60	100	4
	Core Paper -12 Electro Analytical Techniques	5	40	60	100	4
	Core Paper -13 Advanced Field In 21 st Century Chemistry	5	40	60	100	4
	Elective -4 Pharmaceutical Chemistry	3	40	60	100	3
	SBS-4-Leather Technology	2	40	60	100	2
	Practical Physical Chemistry Experiments +-----	5	40	60	100	4
	Total	30			700	25

Department	CHEMISTRY	
COURSE	B.Sc.,CHEMISTRY(under TANSICHE)	Effective from 2014-2015
Subject code:	I-year	Semester-I
Title	CORE PAPER-I INORGANIC CHEMISTRY-I	Max.marks:60 Pass.min:40/100
Hrs/ week	5	Credit:4
Objectives:	<ol style="list-style-type: none"> 1. To understand the periodic table and periodic properties. 2. To know chemical bonding and its types. 3. To understand energetic, basics of acids and bases and the fundamentals of rare gases. 4. To grasp the basics of metallurgy. 5. To know the basics of nuclear chemistry and radioactivity. 	
UNIT	CONTENT	Hrs
UNIT-I	<p>ATOMIC STRUCTURE & PERIODICITY:</p> <p>Atomic orbital-quantum numbers and their significance- shape of atomic orbital-g and u character of atomic orbital-nodal points and nodal planes-principles governing the occupancy of electrons in various quantum levels-Paulis exclusion principles-Hunds rule of maximum multiplicity-Aufbau principle (n+l) rule- writing practice for electronic configuration of vital elements in s,p,d,f block elements- stability of half-filled and completely filled orbital with suitable examples.</p> <p>Long form of periodic table- characteristics-classification of elements on the basis of electronic configuration- periodic properties-cause of periodicity-explanation of atomic radii, ionic radii , electron affinity, ionization energy, electronegativity -factors affecting their magnitudes.</p>	12

UNIT-II	NUCLEAR CHEMISTRY-I a. Constitution of the nuclei-stable and unstable nuclei-their relationship to n/p ratio-magic number-mass defect and binding energy-whole number rule-packing fraction-mass energy relationship. b. Natural radioactivity-detection and measurement of radioactivity-soddy's-group of displacement law. c. Artificial radioactivity-definition-different types of artificial radioactivity-brought about by accelerated particles. d. Artificial transmutation of atoms by projectiles-spallation.	12
UNIT-III	CHEMICAL BONDING a. Introduction : Octet rule – types of chemical bonds – ionic, covalent, coordinate, hydrogen (inter and intra) and metallic bonds with suitable examples. Comparison between ionic and covalent bonded compounds. b. Chemical bonding: Valency bond approach- types of overlapping – σ and π bonds. Concept of hybridization and geometry of molecules. $sp, sp^2, sp^3, sp^3d, sp^3d^2$ with suitable examples, VSEPR theory-shapes of some simple inorganic molecules- $BeCl_2, SiCl_4, PCl_5, SF_6, IF_7, XeF_6, NH_3$ & H_2O . c. Molecular orbital theory: Bonding and anti-bonding molecular orbitals-relative order of energies of molecular orbitals- MO theory applied to homonuclear molecules- Hydrogen, Helium, nitrogen and oxygen- heteronuclear molecules- HF and CO- comparison of VB and MO theories.	12
UNIT-IV	a. Lattice energy -definition- ionic crystals, NaCl and CsCl crystal structure – determination of lattice energy	12

	<p>using Born-Haber cycle-factors affecting crystal lattice energy-properties of ionic crystals (higher melting point, hardness, electrical conductivity in solution)-Fajan's rule-polarization-polarising ability-vanderwaals forces-ion-ion dipole interactions.</p> <p>b. Acids and Bases: Modern concepts of acids and bases-Arrhenius theory – Lowry theory- Bronsted theory- Lux-flood concept- Louis concept- Usanovich concept-leveling effect. Hard and soft acids and bases- definition-classification and few examples.</p>	
UNIT-V	<p>a. Metallurgy: Occurance of metals – minerals and ores – minerals wealth in India – steps involved in metallurgical process – concentration - calcinations-roasting- leaching- reduction to free metal- electro metallurgy- refining of metals- electrolytic- Van Arkel Deboer's process.</p> <p>b. Rare gases : Position of rare gases in the periodic table.</p> <p>c. Organic reagents in inorganic analysis :Preparation-spot tests – advantages- di advantages- DMG- aluminon-thiourea.</p>	12
	TOTAL HOURS/ SEMESTER	60
TEXT BOOKS	<p>1. R. Gopalan, P.S. Subramanian & K.Rengarajan, Elements of analytical chemistry.</p> <p>2. P.L.Soni , Text books of inorganic chemistry, S.Chand & Co., New Delhi.(2006).</p> <p>3. B.R.Puri & Sharma, L.R and Kalia, Principles of inorganic chemistry, New Delhi (2002).</p> <p>4. Selected topics in inorganic chemistry, R.D.Madhan, Malik & Tuli, S. Chand & Co., New Delhi, (2006).</p>	
REFERENCE	<p>1. F.A.Cotton and Wilkinson, Basic inorganic chemistry.</p>	

BOOKS	<p>2. R.D.Madhan, advanced inorganic chemistry S.Chand & Co., New Delhi, (2006).</p> <p>3. Advanced inorganic chemistry – Gurdeep chatwal, Goel Publishing House, 10th edition 1987, New Delhi.</p>
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DEPARTMENT	CHEMISTRY	EFFECTIVE
Course	B.Sc., Chemistry (underTANSCHE)	FROM 2014-2015
Subject code	III- year	semester VI
Title	CORE PAPER-XIII ADVANCED FIELDS IN 21St CENTURY CHEMISTRY	Max.Marks:60 Pass. Min:40/100
Hrs/Week		Credit: 5
UNIT	CONTENT	Hrs.
UNIT-I	NANOTECHNOLOGY: a.Introduction-meaning of ‘nano’-history of nano materials-Moore’s law-nano science the multidisciplinary science. b.Nano materials: Top-down-and bottom-up approach-examples of the bottom-up approach-different types of nano materials: one dimensional materials-carbon nano tubes-types of carbon nano tubes SWNT & MWNT-two dimensional nano materials. c.Properties of nano materials: Different types of nano materials & their sizes – M.pt-quantum effects-size dependent properties of cdse carbon nano tubes & graphene.	15
UNIT-II	NANOTECHNOLOGY -II: a.Preparations of nano materials: Different methods of preparing nano materials- hydro thermal and salvo thermal methods- salvothermal reaction- inorganic nano tubes- assembling nano materials- preparation of metals nano particles, grapheme, gold nano particles, ZnO	15

<p>UNIT-III</p>	<p>nano wires, carbon nano tubes and copper sulphide nano films.</p> <p>b. Analysis of nano particles: Study of nano materials under TEM, SEM, STM & AFM-working of TEM, STM & AFM</p> <p>NANOTECHNOLOGY-III :</p> <p>a. Definition of nanotechnology- nano biotechnology- definition and explanation.</p> <p>b. Applications: applications of nano technology in nano cosmetics, textile, nano sensors, cancer therapy, silver nano particles and water purification , nano computers, MRI with magnetic nano particles and nano materials for energy.</p>	<p>15</p>
<p>UNIT-IV</p>	<p>GREEN CHEMISTRY –I :</p> <p>a. Introduction – definition- green chemistry- need of the day- twelve principles of green chemistry- atom economy.</p> <p>b. Solvent free microwave- assisted organic synthesis: Introduction- solvent – free techniques- microwave activation- benefits and limitations of microwave assisted synthesis.</p> <p>c. Non- traditional (greener alternatives to functional group transformation, condensation, oxidation and reduction reaction (one example each).</p>	<p>15</p>
<p>UNIT-V</p>	<p>GREEN CHEMISTRY –II :</p> <p>a. Ionic liquids: definition- examples- synthesis- tuneable physical properties- application in organic synthesis- hydroformylation of olefins, carbonylation, aryl halides, dimerisation of</p>	<p>15</p>

<p>REFERENCE BOOKS:</p>	<p>butadiene, Diels Alder reaction and total synthesis of pravadoline. General uses of liquids.</p> <p>b.Super critical fluids: definition- basic principle of SFE (super critical fluid extraction)- choice of solvent for SFE- advantages of SFE technology- applications of SFE.</p> <p>c.Super critical Carbondioxide.</p> <p>CO₂ as super critical fluid- features of technique for using super critical CO₂. Advantages and applications of super critical CO₂.</p> <p>TOTAL HOURS/SEMESTER</p> <p>1.Nano world- “An introduction to nano science & technology” – CNR RAO third edn. 2013.Nava Karnataka publication pvt.ltd.</p> <p>2.Green chemistry- environment friendly alternatives- editors: Rashmisanghi. MM. Sri vasta fourth re-print 2009. Norosa publishing house pvt. Ltd.</p>	<p>75</p>
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Department	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(Under TANSCHÉ)	Effective from 2014-2015
Subject code	I – Year	Semester: I
Title	CORE PAPER-2 ORGANIC CHEMISTRY-I	Max. Marks: 60 Pass. Min: 40/100
Hrs/Week	5	Credit:4
Objectives	<p>To Know The Fundamental Concepts of Organic Chemistry and its Reactions.</p> <p>To study the reactions mechanisms and properties of Aliphatic hydrocarbons like alkanes, alkenes, and alkynes.</p>	
Unit	Content	Hrs
Unit:I	<p>Fundamental concepts:</p> <p>Introduction to Organic Chemistry sources and classification of Organic compounds.</p> <p>Nomenclature of Organic compounds Functional groups : Definition – various functional groups – common and IUPAC system of naming Aliphatic and Aromatic hydrocarbons up to 10 carbon atom system and the other functional derivatives.</p> <p>Detection and estimation of elements: Lassaigne’s test. Beilstein test. Estimation of nitrogen by Kjeldahl’s method, Halogens and Sulphur by Carius method.</p> <p>Purification techniques-Fractional distillation, sublimation and crystallization.</p>	12

