ASMV UNIVERSITY RAICHUR

B.Sc. (CHEMISTRY)

SYLLABUS FOR CHEMISTRY

Course: CHEMISTRY

Discipline Specific Course (DSC) For Semester V

Elective Course (EC) For Semester V

As Per SEP (NEPRevised) -2024

B.Sc. Semester–V
DSC-9: Chemistry (Theory)
Course title- Chemistry -9
Course Code: C5CHE2T1

Type of Course	Theory/ Practical	Credits	Instruction hour per week(hr)	Total hoursof Syllabus /Sem	Duration ofExam(hr)	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSE-9A	Theory	04	04	64	03	20	80	100

Course Out comes(CO)

After completion of course chemistry(theory) students will able to

CO1: Explain crystal field splitting in octahedral, tetrahedral and square planner complexes, calculation of CFSE and John Teller distortion. Determination of magnetic susceptibility by Gouy'smethod.Stability of metal complexes.

CO2: Understand Metal carbonyls : Types,nomenclature, preparation,and properties, electron count in metal carbonyls of Cr, Mn, Fe, Co and Ni.Structure of mononuclear and binuclear carbonyls .

CO3: Understand preparation, properties, structure and uses of Phosphazines, phosphonitrilic chloride .

CO4: Study aromaticity of 5-membered and six member rings containing one hetero atom, synthesis of pyrrole, furan, pyridine, Mechanism of Electrophilic substitution reactions of furan, pyrrole and pyridine. Indole, quinoline and isoquinoline.

CO5: Study Classification and general properties of Glucose and Fructrose (Open chain and cyclic structure), Determination of configuration of monosaccharides.

CO6: Define spectroscopy and different regions of electromagnetic spectrum. Basics of UV/visible spectroscopy. different kind of transitions that can take place within molecule.

CO7: Explain the origin of IR spectrum. Explain the principles of different types of IR instruments. Outline different applications of UV, IR.& Raman spectroscopy

CO8: Understand the principles governing colligative properties, interpret experimental data and determine molecular masses.

CO9: Explain the macroscopic and microscopic kinetics, theories of reaction rates ,chain reaction ,photochemical and thermal reaction and flash photolysis.

CO10: Know the manufacture, properties anda pplications of glass and cement.

CO11: Learn the types, manufacture of soaps,detergents and their cleansing actions. study of corrosion, types causes and its control

DSC-9:Chemistry(Theory) 9 (C5CHE2T1)	64hrs
UNIT-I: COORDINATION CHEMISTRY-II ORGANOMETALLICCOMPOUNDS&INORGANIC POLYMERS	16hrs
Coordination chemistry-II Crystal field theory, crystal field splitting in octahedral, tetrahedral and square planner complexes, calculation of CFSE in octahedral and tetrahedral complexes, crystal field effects in weak and strong field ligands.Factors affecting the magnitude of crystal field splitting.Tetragonal distortion of octahedral geometry,JohnTeller distortion.Explanation of colour and magnetic moments of complexes.Determination of magnetic susceptibility by Gouy'smethod. Stability of metal complexes (thermodynamic and kinetic), stepwise and overall stability constant and their relationship. Factors affecting the stability of metal complexes. **(8 Hours)** **Organometallic compounds** Definition and classification with examples, concept of hapticity of organic ligands with examples.Metalcarbonyls: Types, nomenclature, preparation, andproperties.18-electronrule, electron count in metal carbonyls of Cr, Mn, Fe, Co and Ni.Structure of mononuclear ($Cr(CO)_6$, $Fe(CO)_5$& $Ni(CO)_4$) and binuclear carbonyls ($Mn_2(CO)_{10}$, ($Co_2(CO)_8$&($Fe_2(CO)_9$ using VBT. **(5 Hours)** **Inorganic Polymers** General properties and types of inorganic polymers. Comparison with organic polymers. Silicones: preparation, properties and uses. Types of silicones: structure, properties and uses. Phosphazines: Preparation and structure of phosphonitrilic chloride (trimer). **(3 Hours)**	
UNIT-II:HETEROCYCLICCOMPOUNDS,CARBOHYDRATES ,UVANDIRSPECTROSCOPY	16hrs
Heterocyclic Compounds: Classification, Nomenclature by Hantzsch and Widmann method, aromaticity of 5- and 6-membered rings containing one hetero atom, synthesis of pyrrole, furan (Paal-Knor synthesis), pyridine (Hantzsch synthesis). Electrophilic substitution reactions in furan, pyrrole and pyridine (Nitration, sulphonation, halogenation, Friedel-Craft's reaction). Nucleophilic substitution reactions in pyridine: Chichibabin reaction with organo lithium compounds (butyl and Phenyl lithium). Indole (Fischer's synthesis), quinoline (Skrap'ssynthesis). (**5 Hours)** **Carbohydrates:** Classification and general properties. Glucose and Fructrose (Open chain and cyclic structure), Determination of configuration of monosaccharides. Absolute configuration of Glucose and Fructose .Mutarotation. Ascending and descending in monosaccharides, Interconversion of aldose to ketose and vice-versa,Osazone formation.Structure of disaccharides (Sucrose ,Cellobiose , maltose , lactose) and polysaccharides (starch and cellulose) excluding their structure elucidation (**5Hours)**	

