

E.M. GOPALAKRISHNA KONE YADAVA WOMEN'S COLLEGE
An Autonomous Institution -Affiliated to Madurai Kamaraj University
Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC



LESSON PLAN
2021-2022

DEPARTMENT OF CHEMISTRY
(UG – Odd & Even Semester)



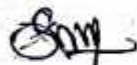
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LESSON PLAN
2021-2022


Class : I BSc Chemistry
Sem : I
Sub. Code : 21K11
Title of the Paper : Inorganic, Organic and Physical Chemistry-I
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	ATOMIC STRUCTURE AND PERIODIC PROPERTIES :Atomic structure: Pauli exclusion principle, Hund's rule, Aufbau principle and electronic configurations of elements – stability of half filled and completely filled orbital – shapes of orbitals, s, p, d and f block elements – classification and characteristic properties. Periodic properties: covalent radius- periodic trends in covalent radii; ionic radius- periodic trends in ionic radii; ionization energy, electron affinity- factors affecting ionization energy, electron affinity- factors affecting electron affinity, electro negativity- scales of electronegativity- Pauling's scale and Mulliken's scale- factors determining electro negativity, applications of electro negativity	I BSc Che	12	Online through Google Meet	<i>A. Arif</i>
SEP	II	CHEMICAL BONDING : Ionic bond-general properties of ionic compounds - lattice energy-Born-Lande equation-Born-Haber cycle-covalent bond-general properties of covalent compounds-Fajan's rule-Valence bond theory- orbital overlap-hybridization- sp^3, sp^2, sp -sigma and pi bonds-VSEPR theory-postulates-geometries of $BF_3, CH_4, H_2O, NH_3, PCl_5, SF_6, IF_7$ molecules. Molecular orbital theory: Linear combination of atomic orbitals-bonding and antibonding molecular orbitals-Bond order- MO diagram of molecules like H_2, He_2, O_2, F_2, NO and CO-Comparison between VBT and MOT	I BSc Che	12	Online through Google Meet	<i>A. Arif</i>
OCT	III	FUNDAMENTALS OF ORGANIC CHEMISTRY : Introduction-IUPAC series- homologous series- functional groups. Electron displacement effect: Inductive effect, electromeric effect, resonance. Breaking of C-C	I BSc Che	12	Online through Google Meet	<i>A. Arif</i>

		bond: Homolytic and heterolytic cleavage. Reaction intermediate - formation and stability of carbocation, carbanion and free radical. Hyperconjugation - attacking reagents - nucleophiles and electrophiles.				
NOV	IV	REACTION MECHANISM: Types of reaction and their mechanism: substitution reaction- mechanism of S_N1 , S_N2 and S_Ni reactions - elimination reactions- mechanism of $E1$ and $E2$, Ei reactions. Addition reaction-electrophilic and nucleophilic, polymerisation reaction-addition and condensation polymerization, Rearrangement reaction - intra and inter molecular rearrangement - reaction mechanism determination: product analysis, isotopic labeling.	I BSc Che	12	Online through Google Meet	A.P.M.J
DEC	V	GASEOUS STATE: Ideal gases: Kinetic theory of ideal gases - gas laws (no derivation) - Maxwell distribution of molecular velocities(no derivation)- Definition of Most probable velocity, Average velocity, RMS velocity - Collision number- collision frequency -Mean free path. Real gases: Deviation from ideal behaviour - Derivation of Vanderwaal's equation - inter molecular forces-Types (dipole-dipole, dipole-induced dipole and induced dipole-induced dipole interaction)-Methods of liquefaction of gases - Joule Thomson effect - Inversion temperature (Definition only).	I BSc Che	12	Online through Google Meet	A.P.M.J



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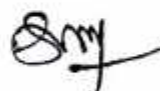




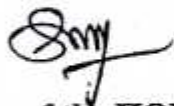
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LESSON PLAN
2021-2022

Class : I BSc Chemistry
Sem : I
Sub. Code : 21SEK11
Title of the Paper : Laboratory Technique
Total Hours : 30hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	LABORATORY HYGIENE AND SAFETY: Storage and handling of chemicals – carcinogenic chemicals – Toxic and poisonous chemicals – Waste disposal – Fume disposal – General precautions for avoiding accidents – First aid techniques – Hazards in laboratory - poisoning – methods to avoid poisoning – Treatment for specific poison – laboratory safety measures.	I BSc Che	6	Online through Google Meet	
SEP	II	PRINCIPLES AND TECHNIQUES OF SEMI-MICRO METHODS: Aims of semi micro qualitative analysis – theory behind inorganic qualitative analysis – Dry reactions – precipitation reactions – Applications of solubility product principle in qualitative analysis – Complexation reaction – Oxidation and reduction reactions – Spot tests – preparation of solution for cation testing on semi micro scale – Removal of interfering ions in the analysis of cations – oxalate, borate,	I BSc Che	6	Online through Google Meet	

		fluoride, chromate, phosphate and arsenite.				
OCT	III	VOLUMETRIC METHODS OF ANALYSIS: General principle-Requirements for volumetric analysis-Concentration systems: Molarity, molality, normality, formality, weight percentage composition and ppm -problems. Primary and secondary standards-criteria for primary standards, preparation of standard solutions, standardization of solutions. Limitation of volumetric analysis, endpoint and equivalence point.	I BSc Che	6	Online through Google Meet	
NOV	IV	GRAVIMETRIC METHODS OF ANALYSIS: Introduction-contamination of precipitates-Co-precipitation-types, post precipitation- differences between Co precipitation and post precipitation-precipitation from homogeneous solution-theory of precipitation-properties of a precipitate-general rules of precipitation-specific and selective precipitants-choice of precipitants	I BSc Che	6	Online through Google Meet	
DEC	V	GENERAL PURIFICATION TECHNIQUES: Purification of solid organic compounds-recrystallisation, use of miscible solvents, use of drying agents and their properties, sublimation. Purification of liquids. Experimental techniques of distillation, fractional distillation, distillation under reduced pressure.	I BSc Che	6	Online through Google Meet	



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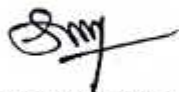
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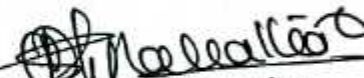
Class : III BSc Chemistry
Sem : I
Sub. Code : 21SEK12
Title of the Paper : Industrial Chemistry
Total Hours : 30hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	MATCH INDUSTRY AND EXPLOSIVES: Match industry: Introduction -composition-types of matches-raw materials need for safety matches- manufacturing process. Pyrotechny: Introduction-composition of fireworks- colored smokes. Explosives: Introduction-classification- characteristics of explosives- preparation and uses of TNT, picric acid, , cordite and RDX.	I BSc Che	6	Online through Google Meet	<i>V. Jagan</i>
SEP	II	SILICATE INDUSTRY: Cement: Introduction-composition of cement-raw materials need for manufacturing of Portland cement-manufacture of Portland cement by wet process and dry process-role of gypsum in the setting of cement. Glass: Introduction- characteristics of glass- physical and chemical properties- manufacture of glass (tank furnace method)-annealing-characteristics of Borosilicate glass, optical glass, colored glass, safety glass, fibre glass, flint glass and Bottle glass.	I BSc Che	6	Online through Google Meet	<i>V. Jagan</i>
OCT	III	AGRICULTURAL CHEMISTRY: Fertilizer: Introduction-classification- role of various elements in plant growth-	I BSc Che	6	Online through Google Meet	

		requirements of a good fertilizer- Manufacturing methods and applications of following fertilizers: ammonium sulphate, ammonium chloride, urca, super phosphate of lime, calcium cyanamide, calcium ammonium nitrate and NPK fertilizer.					
NOV	IV	POLYMER CHEMISTRY: Rubber: Introduction-composition of natural rubber-occurrence and isolation of natural rubber - draw backs of raw rubber- vulcanization- properties of vulcanized rubber- synthetic rubber- preparation and applications of SBR rubber, neoprene rubber, butyl rubber and Thiokol-Distinction between natural rubber and synthetic rubber.	I BSc Che	6		Online through Google Meet	
DEC	V	PLASTICS AND PAPER INDUSTRY: Plastics: Introduction- characteristics of plastics- classification of plastics- differences between thermo setting and thermo plastics- preparation and applications of Bakelite, Polythene, PVC, Polypropylene, Poly Styrene and Urea formaldehyde resin. Differences between plastics and resins. Paper industry: Introduction- raw materials and manufacturing process of paper- types of paper- paper industry in India.	I BSc Che	6		Online through Google Meet	