	<p>Molecular weight of Organic acids and bases-Silver salt method for acids, Platinic chloride method for bases. Problems in determining empirical and molecular formula-differences between them.</p>	
Unit:II	<p>Organic reactions, types of bond cleavages & Reaction intermediates</p> <p>Tetrahedral arrangement of valencies of carbon atoms.</p> <p>Electrophillic and Nucleophillic reagents-Definition and examples.</p> <p>Cleavage of bond: Homolytic and Heterolytic Cleavages of Carbon bond.</p> <p>Electronic effects: Inductive, Electromeric, Resonance effects and hyper conjugation.</p> <p>Reaction intermediates: Free radicals, Carbonium ion, (carbocation) Carbanions and Carbenes generation and their stability.</p> <p>Structure of Organic Molecules involving hybridisations sp, sp^2 & sp^3 .</p>	12
Unit :III	<p>Aliphatic hydrocarbons:</p> <p>Alkanes: Introduction- Sources- Prepration by wurtz synthesis, decarboxylation and using Grignard reagents-reactions- halogenations-free radical mechanism of halogenations of alkanies-cracking and Pyrolysis – Octane number- flash point- synthetic petrol, natural gas.</p> <p>Alkenes: Introduction- classification of alkenes, Physical properties- Preparation by dehydrohalogenation of Rx- dehydration of alcohols & by heating quaternary ammonium salts- Hoffmann’s rule and saytzeff rule with examples. Reactions of alkenes- Electrophillic addition of Br_2 and HBr- Markownikoff’s rule with examples- Peroxide effect with examples</p>	

	<p>Dienes: Classification-isolated-cumulated and conjugated double bond systems-Diels- Alder reactions-1,2 and 1,4-addition mechanism in butadiene- Geometrical isomerism of dienes.</p>	
Unit:IV	<p>Alkynes: Introduction-preparation of alkynes acidity of alkynes. substitution, Hydrogenation, ozonolysis and combustion reactions of alkynes(Mechanism not necessary)</p> <p>Alkyl halides-preparation and chemical properties of alkyl halides(Mechanism not necessary)</p> <p>Isomerism- Structural, chain, position, functional isomerism and Metamerism- Explanation with examples.</p>	12
Unit:V	<p>Types of Organic Reactions:</p> <p>Detailed mechanism of aliphatic nucleophilic substitution reactions- SN^1 ,SN^2 , SN^i reactions.</p> <p>Detailed mechanism of aliphatic elimination reactions: E^1,E^2,E_{ICB} reactions-substitution Vs elimination – polymerization reaction - types- explanation with suitable illustrations- Rearrangement reactions involving alkanes, alkenes and alkynes.</p>	12
	Total hours/semester	60

Reference Books	Bahl B.S., Arun Bahl, Advanced Organic Chemistry (12 th edition) New Delhi, Sultan Chand and Co., (1997), (Text Book). Organic Chemistry, P.L. Soni, Sulthan Chand & Co. Edition 2006. (Text Book). Modern Organic Chemistry 4 th Edition Jain & Sharma Ushal Publishing Company Jalandhar
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Department	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(Under TANSCHÉ)	Effective from 2014-2015
Subject code	I-Year	Semester: II
Title	CORE PAPER-3 PHYSICAL CHEMISTRY-I	Max.marks:60 Pass. Min: 40/100
Hrs/Weeks	6	Credit:4
Objectives	<p>1. To study the Kinetic Theory of gases and the related Derivations.</p> <p>2. To know the fundamentals and properties of liquid, solid and colloidal states.</p> <p>3. To understands the importance of distribution law, adsorption and applications of catalysis.</p>	
Unit	Content	Hrs
Unit I	<p>Kinetic Theory of gases</p> <p>a. Postulate of kinetic theory of gases-Derivations of ideal gas laws from the expressions on the basis of kinetic theory of gases-deviation-Vander waals equation- Equation of state- Clausius, Berthelot and Dieteric equation of state-Reduced equation of state, Law of corresponding states-expansivity and compressibility factor for gases-Boyle and inversion temperatures of gases.</p> <p>b. P-V isotherms of ideal and real gases-Andrew's</p>	12

	<p>experiments-critical state of gases-definition and determination of critical constants-relation between critical and Vanderwaal constants.</p> <p>c. Maxwell-Boltzmann law of distribution of velocities(Derivations not necessary)-graphical representation-effect of temperature on various velocities comparison of RMS, average and most probable velocities.</p> <p>d. Mean free path-viscosity of gases-Collision diameter, collision frequency collision, Brownian movement and determination of Avogadro number-Loschmidt number-principle of equipartition of energy.</p>	
Unit: II	<p>Liquid state</p> <p>a. Nature of cohesive forces in liquids-Trouton's rule and its significance-structure of liquids-Liquid crystals-types-theory of liquid crystals-their applications.</p> <p>b. Physical properties and chemical constitution: Molar volume and its applications Surface tention-influence of temperature on surface tention-Parachor-atomic and structural Parachors-applications Viscosity-influence of temperature on viscosity-Rheochor. Refraction-refractive index-specific refractive index-molar,atomic and structural refraction-applications.</p>	12
Unit III	<p>Solid state</p> <p>1. Isotropy and anisotropy-symmetry in crystal system,space lattice unit cell-Bravais lattice- seven crystal systems-laws of crystallography-law of constancy of interfacial angle-law of symmetry-law of rational indices-</p>	

	<p>miller indices-symmetry elements in crystal systems-X-ray diffraction-Braggs equation-experimental method of determination of interplanar spacing-calculations involving interplanar spacing in crystal.</p> <p>2. Types of crystals-ionic, molecular, covalent and metallic crystals.</p> <p>i. Ionic crystals: Analysis of KCl-determination of Avogadro number</p> <p>ii. Molecular crystals-Water and Ammonia.</p> <p>iii. Covalent crystals-diamond and graphite.</p> <p>iv. Metallic crystals: Metallic bond in metals.</p> <p>v. Conductors, insulators and semiconductors -Frankel and Schottky defects.</p>	12
Unit IV	<p>Colloids states</p> <p>a. colloids definition –various types-classifications-preparation by dispersion and condensation methods .Berdig’s Arc Method Lyophilic and lyophobic colloids-differences between them – purification of colloids.</p> <p>b. Solids in liquids(sols)properties-kinetic, optical &electrical-stability of colloids and protective action-Hardy Schulze Law-gold Number.</p> <p>c. Liquids in liquids(Emulsion)types-emulsifier with examples.</p> <p>d. Liquids in solids(Gels)-classification-preparation-properties-thixotropy-syneresis and imbibition-donnan membrane equilibrium-application of colloids.</p>	12
Unit V	<p>Adsorption , Distribution law and Catalysis</p> <p>a. Adsorption: Definition of various terms – adsorption of gases on solids-characteristics of adsorption of gases on solids –physical and chemical adsorptions-factors</p>	

	<p>influencing adsorption-adsorption isotherms Langmuir, Freundlich-BET –Theory (elementary idea only)</p> <p>b. Distribution law: statement- validity –conditions- modification of law for association , dissociation ,and chemical combination of solute with one of the solvent – applications</p> <p>c. Catalysis: Definition –characteristics-theories of catalysis- types of catalysis – promoters - poisons- enzymes catalysis- mechanism-Michaelis -menton equation (no derivation) Application of catalysis</p>	12
	Total hours/Semester	60

Reference Books	1.Puri B.R., Sharma L.R., Pathania, M.S., Principles of physical Chemistry(23 edition),New Delhi, ShobanLal, Nagin Chand &Co., (1993).
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Dept.	CHEMISTRY	
Course:	B.Sc.,CHEMISTRY(Under TANSICHE)	Effective from 2014-2015
Subject code	II –year	Semester: III
Title	CORE PAPER-4 ORGANIC,INORGANIC & PHYSICAL CHEMISTRY	Max.Marks: 60 Pass.Min: 40/100
Hrs/Week	5	Credit:4
Objectives	<p>1. To study about Alcohols, ethers, Thio alcohol and thioethers.</p> <p>2.To know the preparation and synthetic applications of Poly halogen derivatives.</p> <p>3. To study the chemistry of S, p, d block elements.</p> <p>4. To understand the basics of volumetric analysis and the importance of oxidation and reduction reactions.</p>	
Unit	Content	Hrs
Unit I	<p>Alcohols:</p> <p>a. Preparation by hydroboration, reduction of carbonyl compounds- oxymercuration and demercuration, acids and esters by using Grignard reagents. Reaction with metals. Mechanism and reactivity towards HX,dehydration- Ascending and descending the alcohol series. Rectified spirit- absolute alcohol, methylated spirit, power alcohol-estimation of number of hydroxyl groups.</p> <p>b.Ethers: Mechanism of Williamson's synthesis mechanism of cleavage by HX-estimation of methoxy group by</p>	12

	<p>Zeisel's method</p> <p>Introduction to crown ethers structure, Application of crown ethers.</p>	
Unit II	<p>Polyhalogen Derivatives:</p> <p>a. Polyhalogen derivatives: Chlorofluoro carbons –westron and Freon-Preparation and applications. Preparation and properties of CHCl_3, CHI_3 and CCl_4.</p> <p>b. Halogen derivatives of unsaturated hydrocarbons: vinyl chloride and Allyl chloride-Preparation&reactivity. Polymerisation reaction of vinyl chloride.</p> <p>c. Organo Metallic Compounds: Grignard reagents-preparation, structure and synthetic applications, limitations, Organozinc and organolithium compounds-preparation & synthetic applications.</p>	12
Unit III	<p>Chemistry of s-block elements:</p> <p>a. Elements of group IA-General discussion of elements of group IA-Diagonal relationship of Li with Mg- Anomalous behaviour of lithium- extraction of lithium- properties of lithium- analytical reaction of Li.</p> <p>b. Elements of group IB- general discussion –position in the periodic table,Resemblance among Cu, Ag, Au –Gradation in their properties – Resemblance between coinage metals and the VIII group elements.</p> <p>c. Elements of group IIA – Group discussion –diagonal relationship between Be and Al – Anomalous behaviour of Be – comparison of group IA and group IIA elements.</p>	12
Unit IV	<p>Chemistry of p-block elements:</p> <p>a. General discussion of group IV elements – Preparation properties and uses of carbonyl chloride – lead monoxide – red</p>	

	<p>lead – white lead.</p> <p>b. General discussion of group V elements – active nitrogen – preparation and properties of hydrazine, hydrazoic acid and hydroxyl amine – Marsh test for arsenic.</p> <p>c. Peracids and their salts – definition – peracids of carbon – permono and perdicarbonic acid – permono carbonates and perdicarbonates – peracids of sulphur – permono and perdisulphuric acid.</p> <p>d. Oxidation and Reduction: oxidation and Reduction – Modern electronic concept oxidation number concept – calculation of oxidation number redox reactions balancing ionic reactions involving only $\text{Cr}_2\text{O}_7^{2-}$, Fe^{2+} and MnO_4^{2-} ions in acid medium by oxidation number method. Equivalent weight of oxidizing and reducing agents.</p>	12
Unit V	<p>Thermodynamics–I & Chemical Equilibrium</p> <p>a. Introduction: Types of systems – state of a system – thermodynamic or state variables – extensive and intensive properties – state and path functions – Exact and inexact differentials- Thermodynamic process – Reversible and irreversible processes – Work, Heat & energy – Zeroth law of thermodynamics and its significance .</p> <p>b. Thermochemistry: Significance of Hess law of constant of Summation- Kirchoffs equation- Bond enthalpies and energies.</p> <p>C. Law of mass action- Relation between K_c and K_p -Lechatlier principle and its application to Habers process –Common ion effect in ionic equilibria.</p>	12