Ultraviolet Spectroscopy: Types of electronic transitions, λ_{max}, chromophores and auxochromes ,bathochromic and hypsochromic shifts,intensity of absorption,Woodward–Fieser rules for calculating $\lambda_{max}$of α, β-unsaturated aldehydes, ketones, carboxylic acids, esters. **(3Hours)** **Infrared Spectroscopy:** Introduction to infrared spectroscopy, intensity of absorption band, position of absorptions, C-H, >C=O, O-Hand N-H absorption bands with explanation for variation in stretching frequencies. Identification of Hydrogen bonding in alcohols,phenols and carboxylic acid susing IRspectroscopy.(**3 Hours)**	
UNIT-III:COLLIGATIVE PROPERTIES AND CHEMICAL DYANAMICS **Colligative Properties:**Definition and examples Osmosis and osmotic Pressure: Semi permeable membrane , natural and artificial semi permeable examples . Osmosis and osmotic pressure- determination of osmotic pressure by Berkeley and Hertley's method .Theory of dilute solutions .laws of osmotic pressure relationship between molecular mass and osmotic pressure ,isotonic solutions . Lowering of vapourpressure;Concept of vapour pressure Rault'slawrelative lowering of vapour pressure of solvent ,Its determination by dynamic method (Ostwald's and walker).Calculation of molecular mass from relative lowering of vapour pressure. Elevation inboiling point: Definition and its relationship with relative lowering of vapour pressure (to be derived from Clepeyron-Clausius equation). Ebullioscopic constant of solvent,relationship between molar mass and elevation in boiling point. Detrmination of molar mass of solute by Landberger method. Depression in freezing point: Definition and its relationship to the lowering of vapour pressure cryoscopic constant of solute, relatin between depression in freezing point and molecular mass of solute (to be derived fromClepeyron-Clausius equation). Determination of molecular mass of solute by cryoscopic method. **08 Hour** **Chemical Dyanmics:** Macroscopic and microscopic kinetics, Theories of reaction rate-Collision theory and transition state theory, Thermodynamical formulation of reaction rates(Wyne-jonesandeyring treatment),reaction between ions in solution-Influence of ionic strength on reaction rates. **Concept of steady state kinetics:** chain reactios-chain length and chain inhibition,comparison of photochemical and thermal reactions, mechanism ofphotochemical	16hrs

and thermal reactionsof HCl and HBr **Kinetics of fast reactions-** study of relaxationmethod (temperature and pressure jump), flow method(Plug flow mehtod and stopped flow methods), Flash photolysis and shock tube method..**08 Hours**	

