B.L.D.E.Association's

S.B.Arts and K.C.P. Science College

Vijayapur

PG DEPARTMENT OF CHEMISTRY

Programme Outcomes (POs) , and

Course Outcomes (COs)

2022-23

B.L.D.E.ASSOCIATION'S
SB ARTS AND K.C.P. SCIENCE COLLEGE, VIJAYAPUR
RE-ACCREDITED AT THE 'B^{++}' LEVEL
Master of Science (Chemistry)
2022-23

PROGRAM OUTCOMES

POs	DESCRIPTIONS
PO1:	In advance elementary/fundamental knowledge. To develop strong and compete knowledge in theoretical and practical chemistry.
PO2:	Critical thinking, scientific methods to design, carry out analytical the results of experiments and get awareness of the impact of chemistry on environment, society, etc. Able to explain Theory, Principle, Postulates, Methods, explaining instrumentation, Derivation, calculations and to calculate the physical and electrochemical parameters
PO3:	Higher education, competitive, Reputed Research laboratory. To recognize the various laws and theories and solving numerical problems.
PO4:	Industrial application. To develop various technical and analytical skills through laboratory training.
PO5:	To create awareness the importance. And impact of chemistry on environment.

			EAN, CFT & MOT
		CO7	Determination of properties of dinuclear complexes.
		CO8	Ability to understand chemistry of pi acid metal complexes
		CO9	interpretation of structure & bonding in metal carbonyl, metal nitrosyl & dioxygen complexes. understanding chemistry of Acid Base.
		PCO1	Analyzing & evaluating ore by volumetric titration.
		PCO2	Determination of ore by calorimetric method.
		PCO3	Estimation of calcium and magnesium carbonates in dolomite using EDTA titration. and gravimetric analysis of insoluble residue
		PCO4	Quantitative analysis of Alloy
		PCO5	Determination of COD and BOD of polluted water
MSc Sem 2	Inorganic Chemistry-II	CO1	Understaning Molecular symmetry & Group theory
		CO2	Representation of groups
		CO3	Applications of group theory
		CO4	Reactions and kinetics of substitution in square planar complexes
		CO5	discussion of reactions and kinetics of substitution in octahedral complexes
		CO6	Examine solid state & structural chemistry
		CO7	Explaination of Defects in solids
		CO8	Constructing Structural transformation of solids
		CO9	Adopt Knowledge of Nuclear chemistry
		CO10	Adopt Knowledge of Nuclear radiation.
		CO11	Health and Safety Aspects of Nuclear chemistry
		PCO1	Qualitative analysis of Inorganic radicals
		PCO2	Preparation of complexes
MSc Sem 3	Inorganic Chemistry-III	CO1	Summarizing concept of electronic spectra of metal complexes
		CO2	Interpreting concept of Magnetic properties of metal complexes
		CO3	Understanding & Organizing organometallic chemistry

		CO4	Building reacting of Homogeneous and heterogeneous catalysis
		CO5	outline chemistry of Bioinorganic chemistry.
		CO6	Discovering chemistry of Electron transfer proteins
		CO7	understanding the role of Cytochromes in Biological nitrogen fixation
		CO8	Importance of Essential and trace elements
		CO9	biological functions of biometals
		CO10	Understanding Chlorophyll and its role in photosynthesis
		PCO1	Preparation of coordination compounds
		PCO2	Characterization of Metal ion determination in metal complexes
		PCO3	Anion Estimation in metal complexes
MSc Sem 4	Inorganic Chemistry-IV	CO1	Extend of chemistry of Non aquous solvents & their reactions
		CO2	understanding Chemistry of f-block metals
		CO3	Definition and classification of fuels,
		CO4	characteristics of fuels
		CO5	Nature and properties of super conductivity material
		CO6	Demonstrating Ionic conductivity with NaCl & AgCl
		CO7	Establishing mechanism of ferro and antiferro magnetic ordering
		CO8	Understaing Optical properties in solids.
		PCO1	Experimental setup for Use of Cation and Anion resins column set up.
		PCO2	Determination of SO3 of Cement Gravimetrically
		PCO3	separation and estimation using spectrophotometric/volumetric/gravimetric method