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LESSON PLAN
2021-2022

Class : I BSc Chemistry
Sem : I
Sub. Code : 21NMK1
Title of the Paper : Dairy Chemistry
Total Hours : 30hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	INTRODUCTION: Composition of milk- physical properties- Chemical properties- functional properties-effect of heat on milk-check for purity of milk-detection of adulteration in milk.	I BSc Che	6	Online through Google Meet	A. R. M. J.
SEP	II	MILK PROCESSING: Milk processing: Introduction-different methods of processing of milk -clarification-pasteurization- UHT (Ultra High Temperature) milk- HTST (High Temperature short time) milk-homogenized milk- Whole milk. Chemical analysis: Butter fat, Protein, Lactose	I BSc Che	6	Online through Google Meet	A. R. M. J.
OCT	III	MILK POWDER PROCESSING: Introduction-skimmed milk powder-whole dry milk powder-manufacture of	I BSc Che	6	Online through Google Meet	A. R. M. J.

		whole dry milk powder-butter milk powder.				
NOV	IV	MILK PRODUCTS- I: Butter: Introduction- preparation process-chemical nature of buffer fat-detection of adulteration in butter. Cheese: Introduction- preparation- composition- un-ripened cheese- ripened cheese-processed cheese.	I BSc Che	6	Online through Google Meet	ARMJ
DEC	V	MILK PRODUCTS II: Ghee: Introduction-manufacturing process-detection of adulteration in ghee. Ice-Cream: Composition-milk fat-milk solid- non fat- sweeteners- stabilizers- emulsifiers.	I BSc Che	6	Online through Google Meet	ARMJ



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LESSON PLAN
2021-2022



Class : II BSc Chemistry

Sem : III

Sub. Code : 17K31

Title of the Paper : Organic and Inorganic Chemistry

Total Hours : 60hrs

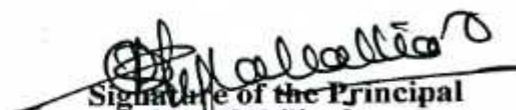
Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	ORGANO HALOGEN COMPOUNDS: a) Alkyl halides: General methods of preparation – general properties – detailed mechanisms of nucleophilic substitution and elimination reactions. Fluorocarbons: Westron and Freon - and elementary idea and their impact on environment. b) Aryl halides: Preparation by halogenation, Sandmayer and Hunsdiecker reactions – general properties – an elementary idea about halogenated pesticides and insecticides. c) Aralkyl halides: Benzyl chloride – preparation and properties – comparison between aryl halide and aralkyl halide.	II BSc Che	12	Online through Google Meet	
SEP	II	ISOMERISM: a) Geometrical isomerism- Definition- Determination of configuration of geometrical isomers - geometrical isomerism of maleic	II BSc Che	12	Online through Google Meet	

		and fumaric acids -aldoximes and ketoximes- E-Z notations. b)Optical isomerism: Optical activity - definition - condition for optical activity - optical isomerism of lactic and tartaric acids - relative and absolute configuration - R and S system - racemization - resolution of racemic mixture - Walden inversion - asymmetric synthesis. Optical activity of compounds without asymmetric carbon atoms: allenes, spiranes and biphenyl compounds.			
OCT	III	HYDROGEN, GROUP I & II ELEMENTS: a) Hydrogen: Ortho and para hydrogen-Hydrides: Ionic or salt like hydrides- covalent hydrides, metallic or interstitial hydrides-intermediate hydrides. b) Group I elements: Alkali metal - electronic structure - general properties- chemical properties - solubility and hydration-stability of carbonates and bicarbonates-halides-Preparation, properties and uses of the following compounds: Sodium nitrite, Lithium aluminium hydride, Lithium carbonate-Anomalous behavior of Lithium. c) Group II elements: Alkaline earth metals- electronic structure- similarities in physical and chemical properties and gradation in them- Anomalous behavior of Be- Diagonal relationship between Be and Al-Occurrence (Important minerals) of alkaline earth metals-Study of following compounds: Plaster of paris, Gypsum and Barium chromate.	II BSc Che	12	Online through Google Meet A. P. Singh
NOV	IV	GROUP III & IV ELEMENTS: a) General characteristics of group III elements - Reactions of elements	II BSc Che	12	Online through Google Meet A. P. Singh

		with acids, alkalis and dioxygen. Compounds of boron- borates, borax and diborane and its structure- qualitative analysis of aluminium. b) General characteristics of group IV elements - Compounds of carbon- Carbides, water gas, producer gas and coal gas - Oxides of silicon-silicates, silicones and their applications.				
NOV- DEC	V	Group-V: Electronic structure and oxidation states- metallic and non-metallic character- difference between nitrogen and other elements- Group V elements: Halides, oxides, oxy acids of nitrogen and phosphorus, Sodium bismuthate, tartar emetic. Group- VI : Group discussion of VI group elements: Sulphur: preparation, properties and uses of persulphides, halides and oxy chlorides (thionyl chloride) - structure - preparation, properties, uses and structure of H ₂ SO ₄ and peracids - preparation, properties, structure and uses of chlorosulphonic acid.	II BSc Che	12	Online through Google Meet	<i>A. R. J.</i>



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LESSON PLAN
2021-2022

Class : III BSc Chemistry


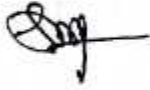
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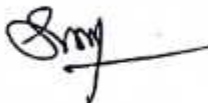
Sub. Code : 17K51

Title of the Paper : Organic Chemistry

Total Hours : 60hrs

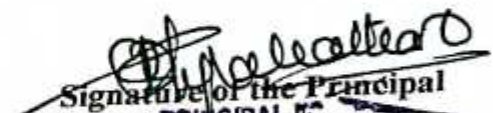
Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	AROMATIC SUBSTITUTION: Isomerism and orientation of benzene derivatives-determination of orientation- rules of orientation-electronic interpretation of directive effects mechanism of aromatic electrophilic substitution - halogenation, nitration and sulphonation, Friedel -Craft's reaction(alkylation, acylation) - influence of substituents - activating and deactivating groups-aromatic nucleophilic substitution-unimolecular, bimolecular substitution and benzyne mechanism.	III BSc Che	12	Online through Google Meet	
SEP	II	AROMATIC ALDEHYDES , KETONES AND CARBOXYLIC ACIDS: a) Preparation and properties of benzaldehyde, and acetophenone- Organic naming reactions: Reimer-Tiemann reaction, benzoin condensation, claisen condensation, knoevenagel reaction, cannizzaro reaction, crossed cannizzaro reaction, claisen-Schmidt reaction,	III BSc Che	12	Online through Google Meet	

		perkin reaction - α , β - Unsaturated carbonyl compounds: Preparation and properties of crotonaldehyde and cinnamaldehyde. b) Carboxylic acids: Preparation and properties of benzoic, malonic, succinic and o-phthalic acids.				
OCT	III	ORGANIC NITROGEN COMPOUNDS : a) Aromatic amines: Introduction- classification- methods of preparation of primary amines- reduction of nitro compounds and ammonolysis of aryl halides - methods of preparation of secondary and tertiary amines from aniline, acetanilide-properties: basicity of amines, salt formation, acylation, alkylation and arylation, carbylamine reaction, reaction with aldehyde, CS_2 , Grignard reagent, bromination, nitration and sulphonation. b) Aromatic nitro compounds: Preparation, properties of nitrobenzene, conversion of nitrobenzene to ortho, meta, para-dinitrobenzene and its properties. c) Cyanides & Isocyanides: Preparation, properties of alkyl cyanides & alkyl isocyanides. Differences between alkyl cyanides & alkyl isocyanides.	III BSc Che	12	Online through Google Meet	
NOV	IV	HETEROCYCLIC COMPOUNDS: Preparation, and properties of pyrrole, furan, thiophene, pyridine, indole, quinoline and isoquinoline	III BSc Che	12	Online through Google Meet	
NOV-DEC	V	CARBOHYDRATES: Definition and classification-detailed study of monosaccharides-glucose and fructose-mutarotation-epimerisation-structure and configuration of glucose and	III BSc Che	12	Online through Google Meet	

	fructose-comparison between glucose and fructose-methods of ascending and descending in the sugar series-interconversion between glucose and fructose-disaccharides-sucrose-preparation, properties and structural elucidation.				
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LESSON PLAN
2021-2022

Class : III BSc Chemistry



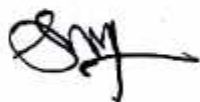
Sem : V



Sub. Code : 17K52

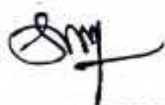
Title of the Paper : Physical Chemistry - I

