

TAMRALIPTAMAHAVIDYALAYA

Tamluk :: Purba Medinipur

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. in Chemistry (Honours) [4-YEAR UNDERGRADUATE PROGRAMME]

Programme Specific Outcomes (PSOs) for B.Sc. in Chemistry (Honours):

Sl.No.	On completing of Semester-I and Semester-II in Chemistry (Honours) programme, the learners will be able to:
PSO1	Achieve knowledge of chemistry through theory and practical experiments with the understanding of the basic principles of organic chemistry, and their applications through various laboratory experiments.
PSO2	Achieve knowledge of chemistry through theory and practical experiments with the understanding of the basic concepts in inorganic chemistry, and their applications through various laboratory experiments.

Course Outcomes (COs) for B.Sc. in Chemistry (Honours) [Under CCFUP-2023-24]

		On completing this course, the learners will be able to:	
Semester-I	Course Type : Major-1 Course Title: T: Organic Chemistry-I P: Organic Chemistry Lab- I Code: CEMHMJ101(T+P) Credits- 3L+ 1P = 4 Full Marks : Full Marks: 75	CO1 Know the physical properties of organic molecules.	
		CO2 Understand the concept of orbital picture and MO theory of organic molecules.	
		CO3 Know various types of intermediates and factors affecting their stability.	
		CO4 Understand the concept of stereochemistry	
		CO5 Learn how to practically separate organic molecules from their mixture.	
		CO6 Know the method of determination of melting points of organic compounds.	
	Course Type : SEC Course Title: P: Chemistry of Cosmetics & Perfumes Code: CEMSEC01(P) Credits- .0L+ 3P = 3 Full Marks : Full Marks: 50	On completing this course, the learners will be able to:	
		CO1 Basics of cosmetics and perfumes	
		CO2 Ingredients and their physical and chemical role for the preparation of various cosmetics and perfumes	
		CO3 Hands on training for the preparation of various cosmetics and perfumes	
		CO4 Concept of safety, economic and skin friendly cosmetics and perfumes.	
		CO5 Concept of toxicity of various cosmetics products.	
CO6 New innovative formulations of the used cosmetics and perfumes			
Course Type : Minor CEM	On completing this course, the learners will be able to:		

	<p>(Disc.-I) Course Title: T: Atomic Structure, Acids And Bases, Redox Reactions, & States of Matter P: Practical Code: CEMMI01(T+P) Credits- 3L+ 1P = 4 Full Marks : Full Marks: 75</p>	C01	Understand the structure of atom on basis of Bohr's and Sommerfeld's model, origin of atomic spectra and quantum numbers and their significance, electronic configuration on basis of <i>Aufbau</i> principle and its limitations. Pauli's exclusion principle, Hund's rule,
		C02	Gain concepts on acidic and basic properties of substances in the light of different acid –base theory, applications and limitations.
		C03	Gain elementary ideas on redox reactions: redox potentials, its applications: Nernst equation, oxidimetry and reductimetry titration.
		C04	Gain the knowledge about different states of matter; Kinetic Theory of Gases, Collision of gas molecules; Maxwell's distribution law, equipartition Principle, Ideal and Real Gases. Law of corresponding states, Viscosity of gases.
		C05	Achieve the concept of properties of liquids; knowledge of Surface tension, Viscosity and its determination.
		C06	Know about the properties and structure of Solids; crystal systems, unit cells, Symmetry elements; Laws of Crystallography. Defects in crystals; Glasses and liquid crystals.
		C07	Explain theoretical basis and practical experience of several experiments like estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture, estimation of Fe(II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator, estimation of Cu(II) ions iodometrically using $Na_2S_2O_3$.
		C08	Explain the theoretical basis and practical concept of Surface tension measurement, Viscosity measurement of various solution and effect of temp, conc. on it.
Semester-II	<p>Course Type : Major-2 Course Title: T: Inorganic Chemistry-I P: Inorganic Chemistry Lab- I Code: CEMHMJ102(T+P) Credits- 3L+ 1P = 4 Full Marks : Full Marks: 75</p>		On completing this course, the learners will be able to :
		C01	Gather in-depth knowledge about the concept of atomic structure especially outer cell structure. quantum numbers, its significance.
		C02	know about quantum mechanical concept, atomic orbitals, Schrodinger wave equation, its significance.
		C03	Understand the elements' periodicity and some significant periodic properties variations.
		C04	Understand the periodic position and chemistry of Lanthanides elements.
		C05	Understand the concepts of a redox reaction and redox potential, its applications, Redox titration, indicator function etc.
		C06	Explain various phenomena of redox reactions using Nernst Equation.
		C07	Understand solubility product principle, common ion effect and their applications.
		C08	Understand in detail different acid-base theories, including the HSAB concept, their applications and limitations.