CLASS	PAPER	COURSE OUTCOMES	DESCREPTIONS
MSc Sem 1	Organic Chemistry-I	CO1	Concept of hybridization : sp3, sp2, sp – with examples.
		CO2	Electronic effects : Inductive, electronic, resonance and hyperconjugation.
		CO3	Classification of organic reagents and reactions.
		CO4	Reactive Intermediates : carbocations, carbanions, free radicals, carbenes, nitrenes, and arynes- their formation, stability, structure and reactions.
		CO5	Organic acid and bases : Effect of substituents with examples
		CO6	**Addition reactions:** Addition to Carbon-Carbon double bond.
		CO7	Elimination reactions: E1, E2, E1CB mechanisms.
		CO8	substitution reactions:
		CO9	Stereochemistry
		PCO1	Preparation p-bromo aniline from aniline.
		PCO2	Preparation of p-nitro aniline from aniline.
		PCO3	Preparation of benzoic acid from benzaldehyde.
		PCO4	Preparation of phenyl azo beta naphthol.
		PCO5	Preparation of 1-phenyl-3-methyl-pyrazolone.
MSc Sem 2	Organic Chemistry-II	CO1	C-C bond forming reactions.
		CO2	C-N bond forming reactions.
		CO3	C-O bond forming reactions.
		CO4	C-Cl bond forming reaction: Hell-Volhard-Zelinski reaction.
		CO5	Oxidation reactions.
		CO6	Reduction reactions.
		CO7	Rearrangement reactions involving migration to electron deficient carbon
		CO8	Rearrangement reactions involving migration to electron deficient nitrogen
		CO9	3-Membered heterocyclic compounds
		CO10	4-Membered heterocyclic compounds with one and two hetero atoms.
		CO11	6-Membered heterocyclic compounds with one

			and two hetero atoms
		PCO1	Analysis of binary organic mixture
		PCO2	Chromatographic techniques.
MSc Sem 3	Organic Chemistry-III	CO1	reagents in organic synthesis
		CO2	photochemistry
		CO3	Norrish type I and Norrish type II reactions
		CO4	Pericyclic Reactions: Classification of pericyclic reactions.
		CO5	Electrocyclic reactions.
		CO6	Sulphonamides: Introduction, classification, synthesis and SAR studies
		CO7	Antimalarials: Introduction, classification, synthesis and drug action
		CO8	Analgesics: Introduction, classification, synthesis and drug action
		CO9	Anti-inflammatory: Introduction, classification, synthesis and drug action
		CO10	pharmacokinetics, pharmacodynamics
		PCO1	Estimation of aniline and glucose.
		PCO2	Determination of saponification value of oils.
		PCO3	Determination of iodine value of oils.
MSc Sem 4	Organic Chemistry-IV	CO1	Designing the synthesis based on retrosynthetic analysis.
		CO2	Disconnection Approach: An introduction to synthons and synthetic equivalents
		CO3	One Group C-C Disconnections.
		CO4	Two Group C-C Disconnections.
		CO5	Bioorganic polymers.
		CO6	Alkaloids and terpenoids.
		CO7	Steroids, antibiotics and prostaglandins.
		CO8	Understaing Optical properties in solids.
		PCO1	Isolation of nicotine from tobacco.
		PCO2	Isolation of caffeine from tea.
		PCO3	Isolation of piperine from pepper.