Unit-IV- INDUTRIAL CHEMISTRY	16Hours
Cement&Ceramics: **Cement:**Introduction,definition,raw materials, grades of cement. Manufacture of Portland cement (by dry and wet process) Mechanism of setting of cement. Types of cement and their uses. RCC **Ceramics**- Introduction, classification- clay defination and feldspar, properties and uses. **03 Hours** **Paints and pigments-:** **Paints** -Introduction requirement of paint constituents of paint, formulation of paint, failure of paint film (Reason) Emulsion paint, manufacture of white lead using Dutch process and uses **Pigments**-Definition, Red and white pigment.**03Hours** **Oils,Fats , Soaps and Detergents:**Composition of oils and fats, Determination of saponification value and Iodine value of oils and fats, Manufacture of soaps(hydrolyser process),Synthetic detergents(syndets),manufacture of sodium lauryl sulphate and sodium dodecyl benzene sulphonate,cleansing action of soaps**. 05 Hours** **Corrosion:** Introduction, Definition,Types of corrosion : Dry corrosion & Wet corrosion , Factors influencing corrosion-Microbiological Corrosion, Atmospheric Corrosion, Mechanism of electrochemical corrosion .Galvanic Corrossion, Concentration Cell Corrossion ,Differential aeration Corrosion. Corrosion control –Proper designing-Using pure metal-Using metal alloys. **05 Hours**	

Recommended Books/References

1. ConciseInorganicChemistry-J.D.Lee,5th Edn,New AgeInternational(1996)
2. ModernInorganicChemistrySathyaPrakash'sbyR.D.Madan,S.ChandandCo.Ltd,NewDelhi.
3. InorganicChemistry-PrinciplesofStructureandReactivity,4th Edn-
   J.E.Huheey,E.A.Keiter,R.L.Keiter and O.K. Medhi. Pearson Education (2009).
4. AdvancedInorganicChemistry-Agarwal&Keemtilal,11th edition,Pragathipublication,2012
5. Organic Chemistry Morrison,R.T. &Boyd,R.N., Pearson, 2010.
6. Advanced OrganicChemistryBahl,A.&Bahl,B.S.,S.Chand,2010.
7. Organic Chemistry-M.K.Jain,Nagin&Co.,1987.
8. Organic Chemistry-Mehtaand Mehta,2005.
9. PhysicalChemistryP.W.Atkins:,2002.
10. FundamentalofmolecularspectroscopybyCNBanwell-2008
11. SpectroscopybyH.Kaur,Apragatiedition-9th edition2014.
12. MolecularstructureandspectroscopybyG.Aruldhas,2nd edition-2014
13. PhysicalChemistryW.J.Moore:1972.
14. Text Book of PhysicalChemistry-P.L.Soni,S.Chand&Co.,1993.
15. Principles of PhysicalChemistry-
    B.R.Puri,L.R.SharmaandM.S.Patania,S.L.N.Chand&Co.1987.
16. AnalyticalChemistry-SUsharani,MacmillianIndiaLimited,2000
17. Industrial Chemistry,B.K.Sharma,9th Edn.KrishnaPrakashanMedia(P)Ltd.Meerut(1997-98)

DSC-10:Chemistry (Theory)10 (C5CHE2T2)	64hrs

B.Sc.Semester–V

DSE-10:Chemistry(Theory)
Course title- Chemistry-10

Typeof Course	Theory/ Practical	Credits	Instruction hour per week(hrs)	Total Hoursof Syllabus /Sem	Duration ofExam (hrs)	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSE-9B	Theory	04	04	64	03	20	80	100

Course Code:C5CHE2T2

Course Outcomes(CO)

After completion of course chemistry(theory)students will be able to understand

CO1: Elementary particles quarks, nuclear stability, nuclear potential, binding energy.
Nuclear models: Shell model- salient features nuclear configuration, liquid drop model.

CO2: Synthesis, properties, bonding and structures of B2H6, Wades rule - structural features and styx codification of B4H10, B5H9, B5H11, B6H10, B10H14
Silanes, cyclosilanes, siloxanes, cyclic siloxanes, Silicon nitrides, synthesis and applications of silicones, zeolites and ultramarines.

CO3: Classification, source, extraction and general properties of Alkoloids and concept of Dyesorganic photochemistry - energetics of excitation and applications of photochemical reactions in organic synthesis

CO4: Oxidation and Reduction Reactions in Organic Synthesis:

CO5: Rotational, vibrational and electronic spectroscopy- Rotation of molecules, diatomic: rigid rotator, selection rule Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules Rotational Raman spectroscopy

CO6: Fuel chemistry and Green chemistry- Distinguishing primary (natural) vs. secondary (artificial/synthesized) fuels .Calorific Value Coal: Chemical composition, origin, and classification**CO7**:Liquid Fuels: Petroleum and Petrochemical ChemistryGaseous and Future Alternative Fuels