Reference Books	<ol style="list-style-type: none">1. P.L.Soni, Text books of Inorganic Chemistry, S.Chand & Co., New Delhi,(2006).2. B.R.Puri, Sharma, L.R. and Kalia, Principles of Inorganic Chemistry, New Delhi (2002).3. Douglas A. Skoog and Donald M.West, principles of Instrumental of Analytical.4. Bahl B.S., Arun Bahl, Advanced Organic Chemistry (12th edition) New Delhi, Sultan Chand and Co., (1997), (Text Book).5. Organic Chemistry, P.L.Soni, Sultan Chand & Co. Edition 2006. (Text Book).6. Advanced inorganic chemistry, R.D. Madhan, Malik and Tuli, S. Chand & Co., New Delhi,(2006).7. R.D.Madan, advanced inorganic chemistry S.Chand & Co., New Delhi,(2006).8. Puri B.R.Sharma L.R.Pathania, M.S. Principles of Physical Chemistry (23rd Edition), New Delhi, Shoban Lal, Nagin Chand & Co.(1993)
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Department	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(Under TANSICHE)	Effective from 2014-2015
Subject code	II-Year	Semester:III
Title	Elective-1 INDUSTRIAL CHEMISTRY	Max.Marks:60 Pass.Min: 40/100
Hrs/Week	4	Credit:3
Unit	Content	Hrs
Unit - I	<p>Glass and Ceramics : Glass – General properties of glass – types of glasses – manufacture of glass – Ceramics – classification – clay products – white wares – chemical store wares - plasticity of clay – manufacture of white pottery, glazing, Earthen wares.</p> <p>Refractories: Definition –classification, properties of refractories – manufacture of refractories, fire clay bricks manufacture, uses of fire clay refractories - High alumina refractories – uses – silicon carbide refractories - properties and use.</p>	10
Unit - II	<p>Paints and varnishes: Paint – definition – classification of paints based on their applications – constituents – Requisites of a good paint – emulsion paints Varnishes – Definition – constituents of varnish – characteristics of a good varnish – uses – japans varnish. Enamel - definition – Types, Ingredients and uses.</p> <p>Pigments: Definition – composition, characteristics and uses</p>	10

	of white lead, zinc oxide, Lithopone and TiO ₂	
Unit - III	Soap and Detergents: Soap – Definition – General consideration in soap making – manufacture of soap – Hot and Cold process – transparent soaps - properties. Detergents – Definition – classification of face active agents cleaning action of soap deference between soap & detergents. Silicones: Preparation & uses.	10
Unit - IV	Portland Cement: Introduction – types of cements composition manufacture & selling of cement. Corrosion: Dry and Wet corrosion – Electrochemical theory of Corrosion- Mechanism –Galvanic corrosion, Concentration cell corrosion Waterline Attack – Pitting – passivity- stress corrosion – Corrosion control methods.	10
Unit - V	Fundamentals of Batteries – Classification of Batteries – Sizes of Batteries - Primary Batteries Le'clanche Dry Cell – Magnesium Dry Cell - Secondary Batteries – Lead Acid Battery – Alkaline Storage -Batteries. Fuel cells(hydrogen- oxygen.	10
	Total Hours/Semester	50
Reference Books	<ol style="list-style-type: none"> J.C. Kuriacose, J. Rajaram – Chemistry in engineering and Technology – Vol-2 Tata McGraw – Hill Publishing Company Limited – New Delhi – 1979. P.C.Jain & Manika Jain – “Engineering Chemistry” 15th Ed., (2005), Dhanpath Raj publishing company, New Delhi. B.K.Sharma - “Industrial Chemistry”, 1st Ed., (1984), Goel Publishing House – Meerut. P.L.Soni, H.M.Chawla – “Text Book of Organic Chemistry” (1994), Sultan Chand & Sons, New Delhi. 	

	<p>5. Arun Bahl and B.S.Bahl - "Text Book of Organic Chemistry" 11th and 18th Ed., S.Chand, New Delhi.</p> <p>6. Krishnamoorthy, P.Vallinayagan & K.Jaya Subramanian – "Applied Chemistry", 2nd Ed., (1999-2001), Tata McGraw – Hill Publishing Co Ltd., New Delhi.</p>
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Department	CHEMISTRY	
Course :	B.Sc., CHEMISTRY (Under TANSCHÉ)	Effective from 2013 – 2014
Subject code	II - Year	Semester : III
Title	NON MAJOR ELECTIVE – I HEALTH CHEMISTRY	Max.Marks:60 Pass.Min:40/100
Hrs/Week	2	Credit :2
Objectives	<ol style="list-style-type: none"> 1. To appreciate the role of chemistry in the service of humanity. 2. To understand the importance and application of various chemical compounds used in food , medicine , dairy farm foods and in day today life. 	
Unit	Content	Hrs
Unit I	Food chemistry I: Introduction – carbohydrates – classification - sources – uses. Proteins – occurrence characteristics – Food adulteration-Rice, milk, butter, wheat, ghee,- contaminants and detection-Brief note on consumer awareness.	5
Unit II	Food Chemistry II : a.Vitamins – definition – sources – classification daily human requirements – deficiency diseases b.Food poisons: Introduction- chemical Food adulteration- introduction only – Bordeaux mixture, Hg, Pb, DDT,BHC, Malathion in beverages (pesticide) SMG(aginomoto). Soft drinks –soda, fruit juices, alcoholic beverages – examples. Addiction and social	5

	problems.	
Unit III	<p>Chemotherapy :</p> <p>a.Antibiotics – Definition – different types – penicillin- tetracyclines – sulpha drugs – classification – sulphadiazine – sulphanilamide – applications.</p> <p>b. Antimalarials- types of malaria therapy – Chloroquine – plasmoquine – applications , c.Antipyrectics and Analgesis – Definition – paracetamol – uses .</p> <p>d.Anesthetics – types –uses .</p> <p>e.Antiseptics – Disinfectants – Definitions .</p>	5
Unit IV	<p>a.Milk -Composition of milk, milk processing, pasteurization .</p> <p>b.Fire protection – Major causes of fire fighting in homes – laps – methods of extinguishing fire – chemical / gas fire extinguishing .</p>	
Unit V	<p>Commonly used chemicals in day today life :</p> <p>Health benefits and ill effects – common salt – baking soda – vinegar – preservatives – soda water- sucrose – flavoring agents - importance and uses soaps and detergents – phenoyl – ink vim house hold – Teflon and aluminium (Altheimers disease) .</p>	5
	Total hourse / Semester	25

Course book	Study material prepared by the department	
Reference Books	<ol style="list-style-type: none">1. P L Soni and H.M Chawla ,Text book of Organic Chemistry , Sulthan Chand & Sons Educational Publishers , 29th edition , 1963 .2. P.L.Soni and Mohan Kstyal , Text book of Organic Chemistry , Sulthan Chand & Sons Educational Publishers , 20th edition 2007 .3. Industrial Chemistry by B.K Sharma , Goel Publishing House 1995 .4. A text books of applied chemistry by Thangammal Jacop , Mecomillan Company Ind Ltd .,1979 .	

Department	CHEMISTRY	
Course :	B.Sc., CHEMISTRY (Under TANSICHE)	Effective from 2014-2015
Subject code	II Year	Semester : III
Title	SKILL BASED SUBJECT -1 DAIRY CHEMISTRY	Max . Marks :60 Pass.Min:40/100
Hrs/Week	2	Credit :3
Objectives	<p>1. To appreciate the role of chemistry in the service of Dairy Chemistry.</p> <p>2. To understand the importance and application of various dairy products used in day today life .</p>	
Unit	Content	Hrs
Unit I	<p>Milk :</p> <p>General composition of milk - factors affecting the gross composition of milk , physic – chemical change taking place in milk due to processing parameters - boiling pasteurization – sterilization and homogenization .</p>	5
Unit II	<p>a.Milk lipids – terminology and definitions .</p> <p>b.Milk proteins : Physical properties of milk proteins with formaldehyde and ninhydrin .</p> <p>c.Milk carbohydrate – Lactose . Estimation of lactose in milk .</p> <p>d.Milk vitamins – water and soluble vitamins .</p>	5
Unit III	<p>a.Creams: Definition – composition – chemistry of creaming process .</p> <p>b.Butter : Definition - % composition – manufacture . Estimation of fat acidity , salt and moisture content Desi</p>	5

	butter .	
UNIT IV	<p>a.Milk powder : Definition need for making power – drying process spraying , drum drying , jet drying and foam drying – principle involed in each .</p> <p>b.Ice cream: Definition percentage composition – types – ingredients needed manufacture of ice – cream stabilizers – emulsifiers and their role .</p>	
Unit V	Dairy Detergents : Definition – charecteristics- classification – washing procedure (modern method) sterilization – chloramines – T and hypochlorite solution .	5
	Total hours / Semester	25
Reference Books	<ol style="list-style-type: none"> 1. Outlines of Dairy Technology Sukumar De . 2. Principles of Dairy Chemistry – Robert Jenness & S.Patarn . 3. Indian Diary products K.S.Rangappa and K.T Achaya . 	