CLASS	PAPER	COURSE OUTCOMES	DESCREPTIONS
MSc Sem 1	Physical Chemistry-I	CO1	Fundamental laws of quantum chemistry and comparative between classical and quantum theory.
		CO2	Laws and principle of photoelectric, Compton and de Broglie hypothesis.
		CO3	Basic postulates of quantum mechanics.
		CO4	To understand the Schrödinger's equation. Physical significance and characteristics of wave function.
		CO5	Review of basic principles of thermodynamics.
		CO6	Derivation of the Various Thermodynamic parameters.
		CO7	To study of basic principle and equation of conductance.
		CO8	To understand and derivation of Debye Huckel Onsager equation.
		CO9	To understand the basic principle of batteries.
		CO10	To determine the strength. equivalent conductance of some electrolytes.
		CO11	To understand the Basic concepts polymers and their types.
		CO12	To understand the fundamentals of nanoscience and methods to fabrication of nanoparticles.
		PCO1	Analysis of binary mixture of two miscible liquids by viscometry and the relation between viscosity of solution and electrical conductivity.
		PCO2	Potentiometric titration of halides in a mixture of Cl-, Br- and I- with $AgNO_3$
		PCO3	Titration of phosphoric acid solution with NaOH using quinhydrone electrode by Potentiometrically.
		PCO4	Precipitation titration of $BaCl_2$ vs Na_2SO_4 by conductometrically.
		PCO5	Precipitation titration of KCl vs $AgNO_3$ by conductometrically.
		PCO6	Verification of Beers lamberts law by colarimetric method and calculation of molar extinction coefficient (molar absorption co-efficient).
MSc Sem 2	Physical Chemistry-II	CO1	To understand the basic concept of statistical thermodynamics.
		CO2	To know the applicative part of the Maxwell Boltzmann stasties. Bose-Einstein statisties. Fermi-diree statisties.
		CO3	Derive the all partition function and there concept.

		CO4	To know the simple harmonic oscillator in classical mechanics and quantum mechanics.
		CO5	To study the applicative part of the quantum mechanics.
		CO6	To study the chemical kinetics and methods of fast and slow reactions.
		CO7	To know the energy relationship and equations.
		CO8	Fundamental laws and basic concept of photochemistry and photodegradation.
		CO9	A review of laws of photochemistry. Physical process and properties and reaction of Photo catalyst.
		PCO1	Kinetics of acid catalyzed of hydrolysis of methyl acetyl and determination of energy activation.
		PCO2	To determine the concentration of H_2SO_4, CH_3COOH and $CuSO_4$ in a given solution by conductometry.
		PCO3	To compare the strength of the weak acid by conductance method (CH_3COOH and $HCOOH$)
		PCO4	To determination of enthalpy of solution of KNO_3 by solubility method
MSc Sem 3	**Physical Chemistry-III**	CO1	To understand the basic concept of Surface chemistry.
		CO2	To study the Basic principles of catalysis and determine rate of reaction by complex mechanisms.
		CO3	To study the Fundamentals and importance of material chemistry.
		CO4	To study the Methods of preparation nanoparticle by using various methods.
		CO5	To derive the 1^{st} and 2^{nd} opposing reactions of rate of chemical kinetics.
		CO6	To study the reaction and mechanism to derive the mathematical treatment.
		CO7	To study the applicative aspect of polymers and dendrimers.
		CO8	To study the fabrication polymer, shape and object of polymers.
		PCO1	Verify the degree of DeBye-Huckel and Onsagar equivalent conductance for electrolytes (NaCl, HCl) and determine the constant
		PCO2	To study the hydrolysis of methyl acetate catalysed by hydrochloric solution by equimolar solution of Urea-HCl solution and hence determine the degree of hydrolysis of salt
		PCO3	To determine the molecular weight of high polymer PVA from viscosity measurements
		PCO4	To investigate the reaction between $K_2S_2O_8$ and KI