Total Hours : 60hrs

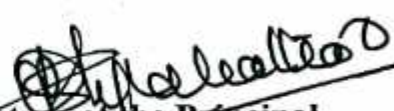
Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	THERMODYNAMICS-I: a) Importance of thermodynamics-concepts of a system, surroundings, energy-state variables-extensive intensive properties-different types of processes-isothermal, adiabatic, isobaric, isochoric, reversible, irreversible processes and cyclic. First law of thermodynamics-definition-mathematical expression-enthalpy and energy as thermodynamic properties - heat capacity at constant P and V-Relation between C_p and C_v -work done in reversible isothermal expansion and compression - maximum work - work done in irreversible isothermal expansion and adiabatic expansion. The Joule-Thomson effect, Joule Thomson coefficient for real and ideal gas. b) Zeroth law of thermodynamics and its significance.	III BSc Che	12	Online through Google Meet	

SEP	<p>II</p> <p>THERMODYNAMICS-II: a) Second law of thermodynamics: Need for second law-different ways of stating II law-Carnot cycle-Carnot's theorem-entropy as a thermodynamic property-Clausius inequality-calculation of entropy change of an ideal gas with change in P,V and T - Entropy changes of an ideal gas in different process -Physical significance of entropy - Work and free energy functions - Variation of free energy change with temperature & pressure - Maxwell's relationships - The Gibbs-Helmholtz equation- The Clapeyron- Clausius equation and its applications. Van't Hoff isotherm- Van't Hoff isochore.b) Third law of thermodynamics: Nernst heat theorem - Statement of Third law of Thermodynamics, determination of absolute entropy of solid, liquid and gas.</p>	III BSc Che	12	Online through Google Meet	
OCT	<p>III</p> <p>III PHASE RULE AND SOLUTIONS: a) Statement and significance of the terms involved. Derivation of phase rule from thermodynamic derivation-application of phase rule to one-component system (water, sulphur system only). b) Two component systems-simple eutectic system (lead-silver system only)-compound formation-congruent melting point (Zn-Mg system only), salt hydrates (FeCl₃-H₂O system only).- incongruent melting point (KI-H₂O system only). c) Thermodynamics of ideal solutions-Henry's law, Raoult's law-binary liquid system-partially miscible (phenol-water system), completely miscible and completely immiscible system-</p>	III BSc Che	12	Online through Google Meet	 

		theory of fractional distillation and steam distillation.				
NOV	IV	COLLIGATIVE PROPERTIES: Colligative properties -lowering of vapour pressure - osmosis and osmotic pressure -elevation of boiling point -depression in freezing point - experimental determination of lowering of vapour pressure and osmotic pressure - Van't Hoff factor - degree of association - degree of dissociation.	III BSc Che	12	Online through Google Meet	
DEC	V	GROUP THEORY: Introduction-symmetry elements and symmetry operations- rules of a group, order of a group - classes and similarity transformation- point group classification ($C_1, C_2, C_3, C_{nv}, D_{nh}, T_d, O_h$) - matrix representation of symmetry operation-rotation & reflection-reducible and irreducible representation (definition only)- Orthogonality theorem - construction of character table (C_{2v} only)	III BSc Che	12	Online through Google Meet	



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LESSON PLAN
2021-2022

Class : III BSc Chemistry

Sem : V

Sub. Code : 17KE5A

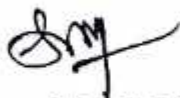
Title of the Paper : Inorganic and Analytical Chemistry

Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	HALOGEN COMPOUNDS a) Halogen compounds: Electronic configuration, diatomic nature, oxidizing property, electronegativity and electron affinity -Difficulties in the discovery and isolation of fluorine - peculiarities of fluorine - electropositive character of Iodine b) Interhalogen Compounds: Interhalogen compounds: preparation, properties of ClF, ICl, ClF ₃ , BrF ₃ , ICl ₃ , ClF ₅ , BrF ₅ , IF ₅ , IF ₇ - structure of ICl, ClF ₃ , IF ₅ , IF ₇ - poly halides and pseudo halogens.	III BSc Che	12	Online through Google Meet	A. Arif
SEP	II	TRANSITION ELEMENTS: a) Transition elements -position in the periodic table -general characteristics of d-block elements. b) Occurrence, extraction, properties and uses of titanium, vanadium, molybdenum and tungsten. c) Chemistry of titanium dioxide, titanium tetrachloride, vanadium pentoxide-	III BSc Che	12	Online through Google Meet	A. Arif

		ammonium vanadate, ammonium molybdate, molybdenum blue, tungsten oxide, tungsten bronze, zirconium halide.			
OCT	III	LANTHANIDES AND ACTINIDES: Position of lanthanides, actinides in the periodic table - general characteristics of lanthanides and actinides - lanthanide contraction - actinide contraction, occurrence and general methods of extraction of lanthanides by reducing the trihalides, ion exchange and valence exchange methods. Isolation of thorium from monazite - preparation, properties and uses of oxides, sulphates and halides of lanthanum and uranium. Applications of lanthanides and actinides.	III BSc Che	12	Online through Google Meet <i>A. P. S. J.</i>
NOV	IV	NON-AQUEOUS SOLVENTS & INORGANIC POLYMERS a) Non-aqueous solvents: Classification of solvents - general properties of ionizing solvents - chemical reactions - liquid ammonia as solvents - liquid sulphur dioxide as solvents - liquid hydrogen fluoride as solvents. b) Inorganic polymers: Introduction - general properties of inorganic polymers - silicon based polymers -	III BSc Che	12	Online through Google Meet <i>A. P. S. J.</i>

		polysilaxane gums and silicon rubber.				
DEC	V	DATA ANALYSIS AND THERMOANALYTICAL METHODS: a) Data analysis: Introduction-mean - median-precision-accuracy-confidence limits- definition - determinate errors- indeterminate errors-rules for types improving accuracy of data-significant figure-method of least squares. b) Thermoanalytical methods: Introduction- Thermogravimetric analysis (TGA) -principle -thermal analysis of silver nitrate- derivative thermogravimetry(DGA)- factors which influence the thermogram- application of thermogravimetry.	III BSc Che	12	Online through Google Meet	A.P.S.



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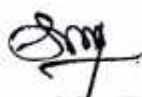
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LESSON PLAN
2021-2022

Class : III BSc Chemistry
Sem : V
Sub. Code : 17SEK51
Title of the Paper : Chemistry of BioMolecules
Total Hours : 30hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	AMINO ACIDS AND PROTEINS: a) Amino acids: Definition- classification- synthesis of α -amino acid (Gabriel synthesis, Koop synthesis)- properties of amino acids (isoelectric point, action of heat, peptide formation).b) Proteins: Definition- classification (simple and conjugated proteins)- structure of proteins (primary, secondary, tertiary and quaternary)- properties of proteins (colloidal nature, isoelectric point, denaturation, hydrolysis)- colour tests for proteins (biuret test, ninhydrin test).	III BSc Che	6	Online through Google Meet	
SEP	II	NUCLEIC ACIDS: Definition- nucleosides- nucleotides- function of nucleotides- nucleotide as energy carriers- types of nucleic acids- structure of DNA- replication of DNA- functions of DNA-structure and functions of RNA.	III BSc Che	6	Online through Google Meet	

OCT	III	VITAMINS AND HORMONES: a) Vitamins: Definition- classification- source- function and deficiency disease of vitamins A, B complex, C, D, E and K. b) Hormones: Definition- classification- main functions of following hormones- Adrenaline, Cortisone, Testosterone, Estrone, Insulin, pituitary hormones, and thyroxin. Differences between hormones and vitamins.	III BSc Che	6	Online through Google Meet	
NOV	IV	ENZYMES: Definition - classification- coenzyme- mechanism of enzyme action- factors influencing enzyme activity- enzyme inhibition (competitive inhibitor, non-competitive inhibitor and end product inhibition)- role of enzymes in the digestion of food.	III BSc Che	6	Online through Google Meet	
DEC	V	OIL: Introduction- classification- composition of oils - extraction and refining of oils-properties (saponification, hydrogenation, rancidity) -analysis of oils and (saponification value, acid value, iodine value, Reichert-Meissl value) - uses of oils.	III BSc Che	6	Online through Google Meet	



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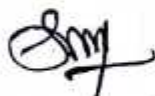
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LESSON PLAN
2021-2022