Department	CHEMISTRY	
Course :	B.Sc., CHEMISTRY (Under TANSCHÉ)	Effective from 2014 – 2015
Subject code	III Year	Semester :IV
Title	ELECTIVE – 2 POLYMER CHEMISTRY	Max .Markss:60 Pass. Min :40/100
Hrs/Week	4	Credit :3
Objectives	<ol style="list-style-type: none"> 1. To highlight the commercially important polymers and their various forms. 2. To understand various industrial polymerization processes. 3. To highlight on average molecular weights. 4. To know preparation and properties of commercially important polymers. 	
Unit	Content	Hrs
Unit I	<ol style="list-style-type: none"> a. Basic Concept : Monomers, Polimers , Polimerization , Degree of Polimerization , Classification of polymers b. Plastics :Definition – Thermoplastic , Thermosetting plastics , Reinforced Plsatic. c. Elastomer : Definition – Natural & synthetic rubber –smoked rubber Reclaimed rubber – Foam rubbers – Spongy rubber – Laminate rubber d. Adhesives : Definition – thermosetting – Thermo resins e. Fibers: Definition – Natural and synthetic , Classification comfort safety - Industrial fibers . 	11
Unit II	Ionic Polymerization : Anionic and Cationic Polimerizations . Step growth polimerisation	10

	(Condensation polymerisation) Co-Polymerisation : Random – Alternating Block and Graft copolymers.	
Unit III	1. Stereo Regular Polymers : Isotactic , syndiotactic & Atactic Geometrical isomers . Factors influencing Structural regularity. 2. Ziegler- Natta catalysis - Bi metallic and Mono metallic mechanisms, Tg and Tm . Determination of Tg by differential scanning calorimeter . Tg of copolymers .	11
Unit IV	Molecular weight of polymers : Number –Average , Weight – Average , Sedimentation – Average & Viscosity – Average molecular weights . Molecular weight distribution GPC method – Average molecular weight and Degree of polymerisation . Determination of Average molecular weight , Light Scattering method , Viscosity method .	10
Unit V	Polymer processing techniques: Calendering , film casting , injection moulding. Preparation and uses of the following polymers . Polyethylene (LDPE & HDPE),P.V.C,Teflon , polystyrene , Nylon-6 , Nylon -6,6, Polyester , Phenol formaldehyde resins and Polycarbonates.	
	Total hours/Semester	52
Text Books	1. Gowariker , V.R ., Viswanathan,N.V.,Jeyadev Sreedhar , Polimer Science , New Age International (P)Limited , Publishers 13 th reprint ,(1999) . 2. Fred . W.Billmeyer, Jr.,Text Book of Ploimer Science ,Wiley-Interscience and Sons , Inc 2 nd edition -2011. 3. Jain. P.Cand Monika Jain.,Compiled by Trisha jain and jyothika Jain , engineering Chemistry , Rai Publishing compamy (P)Ltd.,15 th Edition , 2005.	

Reference Books	<ol style="list-style-type: none"><li data-bbox="488 191 1503 289">1. Mishra , G.S. Polimer chemistry , New Age International (P) Ltd., 2nd Reprint 1989 .<li data-bbox="488 302 1503 449">2. Charles G.Geberlein ,Brown ,Wm. C.,Chemistry And Our World Publishers (Singapore),ISBN069716574-4,1997.<li data-bbox="488 462 1503 627">3. M.Gopala Rao And Marshall Sitig , Drydens outlines of Chemical Technology for the 21st Centuary , East – west press , 3rdEdition,1997.
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Dept.	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(Under TANSCHÉ)	Effective from 2014-2015
Subject code	II-Year	Semester:IV
Title	Non-Major Elective-2 LIFE STYLE CHANGING CHEMICALS IN MODERN HOME APPLIANCES	Max.Marks:60 Pass.Min: 40/100
Hrs/Week	2	Credit:3
Objectives	<ol style="list-style-type: none"> 1. To appreciate the role of chemistry in the service of humanity and enhancing life style of sophisticated fast world. 2. To understand the importance and application of various chemical compounds used modern women friendly home appliances –Washing machines, Refrigerators- dish washers, vaccum cleaners, water purifiers- cleaning agents for LPG stoves. 	
Unit	Content	Hrs
Unit-I	Textile chemistry – Brief introduction to types fabrics- natural and synthetic fabrics (cotton, fur, jute, silk , polymeric , metallic) – durability and maintenance of cloths fading and introduction to natural and synthetic dyes for colouring textiles – starching process.	5

Unit -II	Soaps and Detergents – types of soaps surfactants – type – importance – fabric whiteness stiffeners- flavouring agents – ultramarines brighteners - selection of cost effective washing powders - pleasant odoured flavouring liquids for fabrics – collar and surf dirt remover liquids.	5
Unit -III	Dish washers – soft and hard utensil cleaning liquid soaps – brighteners. Efficient way of using and maintenance – significance in health hazards of corrosive chemicals used in manual cleaning of household vessels - awareness on health way of using cleaning chemicals in day - to – day life.	5
Unit - IV	Floor cleaning agents used in vaccum cleaners (Lysol, Phenyls/sanifresh)-de-odorants- Room air fresheners. LPG stove top a made up of SS, glass, GI, chromium alloys – cleaning liquids not affecting metals and glass. Anti-mosquito repellent machines- evaporators- liquid /solid/gaseous.	5
Unit- V	Chemicals used in water purifiers – Germicidal effect of UV radiation exposure – nutrient minerals- sedimentation alums- types of water purifiers – water born diseases-health care awareness on purified drinking water.	5
	Total hours/Semester	25

Course Book	Study material prepared by the department	
Reference Books	<p>1. Industrial Chemistry by B.K.Sharma, Goel publishing House 1995.</p> <p>Websites, manuals of home appliances-healthcare printouts from the hospitals related to the syllabus mentioned above.</p>	

Department	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(Under TANSCHÉ)	Effective from 2014-2015
Subject code	II-Year	Semester:IV
Title	Elective-2 LAB ANALYTICAL CHEMISTRY	Max.Marks:60 Pass.Min: 40/100
Hrs/Week	3	Credit:4
Unit	Content	Hrs
Unit I	Laboratory hygiene and safety: Storage and handling of chemicals, handling of ethers, Toxic and poisonous chemicals, general precautions for avoiding accidents, first aid techniques-acid and alkali on eye, acid and alkali burn- Bromine burns –cut by glasses- Heat burns- Inhalation of toxic vapours-poisoning- Treatment for specific poisons- acids, alkalis, acetone, arsenic and copper compounds, cyanides- universal antidote.	5
Unit II	Volumetric analysis: Standard solution, titration, equivalence point, end point, indicators, primary and secondary standards, expressing concentrations of standard solutions-Normality, Molarity, Molality and mole fraction Volumetric titrations-Acid base titrations – theory- strong acid Vs strong base, strong acid Vs weak base. Redox titrations- theory-Mohr salt Vs KMnO_4 , complexometric titrations-theory-EDTA titrations.	5
Unit III	Theory of precipitation- mechanism of precipitation, desirable properties of gravimetric precipitates- large particle size- factors affecting the particle size. Low solubility – factors affecting the solubility of precipitates co- precipitation post	5

	precipitation precipitates selective and specific precipitants – precipitation from homogeneous solution, masking and demasking agents- Digestion of the precipitate, filtration, washing and drying methods of obtaining the precipitate- Condition Choice of precipitant- merits and demerits of Organic Inorganic precipitants-Types – specific and selective precipitants Sequestering agents.	
Unit IV	Chromatography: Introduction – classification, partition, adsorption, ion exchange and exclusion. Electrophoresis- principles, types, working and applications, Column chromatography, Thin layer chromatography and paper chromatography- principles, techniques and applications.	5
Unit V	Principles of Physical chemistry Experiments. Conductometry, Potentiometry, pH meter, Chemical kinetics, Phase Diagram, Transition, Temperature, Polarimetry and molecular weight determination by Rast method.	5
	Total hours/Semester	25
Reference Books	1. R.Gopalan, P.S.Subramanian and K.Rengarajan, Elements of Analytical Chemistry.	

Dept.	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(UnderTANSCHÉ)	Effective from 2014-2015
Subject code	III -Year	Semester:v
Title	CORE PAPER-7 INORGANIC CHEMISTRY-II	Max.marks: 60 Pass.Min: 40/100
Hrs/Week	5	Credit:4
Objectives	<p>1.To understand the basics of coordination compounds and inner transition elements in the periodic table</p> <p>2.To introduce the basic of Bio inorganic chemistry and some compounds.</p> <p>3. To study the chemistry of halogens, boron family and silicates.</p>	
Unit	Content	Hrs
Unit -I	<p>Coordination Compounds</p> <p>Introduction-Nomenclature-isomerism in complexes - geometrical and optical-Werner's theory-sidgwick theory EANrule-Valence bond theory-low spin and high spin complexes-magnetic properties-Crystal field theory – Octahedraland square planer complexes-Color of coordination complexes-Metal carbonyls-bonding and structure of Ni(CO)₄,Cr(CO)₆,Fe₂(CO)₉ and Co₂(CO)₈-Application of Carbonyls.</p>	12
Unit-II	<p>The Inner Transition Elements</p> <p>a.The lanthanide series-Occurrence-Properties electronic configuration oxidation states- lanthanide contraction- consequences-causes,color,magnetic properties,basic character,solubility of compounds, complexes-Uses of lanthanides.</p> <p>b.The actinide series-Sources –Transuranic elements-Preparation-Electronic configuration-Properties- Oxidation states-Color of ions</p>	12

	Formation complexes-Comparison of actinide with lanthanides.	
Unit III	<p>Bio Inorganic Chemistry</p> <p>a. Structure and function of Metallo porphyrins-Chlorophyll- Vitamin B₁₂.</p> <p>b. Myoglobin and haemoglobin- structure- Their role in biological systems.</p> <p>c. Role of alkali and alkaline earth metal ions in biological systems- Role of Na⁺ and K⁺ ions sodium pump-Role of Mg²⁺ and Ca²⁺ ions.</p> <p>d. Biological functions and toxicity of elements- Cr,Cu,As and radioactive elements.</p>	12
Unit IV	<p>Halogens:</p> <p>Position of halogens in the periodic table anomalous behavior of fluorine-difficulties in the isolation of fluorine-modern method of isolation of fluorine-estimation of available chlorine in bleaching powder-structure-properties and uses perchloric acidpotassiumperchlorate.</p> <p>Oxides and oxyacids of bromine-brominating mixture –periodic acid-preparation-properties-uses-inter halogen compounds-polyhalides pseudohalogenes-basic iodine-comparative study of Halogens.</p>	12
Unit V	<p>a. Chemistry of Boron Family-Group discussion- Electron acceptor behavior and Electron deficiency of Boron hydrides bonding in diboranes. NaBH₄,LiBH₄- preparation-properties, structure and uses of Borozoles.</p> <p>b. Comparison between Carbon & Silicon-hydrides of silicon and silicates structure.</p> <p>c. Classification of silicates and its applications (elementary study only)</p>	12
	Total hours/Semester	60