CO8: Green chemistry and its need. Goals of green chemistry, Principles of Green Chemistry and Designing a Chemical synthesis Green solvents and reagents

Unit-I NUCLEAR CHEMISTRY, RADIOACTIVITY AND ADVANCED MAIN GROUP CHEMISTRY	**16 Hrs**
. **Nuclear Chemistry:** The atomic Nucleus- elementary particles quarks,classification of nuclides based on Z and N values, Nuclear stability,Nuclear potential, binding energy. Nuclear models: Shell model- salient features, forms of the nuclear potential,filling if orbital, nuclear configuration,liquid drop model. **Radioactivity**: Radioactive decay kinetics,parent-daughter decay growth relationship-seccular and transient equilibria. Theories of α, β^-,β^+ and γ decay internal conversion **(08 Hours)** **Advanced Main group Chemistry** 1.Boron: Synthesis, properties, bonding and structures of B2H6, Wades rule - structural features and st codification of B4H10, B5H9, B5H11, B6H10, B10H14, carboranes and their anions, metalloboranes, metallacarboranes, Borazine, Boron nitride. **(04 Hours)** 2.Silicon: Silanes,cyclosilanes, siloxanes, cyclic siloxanes, Silicon nitrides, Silyl amines, Silicates-classification, diversity of silicate minerals, synthesis and applications of silicones, zeolites ar ultramarines. **(04 Hours)**	
UNIT-II:ALKALODS, DYES ORGANIC PHOTOCHEMISTRY AND OXIDATION AND REDUCTION REACTIONS IN ORGANIC SYNTHESIS	**16Hrs**
Alkaloids: Classification,source,extraction and general properties,Hofmann's exhaustive methylation, constitution and synthesis of hygrine, coniine and nicotine. **(3 Hours)** **Dyes:**Color and constitution, synthesis and applications of congo red, malachite green, phenolphthalein and alizarin,dyes used in food and their safety concern,organic pigments with examples.**(3 Hours)** **Organic Photochemistry**: Introduction to organic photochemistry - energetics of excitation - photochemistry of alkene, diene, aromatic, carbonyl and conjugated systems - Application of photochemical reactions in organic synthesis.**(04 Hours)** **Oxidation and Reduction Reactions in Organic Synthesis**: Oxidation of organic compounds with reagents based on peroxides, peracids, ozone, osmium, chromium, ruthenium, silver, dimethyl sulfoxide, iodine, and selenium dioxide. Reduction of organic compounds with reagents based on alkali and alkaline earth metals, boron, aluminum, hydrogen, hydrazine, formic acid and dissolving metals.**(06 Hours)**	
UNIT-III:ROTATIONAL,VIBRATIONALANDELECTRONICSPECTROSCOPY Interaction of electromagnetic radiation with matter,electromagneticspectrum	**16Hrs**

(a)Rotational Spectroscopy: Rotation of molecules, diatomic: rigid rotator, selection rule : derivation for expression of energy and bond length (HCl), problems on bond length, polyatomic molecules: linear, symmetric top, asymmetric top molecules(qualitative approach). (**4hours**) **(b)Vibrational Spectroscopy:** Vibrating diatomic molecules - energy of diatomic molecules, force constant, vibrational spectra: harmonically vibrating diatomic molecules (HCl) and anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules **(6 Hours)** **(c)Raman Spectroscopy:** Classical theory and Quantum Theory Rotational Raman spectroscopy (Linear and symmetric top molecules for S and R branch), Vibration - rotational Raman spectra (Rotational finestructures) **(03 Hours)** **(d)Electronic Spectroscopy:** Diatomic molecules: Born- Oppenheimer approximation, vibrational course structure of electronic transition and intensity, Franck – Condon principle. **(03 Hours)**	
UNIT-IV FUEL CHEMISTRY AND GREEN CHEMISTRY-I	**16 Hrs**
FUEL CHEMISTRY: Introduction: Definition, Chemical composition Calorific Value and characteristics of an ideal fuel Classification of Fuels and Distinguishing primary (natural) vs. secondary (artificial/synthesized) fuels . **1. Solid Fuels Coal Chemistry** **Coal**: Chemical composition, origin, and classification (peat, lignite, bituminous, anthracite).**Carbonisation**: High and low-temperature carbonisation to produce metallurgical coke. **2.Liquid Fuels: Petroleum and Petrochemicals** Crude Oil Origin, **chemical Composition**: **Fractional Distillation**: Separation of crude oil fractions based on boiling point ranges. **Refining Processes**: Thermal/catalytic cracking. **3. Gaseous and FutureAlternative Fuels** **Industrial Gases**: Composition, synthesis, and industrial utility of Producer Gas, Water Gas, and Coal Gas. **Compressed Gases**: Chemical composition and uses of Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Liquefied Natural Gas (LNG). **4. Bio-Fuels**-Future Alternative Fuels, Biomass conversion, biogas plants, and the chemistry of bio-diesel **10 Hours**	