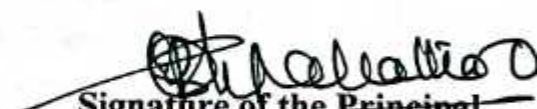
Class : II BSc N&D
Sem : III
Sub. Code : 17AKN3
Title of the Paper : Bio- Chemistry
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	AMINO ACIDS AND PROTEINS: a) Amino acids: Definition- classification- synthesis of α -amino acid (Gabriel synthesis, Koop synthesis)- properties of amino acids (isoelectric point, action of heat, peptide formation).b) Proteins: Definition- classification (simple and conjugated proteins)- properties of proteins (colloidal nature, isoelectric point, denaturation, hydrolysis)- color tests for proteins (biuret test, ninhydrin test)- structure of proteins (primary, secondary, tertiary and quaternary).	II BSc N&D	12	Online through Google Meet	
SEP	II	VITAMINS AND HORMONES: a) Vitamins: Definition- classification- source- function and deficiency disease of vitamins A, B complex, C, D, E and K. b) Hormones: Definition- classification- main functions of following hormones- Adrenaline, Cortisone, Testosterone, Estrone, Insulin, pituitary hormones, and	II BSc N&D	12	Online through Google Meet	

		thyroxin. Differences between hormones and vitamins.				
OCT	III	NUCLEIC ACIDS: Definition- nucleosides- nucleotides- function of nucleotides- nucleotide as energy carriers- types of nucleic acids- structure of DNA- replication of DNA- functions of DNA- structure and functions of RNA- biological aspects of ageing.	II BSc N&D	12	Online through Google Meet	V. gah
NOV	IV	ENZYMES: Definition - classification- coenzyme- mechanism of enzyme action- factors influencing enzyme activity- enzyme inhibition (competitive inhibitor, non-competitive inhibitor and end product inhibition)- role of enzymes in the digestion of food.	II BSc N&D	12	Online through Google Meet	V. gah
DEC	V	FATS: Introduction- classification- composition of fats - extraction and refining of fats-properties (saponification, hydrogenation, rancidity) -analysis of fats (saponification value, acid value, iodine value, Reichert-Meisel value) - uses of fats.	II BSc N&D	12	Online through Google Meet	V. gah



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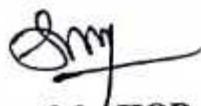
LESSON PLAN
2021-2022

Class : II BSc Physics
 Sem : III
 Sub. Code : 17AKP3
 Title of the Paper : Physical Chemistry
 Total Hours : 60hrs


Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	GROUP THEORY: Introduction-symmetry elements and symmetry operations- rules of a group, order of a group - classes and similarity transformation- point group classification (C_1 , C_2 , C_3 , T_d , O_h) - matrix representation of symmetry operation-rotation & reflection-reducible and irreducible representation (definition only)- Orthogonality theorem-construction of character table (C_{2v} only)	II BSc Phy	12	Online through Google Meet	
SEP	II	STRUCTURE OF SOLIDS: Introduction to solids - Crystalline and amorphous. Unit cell, Bravais lattices and X-ray structure determination (NaCl and KCl only) - powder and single crystal methods. Radius ratio rules - coordination number. Packing arrangement - different structure types in solids - rock salts, zinc blende, wurtzite, spinel and inverse spinel and perovskite structures.	II BSc Phy	12	Online through Google Meet	

OCT	III	III PHOTOCHEMISTRY: i) Definition of photochemical reaction-differences between thermal and photochemical reactions-laws of photochemistry [Lambert, Beer's law and Stark-Einstein's law]-quantum yield-explanation of low and high quantum yield-experimental determination of quantum yield.ii) Jablonski diagram, Non-radiative transition(IC and ISC) and radioactive transition (Fluorescence and Phosphorescence) – differences between fluorescence and phosphorescence. iii) Photosensitization – chemiluminescence and bioluminescence iv)Kinetics of photochemical reactions- hydrogen-chlorine reaction.	II BSc Phy	12	Online through Google Meet	V.golu
NOV	IV	GASEOUS STATE: a) Ideal gases: Kinetic theory of ideal gases - gas laws - ideal gas equation -Definition of most probable velocity - Mean velocity - RMS velocity - Collision diameter -collision cross section - collision frequency -Mean free path.b) Real gases: Deviation from ideal behaviour - Derivation of vander waal's equation - Methods of liquefaction of gases - Joule Thomson effect - Inversion temperature.	II BSc Phy	12	Online through Google Meet	V.golu
DEC	V	CHEMICAL EQUILIBRIUM AND CHEMICAL KINETICS: a) Chemical equilibrium:Reversible and irreversible reactions- chemical equilibrium- law of mass action-equilibrium constant- applications of law of mass action- relation between K_p and K_c - Le-Chatelier-Braun principle and its applications	II BSc Phy	12	Online through Google Meet	V.golu

	<p>in i) manufacture of NH_3 by Haber's process ii) manufacture of H_2SO_4 by contact process. b) Chemical kinetics: Rate of the reaction- rate law- rate constant- order and molecularity of reaction- differences between order and molecularity- derivation of rate constant and half life period for first order reaction. Effect of temperature on reaction rate (Arrhenius theory of reaction rate)</p>				
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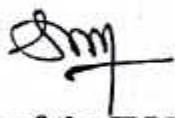
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LESSON PLAN
2021-2022

Class : III BSc N&D
Sem : V
Sub. Code : 17AKN5
Title of the Paper : Applied Chemistry
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	WATER TREATMENT: Chemical and Physical Analysis of water quality parameters – Standard prescribed for water quality by WHO and other Indian Standards – Sea Water as a source of drinking water – Electro dialysis method and Reverse osmosis method for purification of water.	III BSc N&D	12	Online through Google Meet	V. golu
SEP	II	POLYMER CHEMISTRY: a) Rubber: Natural and Synthetic rubbers – Composition of natural rubber, Neoprene, Styrene – Butadiene rubber (SBR). b) Polymer chemistry: Addition and Condensation polymerization – Copolymer – Homopolymer – Definition of natural and synthetic fibres – natural and synthetic resins – Bakelite and Nylon-66.	III BSc N&D	12	Online through Google Meet	V. golu

OCT	III	INDUSTRIAL CHEMISTRY-I: a) Match Industry : Pyrotechnics and explosives – Raw material needed for match industry – Manufacturing process – pyrotechniques – Colored smokes. b) Silicate Industry: Cement and Glass, Raw materials and manufacture of cement and Glass.	III BSc N&D	12	Online through Google Meet	
NOV	IV	INDUSTRIAL CHEMISTRY-II: a) Petrochemicals : Elementary study – Definition-Origin-Composition-Chemicals from natural gas, Petroleum, Light Naphtha and Kerosene. b) Paints and Lacquers: Pigments-Paints-Ingredients in Paints-Manufacture-Lacquers-Varnishes.	III BSc N&D	12	Online through Google Meet	
DEC	V	AGRICULTURAL CHEMISTRY: Fertilizers: Definition-nutrients for plants-role of various elements in plants Growth-natural and chemical fertilizers-classification of chemical fertilizers-Urea and potassium nitrate-Mixed fertilizer.	III BSc N&D	12	Online through Google Meet	



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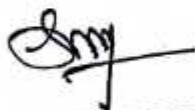
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LESSON PLAN
2021-2022

Class : III BSc Physics
Sem : V
Sub. Code : 17AKP5
Title of the Paper : Inorganic, Physical and Medicinal Chemistry
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
AUG	I	Periodic Table & Periodic Properties: a) Long form of periodic table-classification of elements in to s, p, d and f blocks. B) Atomic radii, ionic radii, ionization potential, electron affinity, electronegativity and their periodic variation-interpretation of these variations based upon their electronic configuration.	III BSc Phy	12	Online through Google Meet	
SEP	II	Chemical Bonding: Covalent bond-Ionic bond- difference between covalent and ionic bonds-Fajan's rule-coordinate covalent bond-VSEPR theory-VBT-molecules with regular geometry-hybridization-sp (BeCl ₂), sp ² (BF ₃) and sp ³ (CH ₄). MOT: Bonding and antibonding molecular orbitals. MO diagram or molecules like H ₂ , He ₂ , O ₂ , N ₂ , CO. Comparison between VBT and MOT.	III BSc Phy	12	Online through Google Meet	

OCT	III	Colloidal State: Introduction-Phases of colloids-classification of colloidal solutions-preparation, purification properties-optical property-Tyndal effect, kinetic property-Brownian movement: Electrical properties-electrical double layer and electrophoresis. Applications of colloids: colloidal medicine, smoke precipitation, artificial kidney machine, sewage disposal, purification of water, artificial rain.	III BSc Phy	12	Online through Google Meet	V. golu
NOV	IV	Petroleum and Petrochemicals: a)Petroleum: Introduction-Occurrence-sources of petroleum in india-composition of petroleum-origin of petroleum-carbide theory-refining of petroleum-cracking-knocking and antiknocking-octane number flash point-synthetic petrol-Fischer Tropsh process. B)Petrochemicals: Definition-different types of petrochemicals.	III BSc Phy	12	Online through Google Meet	V. golu
DEC	V	Medicinal Chemistry: Chemotherapy: Introduction-a)Aneathetics: Definition - Classification with examples. B) Analgesics: Definition-classification with examples. C)Antibiotics: Definition-uses of penicillin, streptomycin, tetracycline and chlorompinacol . d) Antimalarial Drugs:Definition-mode of action-examples	III BSc Phy	12	Online through Google Meet	V. golu



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LESSON PLAN 2021-2022

Class : I BSc Chemistry

Sem : II

Sub. Code : 21K21

Title of the Paper : Inorganic, Organic and Physical Chemistry-II

Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	NUCLEAR CHEMISTRY: Composition of the nucleus- stability of nuclei- mass defect- binding energy- nuclear fission- atom bomb- nuclear fusion- hydrogen bomb- Radioactivity- definition - nature of radiations from radioactive substances - comparison of the properties of α , β and γ radiations- detection and measurements of radioactivity -Geiger - Muller counter - radioactive decay - group displacement law - radioactive decay series - artificial radio activity -Half-life period-Average life period- applications of radioactive isotopes-problems using carbon dating.	I BSc Che	12	Chalk and Talk	A. R. P. J.