Reference Books	<p>1.R.Gopalan,P.S.Subramanian and K.Rengarajan,Elements of Analytical Chemistry.</p> <p>2.PL.Sony,Text books of Inorganic Chemistry,S.Chand& Co.,New Delhi,(2006).</p> <p>3.B.R.Puri,Sharma,L.R. and Kalia Principles of Inorganic Chemistry, New Delhi (2002).</p> <p>4.Selected topics in Inorganic Chemistry,R.D.Madhan,Malik and Tuli,S.Chand & Co.,New Delhi,(2006).</p> <p>For further study:</p> <p>5.F.A.Cotton and Wilkinson,Basic Inorganic Chemistry.</p> <p>6. R.D.Madan,advanced inorganic chemistry S.Chand&Co.,New Delhi,(2006).</p>	
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Dept.	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(Under TANSICHE)	Effective from 2014-2015
Subject code	III –Year	Semester:V
Title	CORE PAPER-8 APPLIED CHEMISTRY	Max.Marks:60 Pass. Min: 40/100
Hrs/week	5	Credit:4
Objectives	1.To introduce and make the students to know about medicinal chemistry, herbal drugs, modern drugs. Hormens, vitamins and Chemotherapy. 2. To apply computer knowledge literacy to chemical applications	
Unit	Content	Hrs
Unit I	<p>Medical Chemistry</p> <p>a. Introduction to the different system of medicine;Ayurveda, Siddha,Homeopathy and Allopathy-History of medicinal chemistry.</p> <p>b.Analgesics and antibyretics; Narcotic analgesics- Morphine and derivatives.Totally synthetic analgesics – pethidine and methadones.(Medicinal uses and structure only)]Antipyretic analgesics-salicylic acid derivatives and P-amino phenol derivatives. (Medicinal uses and structure only)</p> <p>c.Diagnostic tests and estimation of sugar, salt(including lithium) and cholesterol in serum,urine etc.,</p>	12

<p>Unit II</p>	<p>a. Chemotherapy and application of a few drugs (Elementary study)</p> <ul style="list-style-type: none"> i) Sulpha drugs- Sulphadiazine, prontosil and prontosil S ii) Antimalarials-quinine, plasmoquine iii) Arsenical drugs-salvarasan-606-Neosalvarasan. iv) Antibiotics: Definition, Penicillin-Tetracycline (Auromycin and Terramycin) streptomycin and chloromyceitin-structure and uses. <p>b. Hormones and Vitamins:</p> <ul style="list-style-type: none"> i) Definition and classification, Testosterone, Progesterone, Thyroxine, Vitamin C structure only (Structural elucidation not necessary) <p>c. Anesthetics:</p> <ul style="list-style-type: none"> i) Gaseous anesthetics- Vinyl ether-Cyclopropane-Halohydrocarbons-Chloroform-Halothane-Trichloroethylene-Intravenous anesthetics-Thiopentone-Local anesthetics-Cocaine and its derivatives. 	<p>12</p>
<p>Unit III</p>	<p>a. Rubber:</p> <p>Natural and synthetic rubbers- composition of natural rubber, Neoprene, Styrene-Butadiene rubber (SBR).</p> <p>b. Polymer Chemistry</p> <p>Types of polymerization – Addition and Condensation-Mechanism-Copolymer-Definition with Examples Homopolymer-Definition of natural and synthetic fibres-natural and synthetic resins- distinction between plastics – classification of plastics-properties- Bakelite, Urea formaldehyde resins, Deflons, Nylon-66 and Dacron.</p> <p>c. Oils and Fats:</p> <p>Saponification value, iodine value Reichert-Meissan value, Acid value, Definition and their determination-Applications-Manufacture of soap-detergents-cleansing action</p>	<p>12</p>

	of soap and detergents.	
Unit IV	<p>a.Fertilizers: Definition- Nutrients for plants –Role of various elements in plant growth- natural and chemical fertilizers- classification of chemical fertilizers – Urea, super phosphate and potassium nitrate- mixed fertilizer- fertilizer industry in India.</p> <p>b.Insecticides and pesticides: Definition- classification- inorganic pesticides-preparation and application –Lead arsenate, paris green, limesulphur,hydrocyanic acid,organic pesticides,natural and synthetic – fungicides-repellants.</p> <p>c.Preparation of domestically useful chemical products; Washing powder, cleaning powder – phenols(white, black and colour)-shampoo, incense sticks, liquid blue, blue red and green inks, soap soil, face powder and pain balm.</p>	
Unit V	<p>a.Match industry: Pyrotechnics and explosives- Raw materials needed for match industry- Manufacturing process- Pyrotechnics- Colored smokes explosives-Definition- Classification- Nitroglycerine, Dynamite, Cordite,TNT and Picric acid.</p> <p>b.Silicate Industry: Raw materials & Manufacture of cement, Glass&Ceremics.</p> <p>c.Paints and Lacquers: Pigment- Paints- Ingredients in paints- Manufacture- Lacquers- Varnishes.</p>	
	Total hours/Semester	60
Reference Books	1.Grodman and Gilman’s “The Pharmacological basis of therapeutics”. 2.Pharmacology, Mary J. Mycek and Richard A. Harvey 2 nd Edition 2000 3.Foy’s principles of Medicinal Chemistry,David A Williams and Thomas	

- L.Lemke Edn. V,2002.
- 4.Hand book of experimental Pharmacology S.K.Kulkarni,3rdEdn.1999.
 - 5.A text book of Pharmaceutical Chemistry Jeyashree Ghosh S.Chand &Company Ltd.,1997.
 6. Pharmaceutical Chemistry, Dr.S.Lakshmi Sultan Chand &Sons,2004.
 - 7.Industrial Chemistry. B.K.Sharma Goel Publishing house,Edn XIV,2004.
 - 8.Pharmaceutical Manufacturing encyclopedia,Vol-I and II 2nd Edn 2000.
 - 9.Unit process in organic synthesis, Grogging 5th Edn 2000.
 - 10.Biopharmaceutics and Pharmokinetics D.M.Brahamanikava and Sunil.,B.Jaiswal, Edn. XIX,2004.
 - 11.Lakshmi S.Pharmaceutical chemistry, S.Chand&Sons, 1995, New Delhi.
 - 12.Ashutosh Kar, Medicinal Chemistry,Wiley Eastern Ltd.,1993, , New Delhi.
 13. David William& Thomas Lemke, Foyes principles of medicinal chemistry , 5 edition 2005, B1 publishers.
 - 14.Romas Nogrady,Medicinal Chemistry, IIEdition 2004, Oxford Univ.Press.
 - 15.Bio Chemistry by Ambikashanmugam.
 - 16.C.Progrmming by G.Balagursamy.
 - 17.Instant notes by Parker.
 18. Applied Chemistry by Than gamal Jacob.

Dept.	CHEMISTRY	
Course:	B.Sc. ,CHEMISTRY(Under TANSCHÉ)	Effective from 2014-2015
Subject code	III-year	Semester: V
Title	CORE PAPER-9 ANALYTICAL CHEMISTRY AND ORGANIC SPECTROSCOPY	Max.Marks: 60 Pass.Min: 40/100
Hrs/Week	5	Credit :4
Objectives	1. To study the analytical chemistry	
Unit	Content	Hrs
Unit -I	<p>Introduction to analytical chemistry:</p> <p>Types of analytical methods : Importance of analytical methods is Qualitative and Quantitative analysis - chemical and instrumental methods - advantages and limitations of chemical and instrumental methods</p> <p>Simple First Aid procedure for accidents involving acids , alkalis , bromine, burns and cut by glass. Carcinogenic chemicals – toxic and poisonous chemicals- First Aid Technique for poisoning – methods of expressing precision waste disposal – fume disposal-methods only.</p> <p>Evaluation of Analytical data : Idea of significant figures- its importance. Accuracy - methods of expressing accuracy. Error analysis – types of errors – minimizing errors. Precision – methods of expressing precision Mean, Median, Mean deviation, standard deviation and</p>	12

	confidence limit.	
Unit –II	<p>Quantitative analysis:</p> <p>Estimations of commercial samples- Determination of percentage purity of samples – pyrolusite –Iron ore – washing soda and Bleaching powder estimation of glucose and phenol.</p> <p>Gravimetric analysis – Principle – Theories precipitation – solubility product and precipitation – conditions of precipitations – Types of Precipitation – purity of precipitates – Co-precipitation – Post Precipitation – precipitation from homogeneous solution – use of sequestering agents.</p>	12
Unit - III	<p>a .UV spectra: Allowed electronic transitions – conditions for a molecule to be UV active – absorption maxima (max) – applications of UV spectra.</p> <p>b. IR spectra – spectral range – conditions for a molecule to be IR active – mode of vibrations – calculations of IR bands for water and carbon - di- oxide molecule. Finger print region – IR frequency range of functional groups like aldehydes, ketones , acids, acidamide and primary amines only.</p> <p>NMR spectra – conditions for a molecule to be NMR active equivalent and non-equivalent protons – splitting of NMR signals – detailed study of NMR spectrum of ethanol – importance of reference compound TMS (Tetra methyl silane) – applications of NMR spectra.</p>	12
UNIT – IV	a. Mass spectroscopy – Base peak, molecular ion peak and isotopic peak. Spectrum of neopentane , benzene and ethyl bromide	

	<p>b. Raman spectra – theory of Raman Spectra –stoke and anti-stoke lines – conditions for a molecule to be Raman active – comparison of Raman and IR spectra. Applications of Raman spectra only in structural equilibria and mechanism of tautomerism.</p> <p>c. ESR spectra – conditions for a molecule to be ESR active – ESR spectrum of methyl radical and naphthalene ion – application of ESR.</p>	12
Unit - V	<p>Chromatography techniques :</p> <p>Column/chromatography- principle, types of absorbents, preparation of the column, elution , recovery of substances and applications. Thin layer chromatography – principle, choice of adsorbent and solvent, preparation of chromatoplates , Rf – values, factors affecting the Rf – values, significance of Rf- values. Paper chromatography- principle, solvents used ,Development of chromatogram, ascending , decending and radial paper chromatography, paper electrophoresis separation of amino acids and other applications, Ion – Exchange chromatography – principles- types of resins – requirements of a good resin – action of resins. Gas chromatography – principles – types of resins – requirements of a good resin – action of resins .Gas chromatography- principle – Experimental techniques – Instrumentation and applications. High pressure Liquid chromatography – (HPLC)- principles – Experimental techniques,Instrumentation and advantage.</p>	12
	Total hours/semester	60

<p>Reference Books</p>	<ol style="list-style-type: none"> 1. Douglas A. Skoog and Donald M. West, F.J. Holler, Fundamentals of Analytical Chemistry, 7th edition, Harcourt College publishers. 2. Mendham J., Denney R.C., Barnes J.D., Thomas M., Vogel's Text book of Quantative chemical analysis 6th edition, Pearson education. 3. sharma B.K., Instrumental methods of chemical Analysis, Coel publishing House, Merrut. (1997) 4. Gopalan R., Subramaniam, P.S and Rengaraj k., Elements of Analytical Chemistry, Sultan Chand and Sons. 5. Usharani S., Analytical Chemistry, Macmillon. 	
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Department	CHEMISTRY	
Course:	B.Sc.,CHEMISTRY(Under TANSCHÉ)	Effective from 2013-2014
Subject code	III-Year	Semester: V
Title	SKILL BASED SUBJECT-4 LEATHER TECHNOLOGY	Max.Marks:60 Pass.Min: 40/100
Hrs/Week	2	Credit: 2
Unit	Content	Hrs
Unit I	History of tanning industry in India - Conventional tanning process animal skin.	5
Unit II	Manufacture of leather ,preparation of hides for tanning,use of various inorganic and organic chemicals for tanning process	5
Unit III	Various processes of tanning - soaking liming , deliming , dehairing and bating .	5
Unit IV	Vegetables tanning , type of tanning for soles ,belting and heavy leather. Vegetable tanning – synthetic tanning , chrome tanning , finishing of leather.	5
Unit V	Environmental Pollution Pollution problems caused by tanneries and its control treatment of tannery effluents by primary secondary and tertiary processes , Uses of reverse Osmosis sytem for the treatment of polluted water .	5
	Total hours/Semester	25
	Visit to an industry and submission of Report . for industrial visit / Assignment = 5 marks (Internal) .	