GREEN CHEMISTRY-I **Introduction** Definition of green chemistry and its need. Goals of green chemistry. **Principles of Green Chemistry and Designing a Chemical synthesis** Twelve principles of green chemistry. Designing a green synthesis using these principles; prevention of waste/ by-products; maximum incorporation of the materials used in the process into the final products. Atom economy, calculation of atom economy of the Rearrangement and addition reactions. **06 Hours**	

Recommended Books/References

1. Concise Inorganic Chemistry-J.D.Lee,5th Edn,New AgeInternational(1996)
2. Modern Inorganic ChemistrySathyaPrakash'sbyR.D.Madan,S.ChandandCo.Ltd,NewDelhi.
3. Inorganic Chemistry-PrinciplesofStructureandReactivity,4th Edn-J.E.Huheey,E.A.Keiter,R.L.Keiter and O.K. Medhi. Pearson Education (2009).
4. Advanced Inorganic Chemistry-Agarwal&Keemtilal,11th edition,Pragathipublication,2012.
5. A Guide book to Mechanism in Organic Chemistry Sykes,P.,OrientLongman,NewDelhi (1988).
6. Organic Chemistry Morrison,R.T. &Boyd,R.N., Pearson, 2010.
7. Advanced Organic ChemistryBahl,A.&Bahl,B.S.,S.Chand,2010.
8. Organic Chemistry-M.K.Jain,Nagin&Co.,1987.
9. Organic Chemistry-Mehtaand Mehta,2005.
10. Physical ChemistryP.W.Atkins:,2002.
11. Fuel Chemistry: Dr. Manoj Sharma
12. Elements of Fuel combustion technology: O.P.Gupta
13. Petro chemistry: M.Bajus
14. Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).
15. Cann, M.C. &Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).
16. Ryan, M.A. &Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).
18. Ahluwalia, V. K &Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers

FormativeAssessmentforTheory		
Sl. No	Assessmenttype	Marks
01	InternalAssessmenttest1	05
02	InternalAssessmenttest2	05
03	Assignment	10
	Total	20

GENERAL PATTERN OF THEORY QUESTION PAPER FOR DSE

(80 marksforsemesterendExaminationwith3hrsduration)

Part-A Question number 1-10 carries 2 marks each.:20marks

Part-B Questionnumber11-18carries 05 Marks each. Answer any 06 questions:30marks

Part-C Question number19- 22 carries10 Marks each. Answer any 03 questions : 30marks

(Minimum1question from each unit and10 marks question may have subquestions for 7+3or6+4or5+5if necessary) **Total: 80 Marks**

Note:-Proportionate weightage shall be given to each unit based on number of hour sprescribed

B.Sc.Semester–V
DSC-11: Chemistry(Practical)
Course title: Chemistry- 11
CourseCode: C5CHE2P1

Typeof Course	Theory/ Practical	Credits	Instruction hour per week(hr)	Total hoursof Syllabus /Sem	Duration ofExam (hr)	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSE10A	Practical	02	04	64	03	10	40	50

Course Outcomes(CO)

After completion of course,chemistry(Practical) students will be able to

CO1: Identify nature of solid – solid organic mixtures and analyse any one of the separated compound through preliminary tests, element test, physical constant, functional group test and preparation of suitable derivative and its physical constant.

CO2: Understand the – conductivity cell, cell constant & conductivity measurement. Electrodes & its potential, reference electrodes and measurement of electro motiveforce.pH cell and measurement of pH of a solution. Beer- Lambert law, optical density & molar extinction coefficient. Developing skills to handling the instruments for the measurement of conductance, emf, pH and optical density.