JAN	II	<p>ACIDS, BASES AND OXIDATION AND REDUCTION: Modern concepts of acids and bases: Arrhenius, Lowry-Bronsted, Lux-Flood, solvent-system and Lewis concept. Relative strengths of acids and bases - amphoteric solvents-differentiating solvents-levelling effects. Hard and soft acids and bases: Pearson's concept - HSAB principle and its applications. Oxidation and reduction: Definitions- oxidation number-differences between oxidation number and valency-rules for calculating oxidation number- solved examples-oxidizing and reducing agents-redox reactions. Balancing of redox equations by oxidation number method.</p>	I BSc Che	12	Chalk and Talk	V. G. Jolly
FEB	III	<p>ALIPHATIC HYDROCARBONS: Alkanes-methods of preparation- by reduction of alkyl halides- by Wurtz reaction- by using Grignard's reagent. Reactions of Alkanes: Halogenation, nitration and aromatisation [no mechanisms]. Alkenes-methods of preparation-by dehydrohalogenation of alkyl halides - by heating quaternary ammonium hydroxide [Hofmann rule] - by electrolysis of salts of dicarboxylic acids and by</p>	I BSc Che	12	Chalk and Talk	A. B. J.

	<p>pyrolysis (cracking of alkanes). Reactions of alkenes: catalytic hydrogenation [Sabatier-Sendersen's reduction], addition of halogen acids, addition to unsymmetrical alkenes [Markovnikov rule] - Anti Markovnikov addition [Kharash Peroxide Effect], ozonolysis [no mechanism]. Alkynes-methods of preparation: by dehydrohalogenation of 1, 2-dihalides- by electrolysis of salts of unsaturated dicarboxylic acid. Reactions of alkynes: Acidity of alkynes- oxidation reaction with strong alkaline KMnO_4, ozonolysis and polymerization reaction.</p>				
MARCH	<p>AROMATIC HYDROCARBONS: Nomenclature - aromaticity- Huckel's rule- method of preparation from petroleum, from toluene by hydro dealkylation and structural elucidation of benzene. Toluene: Preparation from n-heptane Reactions: - electrophilic substitution reactions [with Cl_2, H_2SO_4, HNO_3] - substitution in CH_3 group (reaction with chlorine) - Styrene: Preparation from benzene Reactions: addition reaction with Br_2 - oxidation with KMnO_4 - Xylenes: Isolation of xylenes from naphtha, Oxidation of</p>	I BSc Che	12	Chalk and Talk	A. Roy

		xylene with alkaline $KMnO_4$ - Polynuclear fused Hydrocarbon: Naphthalene: preparation by Haworth synthesis Reactions: sulphonation- ozonolysis- Friedel-Craft's alkylation- oxidation reactions; uses of naphthalene.			
APRIL	V	SOLID STATE: Forms of solids-Symmetry elements of a crystal- seven crystal systems, Space lattice and unit cells- Bravais lattice types and identification of lattice planes- Laws of Crystallography -Law of rational indices, Miller indices. X-Ray diffraction by crystals, Bragg's equation- derivation. Types of crystal- Molecular crystal(H_2O)- covalent crystal (diamond)-ionic crystal- radius ratio rule and its limitations Characteristic structure of NaCl, CsCl ,ZnS(Wurtzite)- Definition of Conductors, Insulators and Semi conductors- Defects in crystals- Schottky defect - Frenkel defect.	I BSc Che	12	Chalk and Talk

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LESSON PLAN 2021-2022

Class : I BSc Chemistry
Sem : II
Sub. Code : 21SEK22
Title of the Paper : Forensic Chemistry
Total Hours : 30hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	COLLECTION AND PRESERVATION OF EVIDENCES: Introduction-historical development of forensic science; types of physical evidence-importance of physical evidence-collection and preservation of physical evidence- identification of physical evidence- Forensic characteristics of glass and soil - Forensic examination of hair, fibre and paints	I BSc Che	6	Chalk and Talk	
JAN	II	EXAMINATION AND IDENTIFICATION OF DRUGS, ALCOHOL AND POISONS: Drug abuse-effects of marijuana and LSD-Alcohol-effect of the amount of alcohol consumed-analysis of alcohol by breathalyzer -a detailed study. Poisons- types and classification of poison - diagnosis of poisons in the living and the dead- clinical symptoms- identification of phenol,	I BSc Che	6	Chalk and Talk	

		chloral, HCN, alkaloids and arsenic poisons.				
<u>FEB</u>	III	FINGER PRINT AND FORENSIC SEROLOGY: Finger prints- principles- detection and preservation of developed finger prints- Forensic Serology-blood types-characterization of blood strains- preservation of blood evidence - Analysis of seminal stains.	I BSc Che	6	Chalk and Talk	
<u>MARCH</u>	IV	CRIME DETECTION: Document and voice examination-hand writing comparison- collection of hand writing exemplars- typewriting comparisons- voice examination-sound spectrograph- Human bombs-possible explosives (gelatin sticks and RDX) – metal detector devices	I BSc Che	6	Chalk and Talk	
<u>APRIL</u>	V	FORGERY AND COUNTERFEITING: Detecting forgery in bank cheques/drafts and educational records like mark sheet, certificate using UV light. Alloy analysis using AAS to detect counterfeit coins - Checking silver line water mark in currency notes - Detecting of gold purity in 22 carat ornaments and detecting gold plated jewels.	I BSc Che	6	Chalk and Talk	



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LESSON PLAN 2021-2022

Class : I BSc Chemistry

Sem : II

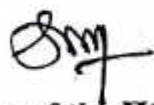
Sub. Code : 21SEK21

Title of the Paper : Medicinal Chemistry

Total Hours : 30hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	TERMINOLOGY AND CLASSIFICATION OF DRUG: Drug: Definition-requirements of drugs- history of drugs. Terminology in Drug Chemistry: Medicinal Chemistry-pharmacy - pharmacology- pharmacodynamics – pharmacophore – pharmacokinetics – antimetabolite - bacteria-virus and fungi. Classification of drugs: On the basis of their therapeutic action.	I BSc Che	6	Chalk and Talk	
JAN	II	ANAESTHETICS, ANALGESICS AND ANTIPYRETICS: Anaesthetics: Definition-characteristics-classification-application of nitrous oxide, chloroform and cocaine. Analgesics: Definition-mode of action-specific applications of antipyrine, aspirin and novalgin. Antipyretics: Definition-mode of action-medicinal uses of salol and paracetamol.	I BSc Che	6	Chalk and Talk	

FEB	III	SULPHA DRUGS, ANTIBIOTICS AND ANTISEPTICS: Sulpha drugs: Definition-mode of action-applications of sulphanilamide, sulphapyridine and sulphadiazine. Antibiotics: Definition-characteristics- mode of action-structure and uses of the following antibiotics- penicillins, streptomycin, chloramphenicol, erythromycin and tetracyclins. Antiseptics: Definition-types of antiseptics-difference between antiseptic and disinfectant.	I BSc Che	6	Chalk and Talk	V-gouta
MARCH	IV	HYPNOTICS, SEDATIVES AND TRANQUILIZERS: Hypnotics and Sedatives: Definition - types (alcohols-aldehydes, ketones and sulphones- urethans-amides and urca-barbiturates) - applications of chloral, paraldehyde, sulphonal and barbituric acid. Tranquilizer: Definition-characteristics-classification-applications of piperadol and hydroxyzine.	I BSc Che	6	Chalk and Talk	V-gouta
APRIL	V	ANTINEOPLASTIC AND HYPOGLYCAEMIC DRUGS: Cancer: Introduction-causes for cancer (poly-cyclic aromatics, nitroaromatics, chloroethylene and halogenated olefins)-treatment (Radiation, Chemotherapy, Surgical treatment)-cancer chemotherapy- mustards-antimetabolites- hormones AIDS and HIV: Introduction-transmission and treatment of HIV prevention of HIV.	I BSc Che	6	Chalk and Talk	V-gouta