	Contact District Industrial Centre (DIC for visits).	
Text Books	Industrial chemistry including chemical engineering - B.K. Sharma – Goel Publishing House 13th Revised and Enlarged Edition .	

Department	CHEMISTRY	
Course:	B.Sc.,CHEMISTRY (Under TANSCHÉ)	Effective from 2013 – 2014
Subject code	III – Year	Semester : VI
Title	PAPER – 10 ORGANIC CHEMISTRY - III	Max . Marks : 60 Pass. min:40/100
Hrs / week	5	Credit : 4
Objectives	<ol style="list-style-type: none"> 1. To understand the preparation , properties, reactions and importance of Alicyclic compounds , Civetone Muscone and poly nuclear hydrocarbons . 2. To introduce the concept of conformational analysis . 3. To understand the concept of spectroscopy and its applications . 4. To study the different molecular rearrangement reactions . 5. To study the preparation properties and uses of Terpenes , Nucleic acids and proteins . 	
Unit	Content	Hrs
Unit I	Carbohydrates : <ol style="list-style-type: none"> a. Introduction and classification : Monosaccharide – preparation , properties and constitution of glucose – configuration – configuration structures – interconversion of glucose and fructose – descending and ascending of sugar series – Epimers and anomors – epimerization - mutarotation . b. Disaccharides : preparation , properties constitution and configuration of sucrose . c. Polysaccharides : A general study of starch and cellulose – uses of cellulose in industries . 	12
Unit II	<ol style="list-style-type: none"> a. Molecular rearrangements: Detailed mechanisms of the following : pinacol – pinacolone , Hofman , benzyl – benzilic acid , claisen , Beckmann and Fries arrangements . 	12

	<p>b. Free radicals – Definition – preparation and reaction of short lived and long lived free radicals – stability of free radicals – detection of free radicals – Mechanism of Sandmeyer reaction .</p>	
Unit III	<p>Dyes :</p> <p>i) Definition - theory of color and constitution – classification of dyes according to structure and applications .</p> <p>ii) Azodyes - preparation of Congo red and Bismark brown. Triphenyl methane dyes : Preparation of malachite green , rosaniline .</p> <p>iii) Phthalein dyes: phenolphthalein , fluorescein preparation .</p> <p>iv) Vat dyes – preparation of Indigo .</p>	12
Unit IV	<p>a. Heterocyclic compounds: preparation and properties of pyrazole , pyridine , quinoline and isoquinoline .</p> <p>b. Alkaloids: Definition : Occurrence and extraction of alkaloids – general methods for determining the structure of alkaloids – classification of alkaloids – structure and synthesis of following alkaloids - cocaine , piperine and papaverine (No structural elucidation)</p>	12
Unit V	<p>a) Terpenes:</p> <p>i. Introduction , classification , occurrence and isolation – general properties – isoprene rule- general methods of determining structure – synthesis – properties and structure of citral , geraniol, terpenol and menthol .</p> <p>b) Proteins , nucleic acids and amino acids :</p> <p>i. Amino acids – definition , classification – preparation and properties of Glycine , Alanine.</p>	

	<p>ii. Definition – classification of proteins – color reactions of proteins – primary , secondary , tertiary and quaternary structure of proteins . Denaturation of proteins (an elementary idea only) .</p> <p>iii. Nucleic acids – nucleosides – nucleotides – RNA and DNA general structure .</p>	
	Total hours/Semester	60
Reference Books	<ol style="list-style-type: none"> 1. I.L.Finar ‘Organic chemistry’ Vol – I & II , (16th edition) England , Addison Wesley Longman Ltd., (1996) . 2. Morrison R.T. Boyd R.N.,Organic Chemistry (6th edition) New York , Allyn & Bacon Ltd .,(2006). 3. Bahl B.S.,Arun Bahl , Advanced Organic Chemistry (12th edition) New Delhi , Sulthan Chand and Co.,(1997) , (Text Book) . 4. Organic Chemistry , P.L. Soni , Sulthan Chand & Co . edition 2006.(Text Book) . 5. Pini S.H.,Organic Chemistry (4thedition) New Delhi. Megraw – Hill international Book Company . (1996) 6. Seyhan N.Ege , Organic Chemistry , New York , Houghton Mifflin Co.,(2004). 7. E.L.Eliel Stereochemistry of carbon compounds . 8. B.M.Silverstein G.C.Bassler and T.C.Morrill , “spectrometric Identification of Organic Compounds”. 9. R.O.C.Norman “Organic Synthesis” 10. S.H.Pine, J.B Hendrickson , D.J Cram and G.S.Hammond “Organic Chemistry” . <p>Raj K Bansal ,Reactions and reagents.</p>	

Department	CHEMISTRY	
Courses:	B.SC.,CHEMISTRY (Under TANSICHE)	Effective from 2014-2015
Subject code	III-Year	Semester: VI
Title	CORE PAPER – II Physical chemistry –II	Max.Marks:60 Pass. Min: 40/100
Hrs/Week	5	Credit:4
Objectives	<p>1. To understand the II & III law of Thermodynamics and its importance.</p> <p>2. To study the basics of electro chemistry ionic equilibrium and chemical kinetics.</p>	
Unit	Content	Hrs
Unit I	<p>Thermodynamics– II</p> <p>1. Limitations Of 1 law of thermodynamics – spontaneous process – statement of II law –conversion of heat into work – thermodynamic efficiency – Carnot cycle –refrigeration cycle – Carnot theorem-Kelvin scale of temperature</p> <p>2. Entropy: Definition and significance –derivation of the concept of entropy-entropy changes in reversible and irreversible (spontaneous) process. Entropy as a thermodynamic function – dependence of entropy on the variable of the system for ideal gases –entropy of mixing of gases –ΔS for physical transformation in chemical reaction – entropy and probability.</p> <p>3. Free energy function :Helmholtz free energy (A)-definition and its temperature dependence –Gibbs free energy (G)- definition</p>	12

	<p>,variation of Gibbs free energy with temperature and pressure. Gibbs-Helmholtz equation & its applications Maxwells relationships-criteria for reversible and irreversible processes in terms of entropy and free energy changes.</p> <p>4. Partial molar quantities : Definition and significance of chemical potential-Gibbs equation –variation of chemical potential with temperature and pressure –chemical potential in the case of system of ideal gases. Clausius –Clapeyron equation –derivation and applications –thermodynamic properties of real gases –fugacity and activity concepts.</p>	
Unit II	<p>Thermodynamics III:</p> <p>Nernst heat theorem and its application-third law of thermodynamics –a simple treatment of the law –temperature dependence of heat capacity and its use in the determination of absolute</p> <p>Entropy –exception to third law –entropy of CO, N₂O, H₂O and NO.</p>	12
Unit III	<p>Chemical Kinetics:</p> <p>a. Introduction –rate of reaction –rate law and rate constant - order and molecularity of a reaction .Reaction of first and pseudo unimolecular reactions. Catalytic decomposition of hydrogen peroxide –decomposition of dinitrogenpentoxide ,inversion of cane sugar and hydrolysis of ester by acid.</p> <p>b. Second, third and zero order reactions-examples –rate equation –half life period (no derivation required)-complex reactions-consecutive and parallel reactions.</p> <p>c. Influence of temperature on the rate of reaction –Arrhenius rate equation and its significance–measurement of parameters.Theory of reaction rates:Bimolecular collision theory -unimolecular reactions-Lindemann’s hypothesis -Absolute Reaction Rate theory.</p> <p>d. Influence of ionic strength on reaction rate –primary and</p>	12

	<p>secondary salt effect –kinetics of fast reactions-relaxation method.</p>	
<p>Unit IV</p>	<p>Electro Chemistry:</p> <ol style="list-style-type: none"> a. Introduction-definition and determination of specific , equivalent conductance with dilution b. Concept of electrochemical cell –cell diagram and terminology- conventions regarding signs of cell e.m.f from single electrode potential – standard emf of the cell – Nernst equation. c. Strong and weak electrolytes-anomaly absolute strong electrolytes –debye-huckel –Onsager equation (no derivative) d. Kohlrausch's law of ionic mobilities and its application – absolute velocity of ionic and their determination –transport number of ions and their determinations e. Application of conductivity measurement – degree of dissociation – solubility product of a sparingly soluble salt – degree of hydrolysis – basicity of acids –conductometric titrations. 	