Expt.No.	Title: ORGANIC CHEMISTRY EXPERIMENTS	56hrs
1to6	**Qualitative analysis of solid–solid organic binary mixtures Experiments 1 to 6** Identification of nature and separation of binary mixture. Analysis of any one compound through preliminary tests, element test,physical constant,functional group test and preparation of suitable derivative and its physical constant. **Acids:** Salicylic,Cinnamic and Phthalicacid **Phenol:** β–naphthol,α-Naphthol **Base:** m-nitroaniline and p-nitroaniline. **Neutral:** Naphthalene,Acetanilide,Benzamide,m-dinitrobenzene &bromoacetanilide	

PHYSICAL CHEMISTRY EXPERIMENTS		
1	Conductometric titration of strong acid HCl against weak base NH_4OH	
2.	Conductometric titration of $BaCl_2$ against $MgSO_4$	
3	Determination of solubilty and solubility product of sparingly soluble salt BaSO4/PbSO4 conductometrically	
4	Potentiometric titration of HCl against NaOH	
5	Potentiometric titration of Ferrous Ammonium Sulphate(FAS)against Standard potassium dichromate solution	
6	Colorimetric method of estimation of Copper in Copper Sulphate and verification of Beer-Lambert's LA Law	

Examination

In a batch of twenty students in the practical examination, ten students may be given organic experiments and other ten students may be given physical chemistry experiments. Selection of experiments may be done by the students based on the lots

Organic Chemistry

In a batch of ten students, not more than two students should get the same mixture in the practical examination. Viva questions maybe asked on any of the experiments prescribed in the practical syllabus. During practical examination chart is not allowed.

Physical chemistry

In a batch of ten students, not more than two students should get the same experiment in the practical examination. Selection of experiments may be done by the students based on the picking up of chits. Viva questions may be asked on any of the experiments prescribed in the practical syllabus.

Distribution of marks:

Nature & Separation-6,Preliminary test and Elemental analysis test:-6marks, PhysicalConstant-3,FunctionalGroup test -5, Confirmativetest-5,Preparationofthederivative-3,systematicpresentation-2,Journal-5, Viva-voce-5.

Distribution of Marks:

Accuracy-18,Technique and Presentation-3 Calculation and graph-9(5+4),Journal-5,Viva-Voce-5,Total=40.

Reduction of Marks for accuracy:

Error upto5%-18,6-10%-15,11-15%-12,16-20%-09,above20%-01

Recommended Books/References

1. Advanced Practical Chemistry, agadamba Singh, R.K.P.Singh, Jaya Singh, L.D.S.Yadav, I.R. Siddiqui, Pragati prakashan, 7th edition, 2017.
2. CollegePracticalChemistry: V.K.Ahluwalia,SunithaDhingraandAdarshGulati.UniversityPress-2011.
3. Comprehensive Practical Organic Chemistry: V.K.Ahluwalia, andRenuAggarwal, UniversityPress-2000.
4. FundamentalofelectrochemistrybyVladimirS.Bagotsky·2005
5. AnintroductiontoelectrochemistrybySamuel Glasstooen2011
6. Photochemistry by GurdeepRaj,5thedition-2008

B.Sc. V Semester
Elective Course-I

Course Title: Chemistry EC-I
Course code: C5 CHE5T1

Type of Course	Theory/ Practical	Credits	Instruction hours per week	Total hours of syllabus/sem	Duration of Exam	Formative Assessment	Summative Assessment	Total Marks
EC-I	Theory	02	02	30	03	10	40	50

Course Outcome (CO)

After completion of course,students will be able to:

CO1: Understand the definition, types and examples of carbohydrates structure and elucidation

CO2: Appreciate the importance of Amino acids proteins and peptides

CO3: Understand the definition, types and examples and the Biological impotence of lipids enzymes alkaloids and vitamins

CO4: Appreciate the importance of Synthetic dyes

CO5: Understand the definition, types and examples and the Biological importance of drugs and pharmaceuticals

B.Sc.V Semester
Elective Course

Bio molecules **30 hours**

Unit – I

Carbohydrates **6 Hrs**

Classification of carbohydrates, reducing and non-reducing sugars, General Projects of Glucose and Fructose, their open chain structure. Epiners, mutarotation and anomers. Determination of configuration of Glucose (Fischer proof).Cycle structure of glucose .Haworth projection. Cyclic structure of fructose, structure of fructose, structure of disaccharides (sucrose, maltose, lactose) and polysaccharides (stretch and cellulose) excluding their structure elucidation.