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LESSON PLAN 2021-2022

Class : I BSc Chemistry

Sem : II

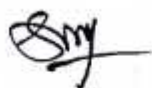
Sub. Code : 21NMK2

Title of the Paper : Chemistry in Everyday Life


Total Hours : 30hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
<u>DEC</u>	I	DETERGENT POWDER AND WASHING POWDER: Detergent powder: Introduction- raw materials - manufacturing method from acid slurry-special features of detergent. Washing powder: Introduction- raw materials- method of manufacturing	I BSc Che	6	Chalk and Talk	A. Arif
<u>JAN</u>	II	SOAPS AND INK: Soaps: Introduction-raw materials- Manufacturing methods- Features in the preparation of toilet soaps-Ink: Introduction- different types of inks- methods of preparation of blue black liquid ink, fountain pen ink, red ink and rubber stamp ink- ink remover.	I BSc Che	6	Chalk and Talk	A. Arif
<u>FEB</u>	III	CHALK AND CANDLES: Chalk: Introduction- materials for manufacturing- manufacturing processes-Candles: Introduction- raw materials- manufacturing method of candles- manufacturing of fragrant candles and candles that can destroy mosquitoes- method of manufacture of superior candles.	I BSc Che	6	Chalk and Talk	A. Arif

MARCH	IV	PHENOILS, INCENSE STICK, SAMBIRANI AND NAPHTHALENE BALLS: Phenoils: Introduction- raw materials - methods of preparation and uses. Incense stick: Introduction- raw materials- method of manufacturing and uses Sambrani: Introduction- raw materials- methods of manufacturing and uses- Naphthalene Balls: Introduction- raw materials- methods of manufacturing and uses	I BSc Che	6	Chalk and Talk	A Pmf
APRIL	V	PLASTER OF PARIS, GUM AND SHOE POLISH: Plaster of Paris: Introduction- Method of manufacturing and uses- Gum: Introduction- Method of manufacturing and uses- Shoe polish: Introduction- raw materials- Method of manufacturing and uses.	I BSc Che	6	Chalk and Talk	A Pmf



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LESSON PLAN
2021-2022

Class : II BSc Chemistry

Sem : IV

Sub. Code : 17K41

Title of the Paper : Organic and Physical Chemistry

Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
<u>DEC</u>	I	ORGANO HYDROXY COMPOUNDS: a) Alcohols: Preparation from alkenes by hydration, hydroboration- oxidation and oxymercuration- demercuration methods – general properties. Ethylene glycols: Preparation and properties- Glycerol: Preparation and properties. b) Phenols: General methods of Preparation – properties- acidity of phenol and effect of substituents- reactions of analytical importance. c) Aromatic alcohol: Benzyl alcohol- Preparation and properties-comparison with phenols.	II BSc Che	12	Chalk and Talk	
<u>JAN</u>	II	ALIPHATIC ALDEHYDES AND KETONES: Methods of preparation of aldehydes and ketones- by direct oxidation of alcohols, Catalytic dehydrogenation of alcohols, oxidation of alkenes with ozone, hydration of alkynes, Stephens reduction of nitriles, Rosenmund reduction of acid chlorides- physical properties – nature of reactions of carbonyl	II BSc Che	12	Chalk and Talk	

		<p>compounds – nucleophilic addition reactions - mechanism of addition of grignard reagents, addition of ammonia -reaction with alcohols, thiols ,ammonia derivatives- Reactions involving alkyl groups - aldol condensation, dehydration of aldols, halogenations -reduction to alcohols – clemmensen reduction- wolf-kishner reduction- reduction to pinacols – oxidation to carboxylic acids –mechanism of haloform reaction , cannizzaro reaction – tests of aldehydes and ketones- Preparation , properties, and uses of acetaldehyde.</p>			
<u>FEB</u>	III	<p>LIQUID STATE: Intermolecular forces in liquids – dipole-dipole attractions, London forces and hydrogen bonding - Heat of vapourisation - Trouton's rule and its significance – molar volume and its applications – surface tension - effect of temperature on surface tension – parachor – atomic and structural parachors - their applications- viscosity – effect of temperature on viscosity – measurement of viscosity – Ostwald method - Reynold's number-Liquid Crystals – classification – smectic – nematic - cholesteric - disc shaped and polymer liquid crystals – LCDs and the Seven Segment cell - applications.</p>	II BSc Che	12	Chalk and Talk
<u>MARCH</u>	IV	<p>SURFACE CHEMISTRY: a) Catalysis: Definition – characteristics of catalytic reactions –Homogeneous catalysis: Acid-base catalysis-enzyme catalysis-Michaelis-Menten equation-autocatalysis- Heterogeneous catalysis – surface catalytic reactions – promoters- catalytic poison – theories of catalysis – applications of catalysis. b) Adsorption: Definition – various terms involved in adsorption – types of adsorption: physical and chemical</p>	II BSc Che	12	Chalk and Talk

A. B. J.

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		adsorption - factors influencing adsorption - Adsorption Isotherms : Freundlich adsorption isotherm and Langmuir adsorption isotherm-derivation - applications of adsorption.				
APRIL	V	CHEMICAL KINETICS: Introduction - rate of reaction - rate law and rate constant - order and molecularity - first order reactions - examples - rate equation - derivation - half life period - second order reactions - examples - rate equations - derivation - zero order and third order reactions - examples - rate equations (no derivation required) - determination of order of a reaction. Influence of temperature on the rate of reaction - Arrhenius rate equation and its significance - theory of reaction rates - Bimolecular collision theory - Unimolecular reactions - Lindemann's hypothesis - Absolute Reaction Rate Theory.	II BSc Che	12	Chalk and Talk	A. Roy



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LESSON PLAN
2021-2022

Class : II BSc N&D

Sem : IV

Sub. Code : 17AKN4

Title of the Paper : Environmental & Organic Chemistry

Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	CORROSION OF METALS : Definition - disadvantages of corrosion - theories of corrosion (dry or chemical and wet or electro chemical theories) - prevention of corrosion (methods of preventing corrosion) -painting- coating with other metals (galvanizing, tinning and electroplating) -anodizing- cathodic protection - corrosion inhibitors.	II BSc N&D	12	Chalk and Talk	<i>A. R. R. J.</i>
JAN	II	CHEMICAL AND METAL TOXICOLOGY : Introduction - highly toxic solids - dangerously toxic liquids and severe irritants- dangerously toxic gases- enzyme inhibition by toxic metals in man - biochemical effects of toxic metals on man and children- lead, mercury, cadmium, arsenic, vanadium, cyanide, cobalt - diagnostic tests for metal poisoning- lead, mercury- treatment of poisoning -lead, mercury, cadmium, arsenic, vanadium, cyanide - cobalt as antidote to cyanide poisoning - trace	II BSc N&D	12	Chalk and Talk	<i>V. R. J.</i>

		metal poisoning- decaying leaves remove toxic metals in water.				
<u>FEB</u>	III	RADIOACTIVE POLLUTION, PROTECTION AND CONTROL FROM RADIATIONS: Anthropogenic sources of radiation – control of occupational radiation exposure – minimizing X-rays hazards – patient protection from radiation –radiography and precautions from radiation risk-minimizing risks of nuclear power-beneficial aspects of radiation.	II BSc N&D	12	Chalk and Talk	V. gally
<u>MARCH</u>	IV	CARBOHYDRATES: Definition and classification-detailed study of monosaccharides-glucose and fructose-mutarotation-epimerisation-structure and configuration of glucose and fructose-comparison between glucose and fructose-methods of ascending and descending in the sugar series-interconversion between glucose and fructose-disaccharides-sucrose-preparation, properties(no structural elucidation).	II BSc N&D	12	Chalk and Talk	A. B. J.
<u>APRIL</u>	V	DYES: Introduction to dyes – color and constitution – classification based on structure and application – preparation and applications of the following dyes –Nitro Dyes, Azo Dyes- methylorange, congo red, malachite green, phenolphthalein, Indigo.	II BSc N&D	12	Chalk and Talk	A. B. J.



