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)
2023-24

PROGRAM OUTCOMES

POs	DESCRIPTIONS
PO1:	Able to acquire firm knowledge over fundamental theories, concepts of all branches of chemistry and able to apply them to societal developments and advanced studies.
PO2:	Able to work in the pure, interdisciplinary and multi-disciplinary areas of chemical sciences and its applications.
PO3:	Able to develop analytical thinking and apply the same for the understanding of underlining the principles, proposing mechanisms, problem solving, identification of chemical species/composition and arriving to logical conclusion.
PO4:	Able to gain knowledge in classical laboratory techniques and be able to use modern instrumentation. So that they can analyze the samples for scientific understanding of day to day problems and perform new experiments, obtain experimental data its interpretation through scientific and chemical principles.
PO5:	Able to integrate knowledge learned in chemistry and chemical sciences to various industrial needs including production and quality control.
PO6:	Able to access search and use the chemical literature and also able to work on spreading the scientific temper for social, economic, environmental and sustainable development of society.
PO7:	Able to apply theoretical and experimental knowledge of chemistry for solving the local to global issues for the holistic development of mankind and preserve the environment.

Course Outcomes(CO's)

CLASS	PAPER	COURSE OUTCOMES	DESCREPTIONS
MSc I Sem	**Inorganic Chemistry-I**	**CO1**	Review of different types of chemical bonds with suitable examples.
		CO2	Apply, apprase& adapt various laws of chemical bonds
		CO3	Classification & Synthesis of Non transition elements .
		CO4	Outline of metal ligand bonds such as VBT, EAN, CFT & MOT
		CO5	Ability to understand chemistry of pi acid metal complexes
		CO6	interpretation of structure & bonding in metal carbonyl, metal nitrosyl&dioxygen complexes. Understanding chemistry of Acid Base.
	Inorganic Chemistry Practicals-I	**CO1**	Analyzing & evaluating ore by volumetric titration.
		CO2	Estimation of calcium and magnesium carbonates in dolomite using EDTA titration, and gravimetric analysis of insoluble residue
		CO3	Determination of COD and BOD of polluted water
MSc I Sem	**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	substitution reactions:
		CO5	Stereochemistry
	Organic Chemistry Practicals-I	**CO1**	Preparation p-bromo aniline from aniline.
		CO2	Preparation of p-nitro aniline from aniline.

		CO3	Preparation of benzoic acid from benzaldehyde.
MSc I Sem	**PhysicalChemistry-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.
	Physical Chemistry Practicals-I	**CO1**	Analysis of binary mixture of two miscible liquids by viscometry and the relation between viscosity of solution and electrical conductivity.
		CO2	Potentiometric titration of halides in a mixture of Cl-, Br- and I- with $AgNO_3$
		CO3	Titration of phosphoric acid solution with NaOH using quinhydrone electrode by Potentiometrically.
MSc I Sem	**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.
MSc I Sem	**Analytical Chemistry-I**	**CO1**	Review of different classification of analytical methods
		CO2	Study the basics of analytical errors, accuracy, precision and sampling method.
		CO3	Study the Basic fundamentals of chromatography, TLC, HPLC and ion

			exchange chromatography
		CO4	To know the detail study of basics of extraction, electrophoresis, TGA, DTA, DSC.
		CO5	To study the principle, instrumentation and applications of analytical techniques
MSc II Sem	**Inorganic Chemistry-II**	**CO1**	UnderstaningMolecular symmetry & Group theory
		CO2	Representation of groups
		CO3	Applications of group theory
		CO4	discussion of reactions and kinetics of substitution in octahedral complexes
		CO5	Adopt Knowledge of Nuclear radiation.
	Inorganic Chemistry Practicals-II	**CO1**	Qualitative analysis of Inorganic radicals
		CO2	Preparation of complexes
MSc II Sem	**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 and reduction reactions.
	Organic Chemistry Practicals-II	**CO1**	Analysis of binary organic mixture
		CO2	Chromatographic techniques.
MSc II Sem	**Physical Chemistry-II**	**CO1**	To understand the basic concept of statistical thermodynamics.
		CO2	To know the applicative part of the Maxwell Boltzmann stastics, Bose-Einstein statistics, Fermi-direc statistics.
		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.
	Physical Chemistry	**CO1**	Kinetics of acid catalyzed of hydrolysis of methyl acetyl and determination of

	Practicals-II		energy activation.
		CO2	To determine the concentration of H_2SO_4, CH_3COOH and $CuSO_4$ in a given solution by conductometry.
		CO3	To compare the strength of the weak acid by conductance method (CH_3COOH and HCOOH)
MSc II Sem	**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.
MSc III Sem	**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.
	Inorganic Chemistry Practicals-III	**CO1**	Preparation of coordination compounds
		CO2	Characterization of Metal ion determination in metal complexes
		CO3	Anion Estimation in metal complexes
MSc III Sem	**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.
	Organic	**CO1**	Estimation of aniline and glucose.

	Chemistry Practicals-III	**CO2**	Determination of saponification value of oils.
		CO3	Determination of iodine value of oils.
MSc III Sem	**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 mechansms.
		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.
	Physical Chemistry Practicals-III	**CO1**	Verify the degree of DeBye-Huckel and Onsagar equivalent conductance for electrolytes (NaCl, HCl) and determine the constant
		CO2	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
		CO3	To determine the molecular weight of high polymer PVA from viscosity measurements.
MSc III Sem	**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.
MSc IV Sem	**Inorganic Chemistry-**	**CO1**	Extend of chemistry of Non aquous solvents & their reactions

	IV	**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
	Inorganic Chemistry Practicals-IV	**CO1**	Experimental setup for Use of Cation and Anion resins column set up.
		CO2	Determination of SO3 of Cement Gravimetrically
		CO3	Separation and estimation using spectrophotometric/volumetric/gravimetric method.
MSc IV Sem	**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.
	Organic Chemistry Practicals-IV	**CO1**	Isolation of nicotine from tobacco.
		CO2	Isolation of caffeine from tea.
		CO3	Isolation of piperine from pepper.
IV Sem	**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.
	Physical Chemistry Practicals-IV	**CO1**	Determine the molecular radius of glycerol by viscosity method.
		CO2	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.
		CO3	Equivalent conductance of infinite dilution of weak electrolyte (CH_3COOH) by Kohlraurch's law.
MSc IV Sem	**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.
MSc IV Sem	**Project /Dissertation**	**CO1**	Augment the recent developments in the field of green and eco-friendly reactions, pharmaceutical, Bioinorganic Chemistry and relevant fields of research and development.
		CO2	Apply the knowledge to develop the sustainable and eco-friendly technology in Industrial Chemistry.
		CO3	Demonstrate and apply the fundamental knowledge of the basic principles in various fields of Chemistry

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