Unit-V	Ionic Equilibrium: <ol style="list-style-type: none">1. Hydrolysis –type of salts –degree of hydrolysis –hydrolysis constants-reletion between hydrolysis constants and dissociation constants for different types of salts under going hydrolysis –experimental determination of degree of hydrolysis .2. pH of solutions -buffer solutions-theory of buffer action – Henderson - Hassrelbach equation .3. Application of emf measurements:<ol style="list-style-type: none">a. Determination of solubility and solubility products of sparingly soluble saltb. Determination of pH using hydrogen electrode, glass electrode and quinhydroneelecrote.c. Determination of transport numberd. Potentiometric titrations.	
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Department	CHEMISTRY	
Course:	B.Sc., CHEMISTRY (under TANSICHE)	Effective from 2013-2014
Subject code	II-year	Semester :III
Title	Environmental Studies	Max.Marks: 60 Pass.Min: 40/100
Hrs/Week	2	Credit:2
Unit	Content	Hrs
Unit-1:	<p>The multidisciplinary nature of environmental studies</p> <ul style="list-style-type: none"> • Definition , scope and importance • Need for public awareness 	
Unit-2:	<p>Natural Resources</p> <ul style="list-style-type: none"> • Renewable and non –renewable resources • Natural resources and associated problems <p>a) Forest resources : Use and over –exploitation ,deforestation . Timber extraction , mining, dams and their effects on forests and tribal people .</p> <p>b) Water resources :Use and over –utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.</p> <p>c) Minerals resources: Use and exploitation, environment effects of extracting and using mineral resources,</p> <p>d) Food resources: world food problems , changes caused by agriculture and overgrazing , effects of modern agriculture, fertilizer pesticide problems, water logging, salinity.</p> <p>e) Energy resources :Growing energy needs, renewable and non renewable energy sources,use of alternate energy</p> <p>f) Land resources: Land as are source, land degradation , man</p>	

	<p>induced lands slide, soil erosion and desertification.</p> <ul style="list-style-type: none"> • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles 	
Unit-3:	<p>Ecosystems</p> <ul style="list-style-type: none"> • Concept of an ecosystem. • Structure and function of an ecosystem • Producers , consumers and decomposers. • Energy flow in the ecosystem • Ecological succession • Food chains ,food webs and ecological pyramids 	
Unit-4:	<p>Biodiversity and its conservation</p> <ul style="list-style-type: none"> • Introduction: Definition • Hotspots of biodiversity • Threats to biodiversity :habitat loss, poaching of wildlife, man wildlife conflicts • Endangered and endemic species of India • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity 	
Unit-5:	<p>Environmental Pollution</p> <ul style="list-style-type: none"> • Definition • Causes, effects and control measures of: <ul style="list-style-type: none"> a) Air Pollution b) Water pollution c) Soil pollution • Solid waste management: causes , effects and control measures of urban an industrial wastes • Role of an individual in prevention of pollution 	
Unit-6:	<p>Social issues and the</p> <ul style="list-style-type: none"> • From unsustainable to sustainable development 	

	<ul style="list-style-type: none"> • Water conservation, rain water harvesting, watershed management • Environmental ethics: issues and possible solutions. • Climate change, global warming, acid rain ,ozone layer depletion, case studies. 	
Unit-7:	<p>Human population and the Environment</p> <ul style="list-style-type: none"> • Population explosion family welfare programme • Environment and human health • Women and Child Welfare • Role of information Technology in Environment and human health 	

Dept.	CHEMISTRY	
Course:	B.Sc.,CHEMISTRY(Under TANSCHÉ)	Effectiive from 2013-2014
Subject code	II-Year	Semester:III
Title	PART – III ELECTIVE-I PHARMACEUTICAL CHEMISTRY	Max.Marks:60 Pass. Min:40/100
Hrs/Weak	2	Credit:2
Objectives	<ol style="list-style-type: none"> 1. To know the termini to gas used in pharmaceutical chemistry 2. To understand various traditional practice 3. To gain knowledge about analysis antiseptics &disinfectors 4. To know the uses of various anesthetics 5. To gain knowledge about different types of medicines to cure various diseases 	
Unit	Content	Hrs
Unit I	Terminologies used in pharmaceutical chemistry-pharmacology-pharmacognosy-pharmacy-pharmacodynamics-therapeutics-toxicology-chemotherapy-pharmacopoeia-national-formulary(BNF,NF of india british pharmaceutical codex AMA drug evaluation),therapeutic index,LD ₅₀ , ED ₅₀ ,grams test, bacteria, virus, immunity, vaccines and toxoids . pharmacophore, antimetabolite.	5
Unit II	Traditional practice –sidda , ayurveda and unani. Medicinally important compounds of Al, P,As, Hg and Fe and its uses Blood -blood grouping –Rh factor-buffers in blood, maintenance of pH of blood-composition of blood-clotting mechanism-blood pressure(normal, high and low and control of B.P)	5
Unit III	<ol style="list-style-type: none"> 1. Analgesics: Definition classification ,action of analgesics-narcotice analgesics (morphine and its derivatives with reference to SAR) synthetic analgesics- preparation, assay and uses of pethidines and methadones. Antipyretic analgesics-salicylic as it derivatives,indole derivatives &p-amino phenol derivatives 2. Antiseptics and 	

	<p>disinfectants-Definition and distinction, standartization of disinfectants.</p> <p>Use of phenols,dyes, chloramines, dequalinium chloride, formaldehyde and cationic surface active agent</p>	5
Unit IV	<p>1.Anaesthetics :Definition and classification.</p> <p>2.Uses of volatile anaesthetics –ethers, halohydrocarbons – chloroform ,halothane ,try chloroethylene , ferguson principle.</p> <p>3. Gaseous anaesthetics:Cyclopropane,N₂O- preparation ,advantages, adverse, effect and assay of N₂O.</p> <p>4.Non volatile anaesthetics:Intravenous anesthetics-preparation of thiopental sodium and methohexitone.</p> <p>5. local anesthetics: Classification, structure, preparation and uses of procaine, derivatives of procaine, benzocaine and cocaine.</p>	5
Unit V	<p>1. Tranquilisers - classification in detail.</p> <p>2.Sedatives and hypnotics-distinction, definition, classification of hypnotics-structure and uses of barbiturates and non barbiturates</p> <p>3.Haematological agent: Anticoagulants and coagulants drugs</p> <p>4.Antianaemic Drugs: iron,vitamin-B₁₂ and folic acid</p> <p>5.Cardiovascular drugs-examples and uses.</p> <p>6.Aids: causes,prevention and treatment</p>	5
	Total hours/ semester	25

Department	CHEMISTRY	
Course:	B.Sc., CHEMISTRY(Under TANSICHE)	Effective from 2014-2015
Subject code	III-Year	Semester: V
Title	CORE PAPER - 6 ORGANIC CHEMISTRY - II	Max.Marks:60 Pass.Min: 40/100
Hrs/Week	5	Credit:4
Objectives	<ol style="list-style-type: none"> 1. To study the Stereoisomerisms of organic compounds. 2. To understand the Chemistry of Carbohydrates and its applications. 3. To study the properties of aromatic compounds and aromatic acids. 4. To know the synthetic applications of some organic reagents inorganic analysis. 	
Unit	Content	Hrs
Unit – I	Stereoisomerism: <ol style="list-style-type: none"> a. Geometrical isomerism: Definition – geometrical isomerism of maleic and fumaric acids – aldoximes and ketoximes – determination of configuration of geometrical isomerism. b. Optical isomerism: <ol style="list-style-type: none"> 1. Optical activity- Enantiomers, diastereoisomers – specific rotation and its polarimetric determination- definition of optical isomerism. 2. Optical isomerism of compounds containing asymmetric carbon atom - racemisation and resolution of racemic mixtures – Walden inversion – asymmetric synthesis. Chirality – specifications of absolute configuration by R and S notations. 	12

Unit - II	<p>a. Conformational Analysis: Difference between configuration and conformation. Fischer, Saw – horse and Newman projection formulate - Conformational analysis – of ethane, n-butane, 1,2-dichloroethane, cyclohexane and monosubstituted cyclohexane.</p> <p>b. Alicyclic compounds: General methods of preparation and Properties of cycloparaffines – Baeyer’s strain theory and its modification.</p> <p>c. Poly nuclear hydrocarbons and their Derivatives:</p> <p>i. Condensed Systems: Preparation properties, uses and structural elucidation of Naphthalene. Derivatives of Naphthalene. Naphthylamines, Naphthols – Preparation, properties and uses. Anthracene, Preparation, properties and structural elucidation of Anthracene.</p>	12
Unit - III	<p>Aromatic Compounds: (Aldehydes And Phenols)</p> <p>a. Aromatic aldehydes: Benzaldehyde – mechanism of Cannizaro, Claisen reaction and Benzion condensation.</p> <p>b. Preparation & properties of cinnamaldehyde.</p> <p>c. Phenols: Acidity of phenols – effect of substituents on the acidity of phenol, mechanism of Kolbe’s reaction. Reimer, Tiemann reaction, test for phenol.</p>	12
Unit - IV	<p>Aromatic Acids:</p> <p>a. Effective of substituents on acidic character.</p> <p>b. Substituted acids: Preparation, properties of salicylic acid and anthranilic acid.</p> <p>d. Dicarboxylic acids: Isomers of Phthalic acid, preparation, properties of phthalic acid – derivatives of phthalic acid - phthalic anhydride & phthalamide. Preparation, properties and uses.</p> <p>e. Preparation & properties of phenylacetic acid, cinnamic acid.</p> <p>f. Aromatic sulphonic acids preparation, properties and uses of benzene sulphonic acid, saccharin chloramines – T & dichloramine – T.</p>	12

Unit – V	a. Uses of reagents in organic synthesis: SeO_2 , OsO_4 , N –bromo succinimide, Raney Ni. b. Tautomerism: Definition – condition of tautomerism and difference between tautomerisation & Resonance – type of tautomerism. I. Keto – enol tautomerism II. Nitro – acinitro tautomerism III. Lactum – latim tautomerism IV. Quinone monoxime – p – nitro phenol tautomerism.	12
	Total hours/ Semester	60
Reference Books	1. I.L.Finar ‘Organic Chemistry’ Vol-I&II, (16 th edition) England, Addison Wesley Longman Ltd.,(1996). 2. Morrison R.T.Boyd R.N., Organic Chemistry (6 th edition) New York, Allyn & Bacon Ltd.,(2006). 3. Bahl B.S., Arun Bahl, Advanced Organic Chemistry (12 th edition) New Delhi, Sultan Chand and Co., (1997), (Text Book). 4. Organic Chemistry, P.L.Soni, Sultan Chand & Co. Edition 2006. (Text Book). 5. Pine S.H., Organic Chemistry (4 th edition) New Delhi. Megraw – Hill international Book Company. (1996) 6. Seyhan N. Ege, Organic Chemistry, New York, Houghton Mifflin Co., (2004). 7. E.L.Eliel ‘Stereochemistry of carbon compounds. 8. B.M.Silverstein G.C.Bassler and T.C.Morrill, ‘Spectrometric Identification of Organic Compounds’. 9. R.O.C.Norman ‘Organic Synthesis’ 10.S.H.Pine, J.B.Hendrickson, D.J.Cram and G.S.Hammond ‘Organic Chemistry’. 11. Raj K Bansal, Reactions and reagents.	