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LESSON PLAN
2021-2022

Class : II BSc Phy

Sem : IV

Sub. Code : 17AKP4

Title of the Paper : Organic and Physical Chemistry

Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	AMINO ACIDS AND PROTEINS: a) Amino acids: Definition- classification- synthesis of α -amino acid (Gabriel synthesis, Koop synthesis)- properties of amino acids (isoelectric point, action of heat, peptide formation). b) Proteins: Definition- classification (simple and conjugated proteins)- properties of proteins (colloidal nature, isoelectric point, denaturation, hydrolysis)- color tests for proteins (biuret test, ninhydrin test)- structure of proteins (primary, secondary, tertiary and quaternary).	II BSc Phy	12	Chalk and Talk	<i>V. Gopal</i>
JAN	II	CARBOHYDRATES: Definition and classification-detailed study of monosaccharides-glucose and fructose-mutarotation-epimerisation-structure and configuration of glucose and fructose-comparison between glucose and fructose-methods of ascending and descending in the sugar series-interconversion between glucose and fructose-disaccharides-sucrose-preparation, properties and structure elucidation.	II BSc Phy	12	Chalk and Talk	<i>A. Pong</i>
FEB	III	NUCLEIC ACIDS: Definition- nucleosides- nucleotides- function of nucleotides- nucleotide as energy carriers- types of nucleic acids- structure of DNA- replication of DNA- functions	II BSc Phy	12	Chalk and Talk	<i>A. Pong</i>

		of DNA-structure and functions of RNA- biological aspects of ageing.				
MARCH	IV	ELECTROCHEMISTRY: Conductance - definition - specific conductance - equivalent conductance - molar conductance - effect of dilution on equivalent conductance-cell constant- electrolytic dissociation - degree of dissociation - Kohlrausch's law and its applications - conductometric titrations - Ostwald's dilution law -Ionic product of water- The pI _f scale- Common ion effect - buffer solutions - theory of buffer action - applications of buffer solutions - Henderson's equation .	II BSc Phy	12	Chalk and Talk	<i>V. G. G. G.</i>
APRIL	V	ELECTROCHEMICAL CELLS : Electrochemical cells-Galvanic cells and Electrolytic cell-electrode reaction, electrode potential and standard electrode potential -thermodynamics of cells-Nernst equation- EMF and measurement of EMF-representation of electrodes -sign conventions for electrodes- -different types of electrodes (metal-metal ion electrode, gas electrode, calomel electrode, oxidation-reduction electrode)- cells (standard western cadmium cell, lead storage battery)- fuel cells (hydrogen-oxygen fuel cells) Concentration cells (electrode concentration cells, electrolyte concentration cells).	II BSc Phy	12	Chalk and Talk	<i>A. P. P.</i>

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LESSON PLAN 2021-2022

Class : III BSc Phy

Sem : VI

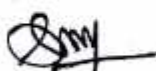
Sub. Code : 17AKP6

Title of the Paper : Analytical and Inorganic Chemistry

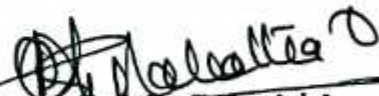
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	ANALYTICAL CHEMISTRY-I: Volumetric methods of analysis: i) Introduction- principle-terminology: molality, molarity, normality, mole fraction -titration-end point- indicator - types of indicators - Standard solution- types of standard solution- requirements of primary standard solution ii) Acid-base titration:Types- titration curves and choice of indicators- Ostwald's theory-theory of acid-base indicators.	III BSc Phy	12	Chalk and Talk	V. gow
JAN	II	ANALYTICAL CHEMISTRY-II: Chromatography: Definition-principle of chromatography- types of chromatography- experimental techniques and applications of column chromatography- thin layer chromatography and paper chromatography- R_f value and factors affecting R_f value.	III BSc Phy	12	Chalk and Talk	V. gow

FEB	III	PRINCIPLES AND PROCESS OF METALLURGY: a) Ores and minerals: Definition-examples - various steps of metallurgy- crushing, pulverizing -concentration of the ore- calcination and roasting- reduction into metals Aluminothermic process. b) Refining of metals: Electrolytic refining, Zone refining and Van-Arkel process.	III BSc Phy	12	Chalk and Talk	V. golu
MARCH	IV	RADIO ACTIVITY: Radioactivity- definition – nature of radiations from radioactive substances – comparison of the properties of α , β and γ radiations- detection and measurements of radioactivity –Geiger Muller counter–group displacement law- nuclear fission-atom bomb- nuclear fusion- hydrogen bomb- applications of radioactive isotopes.	III BSc Phy	12	Chalk and Talk	V. golu
APRIL	V	ACIDS, BASES AND OXIDATION AND REDUCTION: Acids and Bases :Modern concepts of acids and bases- Arrhenius, Bronsted- Lowry, Lewis and Lux-Flood concept -levelling effects. Oxidation and Reduction :Modern concept-oxidation number- Calculation of oxidation number- oxidizing agents- reducing agents- redox reactions- Balancing of redox equations by oxidation number method.	III BSc Phy	12	Chalk and Talk	V. golu



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LESSON PLAN
2021-2022

Class : III BSc N&D

Sem : VI

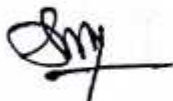
Sub. Code : 17AKN6

Title of the Paper : Applied and Medicinal Chemistry

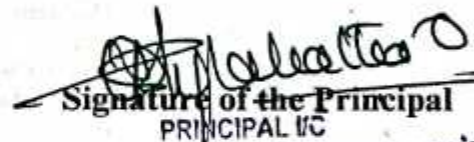
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	SOAP AND DETERGENTS: Soap: Saponification –Definition- Types of soap- Manufacture of soap: Hot process, Cold process and Modern continuous process- Cleansing action of soap. Detergent: Definition- Classification with example- Distinction between soaps and detergents.	III BSc N&D	12	Chalk and Talk	V. G. Jothi
JAN	II	PLASTICS AND PAPER INDUSTRY: a) Plastics: Introduction-characteristics of plastics-classification of plastics- differences between thermo setting and thermo plastics- preparation and applications of bakelite, polythene, PVC, polypropylene, poly styrene and urea formaldehyde resin. Differences between plastics and resins. b) Paper industry: Introduction- raw materials and manufacturing process of paper- types of paper-paper industry in India	III BSc N&D	12	Chalk and Talk	V. G. Jothi
FEB	III	LEATHER TECHNOLOGY: Preservation and processing of leather : Chemical methods of curing and preservation of hides and skins in acid & alkaline solutions- principles of methods employed in	III BSc N&D	12	Chalk and Talk	V. G. Jothi

		curing, liming, deliming, bating and pickling –process of dyeing leather-use of mordants-dyeing auxiliaries such as leveling,wetting and dispersing agents- dye fixations.				
MARCH	IV	ANAESTHETICS, ANALGESICS AND ANTIPYRETICS: a)Anaesthetics: Definition- classification-applications of nitrous oxide and chloroform. b)Analgesics: Definition-mode of action-specific applications of antipyrine and aspirin. c)Antipyretics: Definition-mode of action- medicinal uses of salol and paracetamol.	III BSc N&D	12	Chalk and Talk	<i>V. gahlot</i>
APRIL	V	SULPHA DRUGS AND ANTIBIOTICS a) Sulpha drugs: Definition-mode of action-applications of sulphanilamide and sulphapyridine. b) Antibiotics: Definition-characteristics- mode of action-structure and uses of the following antibiotics- penicillins and tetracyclins.	III BSc N&D	12	Chalk and Talk	<i>V. gahlot</i>



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LESSON PLAN
2021-2022

Class : III BSc Chemistry



Sem : VI

Sub. Code : 17K61

Title of the Paper : Organic chemistry and Spectroscopy

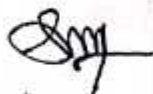
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	REACTIVE METHYLENE COMPOUNDS, DYES AND CHROMATOGRAPHY: a) Reactive methylene compounds: Introduction- Preparation & synthetic applications of acetoacetic ester & malonic ester. b) Dyes: Introduction to dyes - color and constitution - classification based on structure and application - preparation and applications of the following dyes - methylorange, congo red, malachite green, phenolphthalein, indigo. c) Chromatography: Definition-principles of chromatography-types of chromatography-experimental technique and applications of column chromatography, thin-layer chromatography, paper chromatography, paper electrophoresis- R_f values and factors affecting R_f values.	III BSc Che	12	Chalk and Talk	

<u>JAN</u>	II	<p>ALICYCLIC COMPOUNDS AND CONFORMATIONAL ANALYSIS a)</p> <p>Alicyclic compounds: Introduction-nomenclature-preparation: from dihalogen compounds, calcium salts of carboxylic acids, Dieckmann reaction-properties: reactions with halogens, halogen acids, reduction, oxidation, rearrangement reaction- relative stability of cycloalkanes – Bayer's strain theory and its modification.b) Conformational analysis: Definition-differences between conformation and configuration-conformations and stability of ethane, n-butane, 1, 2-dichloroethane, cyclohexane and methyl cyclohexane.</p>	III BSc Che	12	Chalk and Talk	
<u>FEB</u>	III	<p>MOLECULAR REARRANGEMENTS AND TAUTOMERISM a)</p> <p>Molecular Rearrangements: Detailed mechanisms of the following rearrangements: Pinacol-pinacolone, Hofmann, Claisen, Benzidine, Beckmann and Fries rearrangements.b) Tautomerism: Definition-classification of tautomerism-prototropy and</p>	III BSc Che	12	Chalk and Talk	