		C09	Understand the principle of Acid and Base Titrations and can able to estimate the amount of carbonate , bicarbonate, hydroxide present in sample.
		C010	Understand the basic principle of Oxidation-Reduction Titrimetric Estimation and can able to perform permanganometric, dichromatometric and Iodometric estimation.
	Course Type : SEC		On completing this course, the learners will be able to :
	Course Title: P: Medicinal & Pharmaceutical Chemistry Code: CEMSEC02(P) Credits- .0L+ 3P = 3	C01	Know the basic knowledge about Medicinal & Pharmaceutical products, , that can be extracted from various sources of Plant Kingdom. Their usefulness in daily life, Scope of entrepreneurship.
		C02	Develop the skills of the extractions of essential oil from the eucalyptus leaf and its therapeutic use.
		C03	Learn about the extraction method of Extraction of eugenol from clove and its usefulness.
		C04	Know the extraction methods of nicotine from tobacco and as a pharmaceutical drug and its medicinal use.
		C05	understand the extraction techniques of Curumine from turmeric, which is a safe substance that is used as food, cosmetic additive and pharmaceutical product.
		C06	gain a basic knowledge regarding extraction methods of caffeine from tea/coffee and its use as medicine to improve mental alertness, and also use in combination with painkillers (such as aspirin and acetaminophen) and for treating migraine headaches.
	Course Type : Minor CEM (Disc.-II)		On completing this course, the learners will be able to :
	Course Title: T: General Organic Chemistry, Aliphatic Hydrocarbons & Chemical Kinetics P: Practical Code: CEMMI02(T+P) Credits- 3L+ 1P = 4	C01	Understand the electronic displacements in bond and structure of molecules: cleavage of bonds: reactive intermediates and their stabilities.
		C02	Know about Stereochemistry of molecules and their representations, stereochemical nomenclature, have the concept of geometrical and optical isomerism.
		C03	Clear understanding on preparations & reactions of Aliphatic Hydrocarbons in the light of Substitution, Elimination and Addition Reactions.
	Full Marks : Full Marks: 75	C04	Gain knowledge about Chemical Kinetics; ideas about rate law, Order and molecularity; Extent of reaction; Theories of different chemical reactions , Temperature dependence of rate constant; Arrhenius equation, energy of activation; Collision theory; Lindemann theory of unimolecular reaction; outline of Transition State theory.
		C05	Perform qualitative Analysis of Single Solid Organic Compound(s) and detection of various functional groups along with special elements (N, Cl, and S) in the light of different experiments (s).
		C06	Perform the study the kinetics of some specific reactions.

Programme: B.Sc. with chemistry (multidisciplinary studies)
[3-YEAR UNDERGRADUATE PROGRAMME]

Programme Specific Outcomes (PSOs) for B.Sc. in Chemistry (In Sem-I & Sem-II):

Sl.No.	On completing B.Sc. in Chemistry (General) programme, the learners will be able to:
PSO1	gain knowledge of a part of chemistry through theory and practical experiments,
PSO2	thoroughly understand good laboratory practices and knowledge of safety.

Course Outcomes (COs) for Sem-I and Sem-II with Chemistry (multidisciplinary studies)