Amino Acids, Peptides and Proteins **6 Hrs**

Classification of Amino Acids, Zwitterion structure and Isoelectric point .Overview of Primary,Secondary, Tertiary and Quaternary, structure of proteins.Determination of primary structure peptides, determination of N-terminal amino acid (by DNFB and Edman method) and C-terminal amino acid (biothiohydantion and with carboxypeptidase on enzyme).

Unit –II

Lipids and Alkaloids **08Hrs**

Introduction to lipids, classification, oils and fats: Common fatty acids present in oils andfats, Omega fatty acids, Trans fats, Hydrogenation , Saponification value, Iodine number,. Biological importance of triglycerides, phospholipids, glycolipids and steroids (Cholesterole).
Introduction, Classification with examples, general methods of structural elucidation, synthesis and elucidation of structure of nicotine, structural formula and uses of Quinine and atropine.

Drugs, Pharmaceuticals and Synthetic Dyes **10hrs**

Drugs and Pharmaceuticals

Types of drugs, Definition with examples (Analgestic, Narcotics, Diuretics, sedatives, cardiovascular, Antimalarial, Anthelmintic, Anticounvulsant, Antisepticm, Anticeptics) Synthesis and Aspirin, Paracetsmol, sulphanilamide sulphaziole and chloramines — T4

Synthetic Dyes: Introduction to dyes: Definition, characteristics, and applications of dyes. Difference between dyes and pigments. Classification based on structure Source (natural and synthetic), Chromophore theory of colour and constitution, synthesis of Congo red, Bismarck brown, malachite green and alizarin. Environmental impact of dye manufacturing and dye effluents, eco-friendly approaches to dye production.

Recommended Books/References

1. Lee, J.D.ConciseInorganicChemistryELBS,1991.
2. Cotton,F.A.,Wilkinson,G.&Gaus,P.L.BasicInorganicChemistry,3rdEd.,Wiley.
3. Huheey,J.E.,Keiter,E.A.,Keiter,R.L.&Medhi,O.K.InorganicChemistry:PrinciplesofStructureand Reactivity, Pearson Education India, 2006.
4. Rodgers,G.E.Inorganic&SolidStateChemistry,CengageLearningIndia Ltd.,2008.
5. OrganicChemistry-P.Y.Bruice,7thEdition,PearsonEducationPvt.Ltd.,NewDelhi(2013).
6. HeterocyclicChemistry-R.K.Bansal,3rd Edition, New-AgeInternational,NewDelhi,2004.
7. McMurry,J.E.FundamentalsofOrganicChemistry,7thEd.CengageLearningIndiaEdition,2013.
8. Morrison,R.T.&Boyd,R.N.OrganicChemistry,Pearson, 2010.
9. Bahl,A.&Bahl,B.S.AdvancedOrganicChemistry,S.Chand,2010.
10. OrganicChemistryVolume-I,II-I.L. Finar,6thEdition, ELBSLondon(2004).
11. P.W.Atkins:PhysicalChemistry,2002.
12. TextBookofPhysicalChemistry-P.L.Soni,S.Chand&Co.,1993.
13. PrinciplesofPhysicalChemistry-B.R.Puri,L.R.SharmaandM.S.Patania,S.L.N.Chand&Co.1987.
14. AtextbookofPhysicalChemistry-A.S.Negi&SCAnand,3rdedition2022

FormativeAssessment forTheory		
Sl.No	Assessment type	Marks
01	InternalAssessmenttest1	05
02	InternalAssessmenttest2	05
03	Assignment	10
	Total	20/2=10
FormativeAssessmentas pertheguidelines		

GENERAL PATTERN OF THEORY QUESTION PAPER FOR DSE
(40 marks for semester end Examination with 3 hrs duration)

Part-A

1. Question number 1-5 carries 2 marks each. : 10marks

Part-B

2. Question number 6-8 carries 05 Marks each. : 15marks

Part-C

3. Question number 9-11 carries 05 Marks each. :15 marks

Total: 40 Marks

Note :Proportionate weightage shall be given to each unit based on number of hours prescribed.