Department	CHEMISTRY	
Course:	B.Sc. ,CHEMISTRY(Under TANSICHE)	Effective from 2014-2015
Subject code	III-year	Semester : V
Title	CORE PAPER-9 RENEWABLE ENERGY RESOURCES	Max.Marks:60 Pass .Min : 40/100
Hrs/Week	2	Credit :2
Unit	Content	Hrs
Unit-I	<p>Principles of Solar Radiation</p> <p>(a) Introduction to energy resource classification- importance of renewable energy resources –the solar energy option, environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.</p> <p>(b) Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis advanced collectors</p>	6
Unit-II	<p>a. Solar Energy Storage and applications Different methods,sensible,latent heat and stratified storage,solar ponds.solar applications-solar heating/cooling technique,solar distillation and drying,photovoltaic energy conversion.</p> <p>b. Wind energy: Sources and potentials ,horizontal and vertical axis wind mills,performance characteristics , Betz criteria</p>	

Unit III	<p>Bio-mass :</p> <p>Principles of bio-conversion,an aerobic/aerobic digestion,types of bio-gas digesters,gas yield,combustion characteristics of bio-gas,utilization for cooking,I.C.Engine operation and economic aspects.</p>	
Unit IV	<p>Geothermal energy:</p> <p>Resources ,types of wells,methods of harnessing the energy ,potential in India.OCEANENERGY:OTEC,principles utilization,setting of OTEC plants , thermodynamic cyclic.Tidal and wave energy:potential and conversion techniques,mini-hydel power plants,and there economics.</p>	
Unit V	<p>Direct energy conversion:</p> <p>Need for DEC,carnot cycle,limitations , principles of DEC</p>	
Text books	<p>1. Non –conversional energy sources/G.D.Rai,khanna publishers.</p> <p>2. Renewable energy resources ” Twidell&wier , CRC press(taylor&francis)</p>	
Reference Books	<p>1. Renewable energy resources/ Diwari&ghosal/narosa</p> <p>2. Renewable energy technologies/ramesh&kumar/narosa</p> <p>3. Non-conversional energy systems-K Mittal/wheeler</p> <p>4. Renewable energy sources&emergine technologies by D.P.kothari,k.c.singhal,P.H.I.</p>	

Department	CHEMISTRY-ANCILLARY	
Course:B.Sc.,	B.Sc., Physics, Zoology and Botany SYLLSBUS	Effective from 2014-2015
Subject code:	II – year	Semester :III
Hrs /week: 5	GENERAL AND ADVANCED CHEMISTRY	Credit :4
Unit	Content	Hrs
Unit –I	<p>a.Adsorption- Definition of various terms-adsorption of gases on solids-characteristics of adsorption of gases on solids- physical and chemical adsorptions-factors influencing adsorption.</p> <p>b.Catalysis : Definition –characteristics- theories of catalysis- types of catalysis – promoters – poisons – enzyme catalysis – mechanism- Michaleis –Menton equation (no derivation) – applications of catalysis.</p> <p>c. Colloidal state : Colloids definition – various types- classification – preparation by dispersion and condensation methods . Berdig’s arc method- lyophilic and lyophobic colloids – differences between them – purification of colloids (electro dialysis one method only) – application of colloids.</p>	12
Unit –II	<p>Fundamental concepts of organic chemistry:</p> <p>a. Tetrahedral arrangement of valencies of carbon atoms.</p> <p>b. Electrophillic and Nucleophilic reagents- Definition and examples.</p> <p>c. Cleavage of bond: Homolytic and Heterolytic Cleavages of Carbon bond.</p> <p>d. Electronic effects: Inductive, Electromeric, Resonance effects and hyper conjugation.</p> <p>e. Reaction intermediates: Free radicals, Carbonium ion (carbocation) and Carbanions generation and their stability.</p> <p>f. Concept of hybridization - Geometry of Organic Molecules involving hybridizations sp, sp^2 & sp^3 (eg :methane, ethylene, acetylene only).</p>	12
Unit –III	a. Chemotherapy and applications of few drugs (Elementary study only):	

	<p>i. Sulpha drugs- sulpha diazine, antimalarials –quinine. ii. antibiotics: definition –penicillin- tetracycline-structure(no structural elucidation) and uses.</p> <p>b. Hormones and vitamins: Definition and classification of hormones- testosterone, progesterone- biological importance. Vitamin –types and deficiency disease of each vitamins.</p> <p>c. Carbohydrates: Introduction and classification – preparation and uses of monosaccharides - glucose and fructose, Disaccharides – sucrose, polysaccharides – starch and cellulose. Conversion of Glucose to fructose only.</p> <p>d. Aminoacids, Proteins and Nucleic acids: i. Aminoacids – Definition, classification.</p> <p>ii. Proteins –Definition, classifications, colour reactions and denaturation of proteins(an elementary idea only).</p> <p>iii. Nucleic acids: Nucleosides –nucleotides- RNA and DNA general structure – biological importance of RNA and DNA.</p>	12
Unit IV	<p>a. Green chemistry :Introduction -12 basic principles of Green chemistry. Microwave- Microwave cooking – advantages of microwave.</p> <p>b. Nano Chemistry : Introduction – Preparation of Nano particles-gold, Nano wire- ZnO, Nano sheet – Graphene, carbon nano tubes – MWNT and SWNT –properties of nano materials- Applications –Nano sensor-cancer therapy –nano cosmetics.</p> <p>c. Food poisons: Introduction- chemical – Food adulteration- introduction only – Bordeaux mixture, Hg, Pb, DDT, BHC, Malathion in beverages (pesticide) SMG(aginomoto). Soft drinks –soda, fruit juices, alcoholic beverages – examples. Addiction and social problems.</p>	12
UNIT -V	<p>CHEMICAL BONDING Introduction : Octet rule – types of chemical bonds – ionic, covalent, co</p>	

	<p>ordinate, hydrogen (inter and intra) and metallic bonds with few suitable Examples. Comparison between ionic and covalent bonded compounds.</p> <p>b. Chemical bonding: Valency bond approach- types of overlapping and orbital diagrams – σ and π bonds. VSEPR theory – apply VSEPR theory to BeCl_2, BF_3, CCl_4, PF_5 and SF_6. (Sp, Sp^2, Sp^3, Sp^3d and Sp^3d^2).</p> <p>c. Molecular orbital theory: Bonding and anti-bonding molecular orbitals-relative order of energies of molecular orbitals- MO theory applied to molecules- Hydrogen, Helium, nitrogen and oxygen.</p>	
	Total hours/ Semester	60
Reference Books	<p>1.Puri B.R., Sharma L.R., Pathania, M.S., Principles of physical Chemistry (23rd edition),New Delhi, ShobanLal, Nagin Chand &Co., (1993).</p> <p>2.PL.Sony,Text books of Inorganic Chemistry,S.Chand& Co.,New Delhi,(2006).</p> <p>3.B.R.Puri,Sharma,L.R. and Kalia Principles of Inorganic Chemistry, New Delhi (2002).</p> <p>4.P.L.Soni and Mohan Kstyal , Text book of Organic Chemistry , Sulthan Chand & Sons Educational Publishers , 20th edition 2007</p> <p>5..Nano world- “An introduction to nano science & technology” – CNR RAO third edn. 2013.Nava Karnataka publication pvt.ltd.</p> <p>6..Green chemistry- environment friendly alternatives- editors: Rashmisanghi. MM. Sri vasta fourth re-print 2009. Norosa publishing house pvt. Ltd.</p>	

Department	CHEMISTRY	
Course:	B.Sc., Physics, Zoology and Botany	Effective from 2014-2015
Subject code:	II – year	Semester :III
Hrs /week: 5		Credit :4
Objectives	<ol style="list-style-type: none"> 1. To introduce and make the student to know about hydrides & inter halogen compounds. 2. To gain knowledge about the drugs & industrially important compounds used in our everyday life . 3. To understand the preparation & uses of various fuels, fertilizers & silicons. 4. To study the principles and applications of chromatographic techniques & metallurgy. 5. To study thermodynamics and photo chemistry. 	
Unit	Content	Hrs
Unit –I	Inorganic chemistry a. Hydrides :- Classification-Ionic hydrides-Covalent, Metallic, Complex hydrides-Preparation, Properties (Uses not required) - Diborane -Preparation and Properties. b. Inter halogen compounds :- Preparation and Properties, Structure and uses of Cl, BrF ₃ , IF ₅ & IF ₇ .	12
Unit –II	Chemistry In Everyday Life a. Chemotherapy :- Definition- Sulpha drugs- Synthesis, Properties, Mechanism of action and Uses of –Sulphanamide-Antibiotics- Definition. Structure and Uses of Penicillin, Chloronycetin & Streptomycin. Causes and treatment of Diabetics, AIDS and Cancer. b. Industrially Important Organic Compounds:- Preparation and Uses of CHCl ₃ , Freons, Saccharine & Aspartic acid.	12
Unit –III	Industrial Chemistry a. Fuel Gases:- Preparation and uses of Natural gas , Water gas, Producer gas , Semi- water	

	<p>gas, Carbonated water gas & oil gas.</p> <p>b. Fertilizers:- Manufacture and uses of Urea, Ammonium sulphate, Ammonium nitrate, Super phosphate of lime, Triple super phosphate and potassium nitrate.</p> <p>c. Silicons :- Definition-Types-Preparation, properties and uses.</p>	12
Unit IV	<p>Applied Chemistry</p> <p>a. Chromatography:-Principle- Working and Applications of Column, and Paper chromatography.</p> <p>b. Metals and Alloys:-<i>Metals</i>-Definition-General methods of extraction-Ores, Minerals differences between them-Refining of metals by Van Arkel process- Extraction of Uranium and Thorium. <i>Alloys</i>-Definition-Types, Composition, Special properties and uses of Stainless steel, Tungsten steel, Manganese steel, Invar and Perm alloy.</p>	12
Unit V	<p>Physical Chemistry</p> <p>a. Thermodynamics:-System-types of system-Work and Heat-Spontaneous and Non-Spontaneous changes, Reversible and Irreversible changes, Isothermal and Adiabatic changes-Statement and Mathematical expression of first law of thermodynamics-Statement of second law thermodynamics.</p> <p>b. Photo Chemistry:-Definition –Grotthus -Draper’s law –Law of photochemical equivalence- Quantum yield-Photo chemical reactions-Photo sensitisation – Chemiluminisence- Fluorescence, Phosphorescence.</p>	12