		<p>anionotropy. A detailed study of</p> <p>i) keto-enol tautomerism ii) nitro-acinitro tautomerism</p> <p>Differences between tautomerism and resonance-differences between tautomerism and isomerism.</p>			
MARCH	IV	<p>ALKALOIDS AND TERPENOIDS: a) Alkaloids: Definition- occurrence- classification of alkaloids - extraction of alkaloids-general methods of determining the structure of alkaloids- structure and synthesis of the following alkaloids: coniine and nicotine. b) Terpenoids: Definition- occurrence- classification- - isolation- isoprene rule- general properties-general methods of determining structure- and structural elucidation of citral and menthol.</p>	III BSc Che	12	Chalk and Talk
APRIL	V	<p>MOLECULAR SPECTROSCOPY : a) Ultra violet-visible spectroscopy (Electronic Spectroscopy): Introduction-Franck Condon principle (Electronic transition)-types of transition in organic molecules ($n-\pi^*$, $\sigma-\sigma^*$, $n-\sigma^*$, $\pi-\pi^*$)-basic concepts-bathochromic shift, hypsochromic shift, hyper chromic shift, hypochromic shift, auxochrome chromophore, effect of conjugation, Woodward Fieser rules for calculating λ_{max} value-</p>	III BSc Che	12	Chalk and Talk

	<p>(conjugated dienes, α,β unsaturated carbonyl compounds).</p> <p>b) IR Spectroscopy: Introduction- principle-selection rules-factors influencing vibration frequencies-finger print region-spectral features of some organic compounds (alkane, alkyl residue, alkenes, alkynes, cycloalkanes, halogens, alcohols and carbonyl compounds).</p> <p>c) NMR Spectroscopy: Introduction-rules (predicting the nuclear spin)-chemical shift, factors influencing chemical shift, shielding and deshielding of protons, spin-spin coupling (NMR spectrum of acidified and pure ethanol), coupling constant-rules for calculating the number of lines in NMR spectra (Pascal's triangle)-NMR spectra of ethane, propane, toluene, nitrobenzene, acetone, ethylene, paraxylene.</p>				
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LESSON PLAN 2021-2022

Class : III BSc Chemistry

Sem : VI

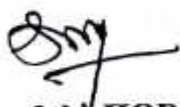
Sub. Code : 17K62

Title of the Paper : Physical Chemistry-II

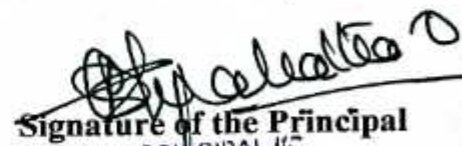
Total Hours : 60hrs

Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
DEC	I	ELECTROCHEMISTRY: Electrolytic conductance-Faraday's laws of electrolysis – specific conductance – equivalent conductance – molar conductance – variation of molar conductance with dilution – Ionic mobility -Transport number – determination of transport number : Hittrof's method, moving boundary method – Kohlrausch's law – applications – applications of conductance measurements : determination of solubilities of sparingly soluble salts, conductometric titrations, precipitation titrations. - Ostwald's dilution law - Debye - Huckel Onsager theory of strong electrolytes .	III BSc Che	12	Chalk and Talk	
JAN	II	ELECTROCHEMICAL CELLS : Galvanic Cells –half cell reactions and reversible electrodes – single electrode potential – thermodynamics of reversible electrodes and cells - The Nernst equation – standard electrode	III BSc Che	12	Chalk and Talk	

		particle in 3D box.				
APRIL	V	<p>MOLECULAR SPECTROSCOPY: a) Introduction-characterization of electromagnetic radiation (wavelength, wave number)-regions of the spectrum.</p> <p>b) Rotational spectra of diatomic molecules: Rigid rotator- selection rule -determination of moment of inertia and bond length- relative intensities of spectral lines - effect of isotopic substitution. c) Vibrational-rotational spectroscopy (Infra-red spectroscopy): Introduction-derivation of force constant of diatomic molecule-vibrational energy levels-selection rules-modes of vibration of atoms in poly atomic molecules-CO₂, H₂O(stretching and bending vibrations)- applications, detection of functional group (OH, COOH, NH₂, NO₂, CO), study of hydrogen bonding and finger print region d) Raman spectroscopy: Introduction-types of scattering-stokes lines-anti stokes lines-quantum theory of Raman effect-selection rules-advantages of Raman spectroscopy over IR spectroscopy-rule of mutual exclusion-applications (structure of CO₂, H₂O, N₂O)</p>	III BSc Che	12	Chalk and Talk	Amy



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LESSON PLAN
2021-2022

Class : III BSc Chemistry

Sem : VI

Sub. Code : 17KE6A

Title of the Paper : Inorganic and Application of Computer in Chemistry


Total Hours : 60hrs

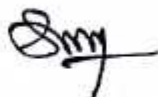
Month	Unit	Description of the Syllabus	Class	Hours Allocated	Teaching Mode & Methods	Course Teacher Signature
<u>DEC</u>	I	COORDINATION COMPOUNDS-I: Double salts and coordination compounds – terminology: coordination sphere, coordination number, ligand and its types – nomenclature – EAN rule - Isomerism: structural isomerism and stereo isomerism Chelates: classification – chelate effect and application of the formation of chelated complexes in analytical chemistry.	III BSc Che	12	Chalk and Talk	A. R. M. J.
<u>JAN</u>	II	COORDINATION COMPOUNDS-II: Werner's coordination theory: postulates and experiment evidence - Sidgwick's concept: EAN rule – applications and limitations - Valence Bond Theory: assumptions and illustration to 4- and 6- coordination ions - hybridization and geometry - limitations - Crystal Field Theory: salient features - orbital splitting as applied to octahedral, tetrahedral and square planar complexes - CFSE and its calculation –factors	III BSc Che	12	Chalk and Talk	A. R. M. J.

		<p>influencing the magnitude of CF splitting: nature of central cation, spectrochemical series- magnetic moments and color of transition metal complexes- Comparison of VBT and CFT - Molecular orbital theory</p> <p>σ bonding in octahedral complexes $[\text{Co}(\text{NH}_3)_6]^{3+}$ & $[\text{CoF}_6]^{3-}$- π bonding system introduction only.</p>			
<u>FEB</u>	III	<p>METAL CARBONYLS, INORGANIC POLYMERS AND BIO-INORGANIC CHEMISTRY :</p> <p>a) Metal Carbonyls: Definition-classification-general methods of preparation and properties of carbonyls-structure and bonding in $\text{Ni}(\text{CO})_4$, $\text{Fe}(\text{CO})_5$, $\text{Cr}(\text{CO})_6$, $\text{Mn}_2(\text{CO})_{10}$, and $\text{Co}_2(\text{CO})_8$-EAN rule as applied to carbonyls.b) Metal nitrosyls:Nitrosyls-types-nitrosyls compounds.preparation, properties and structure -sodiumnitroprusside-nitroferrous sulphate-EAN as applied to nitrosyls.</p> <p>c) Bio-Inorganic Chemistry: Role of metal ions (Fe, Co, Zn, Mg, Na, Ca &K) in biological systems- structure of metallo porphyrins- structure and functions of heamoglobin, myoglobin, chlorophyll.</p>	III BSc Che	12	Chalk and Talk
<u>MARCH</u>	IV	<p>PROGRAMMING IN C LANGUAGE:</p> <p>a) Advantages-types of the language- keywords-variables and parameters- arrays-data types-structures- funning of C program constants- operators-expressions- input and output-control statements- looping-functions. b) Applying C programme to Calculation of Inversion temperature-Crms, Cav</p>	III BSc Che	12	Chalk and Talk

A.P.M.J

S.M.J

		and Cmp velocity- degrees of freedom on the basis of phase rule- efficiency of a heat engine- half-life period of a reaction- critical constants-ionic strength of any electrolytic solutions				
APRIL	V	<p>CHEM INFORMATICS:</p> <p>a)Representation and manipulation of 2d molecular structure: Introduction- computer representation of chemical structure- Graph Theoretic Representations of Chemical Structures- connection tables and linear notations- structure searching – substructure searching (screening methods) –reaction databases.b)Representation and manipulation of 3d molecular structure:Introduction-theoretical 3D databases (structure generation programmes – conformational search & analysis – systematic conformational search – random conformational search).</p>	III BSc Che	12	Chalk and Talk	



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