			by colarimetric method
		PCO5	Determination of heat of solution of benzoic acid by solubility method
		PCO6	To determine the COD in the given water sample
MSc Sem 4	**Physical Chemistry-IV**	CO1	To study the applicative part of the superconductors of various processes.
		CO2	To understand the fundamentals of magnetochemistry.
		CO3	Basic concept of Partial molar properties.
		CO4	To study the law, principle, properties, derivation, equation and process of partial molar properties.
		CO5	To study the detailed study of atomic spectra and atomic structure.
		CO6	To study the space quantization of some effects.
		CO7	To study the applicative part of electrochemistry and electroplating.
		CO8	To know the summery of corrosion and plating.
		PCO1	Determine the molecular radius of glycerol by viscosity method.
		PCO2	To determine the molar refraction of methylacetate, ethylacetate, n-hexane and CCl_4 and hence to calculate the refraction of C, H and Cl atom.
		PCO3	Equivalent conductance of infinite dilution of weak electrolyte (CH_3COOH) by Kohlraurch's law.
		PCO4	To verify beer's lamberts law for Cu-NH_3 complex and hence to determine the unknown Cu ion concentration in a given solution.

CLASS	PAPER	COURSE OUTCOMES	DESCREPTIONS
MSc Sem 1	**Spectroscopy-I**	CO1	Review of different types of electromagnetic radiations.
		CO2	Study the types of transitions and their energy levels.
		CO3	Understand the selection rules.
		CO4	Study the classification of polyatomic molecules (CO_2, CH_3F and BCl_3) based on moment of inertia-linear, symmetric top and asymmetric top.

		CO5	To know the detail study of UV-Visible Spectroscopy.
		CO6	To study the λmax for polyenes, α,β-unsaturated aldehydes and ketones (Woodward- Fisher rules), aromatic systems and their derivatives.
		CO7	To know about the number of degrees of freedom of vibration, modes of vibratioa and. Vibrational coupling overtones and Fermi resonance.
		CO8	To study the brief discussion of identification of functional groups alkanes, alkenes, aromatics, carboxylic acids, carbonyl compounds(aldehydes and ketones, esters), amides and amines.
		CO9	To study the principle, instrumentation and applications of Raman Spectra
MSc Sem 2	Spectroscopy-II	CO1	To understand the magnetic properties of nuclei.
		CO2	To learn about the various factors influencing in NMR spectroscopy.
		CO3	To know about the principle, instrumentation and applications of FT-NMR spectroscopy.
		CO4	To study the brief discussion of simplification of complex spectra.
		CO5	To know the detail study of the ^{13}C-NMR spectroscopy.
		CO6	To learn about the two dimensional NMR spectroscopy (COSY, NOESY, DEPT Spectra and MRI).
		CO7	To know the detail study of the mass spectroscopy.
		CO8	To understand the basic theory, principle and instrumentation of different mass spectroscopy techniques.
		CO9	To know about the modes of fragmentation and their rules for different class of organic compounds.
		CO10	Combined applications of spectroscopic techniques.
MSc Sem 3	Spectroscopy-III	CO1	To study the basic applications of infra red spectroscopy to inorganic compounds.

		CO2	To know the changes in infrared spectra of donor molecules upon coordination.
		CO3	To learn about the change in spectra accompanying change in symmetry upon coordination.
		CO4	To know the detail study of the FTIR.
		CO5	To learn about basic principle and interaction between spin and magnetic field ESR spectroscopy.
		CO6	To discuss the various factors affecting for ESR spectroscopy.
		CO7	To know the detail study of the nuclear quadrupole resonance spectroscopy.
		CO8	To study the theory, principles and experimental methods of mossbauer spectroscopy.
MSc Sem 4	Spectroscopy-IV	CO1	To know the detail study of the flame emission spectroscopy.
		CO2	To understand the basic principle, theory and flame spectra variation of emission intensity with flames, flame background, metallic spectra in flame.
		CO3	To study the applications of flame emission spectroscopy.
		CO4	To know the detail study of the chiroptical spectroscopy.
		CO5	To learn about the plane polarized light, instrumentation and optical rotary dispersion (ORD) of chiroptical spectroscopy.
		CO6	To determine the configuration of cyclic and steroidal ketones.
		CO7	To study the theoretical basics for fluorescence and phosphorescence in molecular luminescence spectroscopy.
		CO8	General scope of applications of luminescence.
		CO9	To know the detail study of the photoelectron spectroscopy.
		CO10	To learn about the X-ray photoelectron, Auger electron spectroscopy and applications.

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