		On completing this course, the learners will be able to:
Semester-I	<p>Course Type : Major (Disc.-A1)</p> <p>Course Title: T: Atomic Structure, Redox Reactions and precipitation reactions, general organic chemistry & aliphatic hydrocarbons P: Practical Code: CEMPMJ101 (T+P) Credits- 3L+ 1P = 4 Full Marks : Full Marks: 75</p>	<p>CO1 Understand the structure of atom on basis of Bohr's and, Sommerfeld's model, origin of atomic spectra and quantum numbers and their significance, electronic configuration on basis of <i>Aufbau</i> principle and its limitations. Pauli's exclusion principle, Hund's rule,</p>
		<p>CO2 Gain elementary ideas on redox reactions: redox potentials, its applications: Nernst equation, oxidimetry and reductimetry titration.</p>
		<p>CO3 Understand the electronic displacements in bond and structure of molecules: cleavage of bonds: reactive intermediates and their stabilities.</p>
		<p>CO4 Know about Stereochemistry of molecules and their representations, stereochemical nomenclature, have the concept of geometrical and optical isomerism.</p>
		<p>CO5 Explain theoretical basis and practical pertinence of several experiments like estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture, estimation of Fe(II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator, estimation of Cu(II) ions iodometrically using $Na_2S_2O_3$, detection of Special elements, chromatographic separation of mixtures (amino acids, sugars).</p>
	<p>Course Type : Minor (Disc.-C1) Course Title: T: Atomic Structure, Acids and Bases, Redox Reactions & States of Matter P: Practical Code: CEMPMJ101 (T+P) Credits- 3L+ 1P = 4</p>	<p>On completing this course, the learners will be able to:</p>
		<p>CO1 Understand the structure of atom on basis of Bohr's and, Sommerfeld's model, origin of atomic spectra and quantum numbers and their significance, electronic configuration on basis of <i>Aufbau</i> principle and its limitations. Pauli's exclusion principle, Hund's rule,</p>
		<p>CO2 Gain concepts on acidic and basic properties of substances in the light of different acid-base theory, applications and limitations.</p>

	Full Marks : Full Marks: 75	C03	Gain elementary ideas on redox reactions: redox potentials , it's applications : Nernst equation, oxidimetry and reductimetry titration .
		C04	Gain the knowledge about different states of matter; Kinetic Theory of Gases, Collision of gas molecules; Maxwell's distribution law, equipartition Principle, Ideal and Real Gases. Law of corresponding states, Viscosity of gases.
		C05	Achieve the concept of properties of liquids ;knowledge of Surface tension , Viscosity and its determination.
		C06	Know about the properties and structure of Solids; crystal systems, unit cells, Symmetry elements; Laws of Crystallography. Defects in crystals; Glasses and liquid crystals.
		C07	Explain theoretical basis and practical experience of several experiments like estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture, estimation of Fe(II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator, estimation of Cu(II) ions iodometrically using $Na_2S_2O_3$.
		C08	Explain the theoretical basis and practical concept of Surface tension measurement, Viscosity measurement of various solution and effect of temp, conc. on it.
		Course Type : SEC	
Course Title: P: Chemistry of Cosmetics & Perfumes Code: CEMSEC01(P) Credits- .0L+ 3P = 3 Full Marks : Full Marks: 50	C01	Basics of cosmetics and perfumes	
	C02	Ingredients and their physical and chemical role for the preparation of various cosmetics and perfumes	
	C03	Hands on training for the preparation of various cosmetics and perfumes	
	C04	Concept of safety, economic and skin friendly cosmetics and perfumes.	
	C05	Concept of toxicity of various cosmetics products.	
	C06	New innovative formulations of the used cosmetics and perfumes	
Semester-II	Course Type : Major(Disc.-B1)		On completing this course, the learners will be able to :
	Course Title: T: Atomic Structure, Redox Reactions and precipitation reactions, general organic chemistry & aliphatic hydrocarbons P: Practical Code:CEMPMJ101 (T+P) Credits- 3L+ 1P = 4	C01	Understandthe structure of atom on basis of Bohr's and, Sommerfeld's model, origin of atomic spectra and quantum numbers and their significance, electronic configuration on basis of <i>Aufbaup</i> principle and its limitations. Pauli's exclusion principle, Hund's rule,
		C02	Gain elementary ideas on redox reactions: redox potentials , it's applications : Nernst equation, oxidimetry and reductimetry titration .
		C03	Understand the electronic displacements in bond and structure of molecules: cleavage of bonds: reactive intermediates and their stabilities.
	Full Marks : Full Marks: 75	C04	Know about Stereochemistry of molecules and their representations, stereochemical nomenclature, have the concept of geometrical and optical isomerism.

		C05	Explain theoretical basis and practical pertinence of several experiments like estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture, estimation of Fe(II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator, estimation of Cu(II) ions iodometrically using $Na_2S_2O_3$, detection of Special elements, chromatographic separation of mixtures (amino acids, sugars).
Course Type : Minor CEM (Disc.-C2) Course Title: T: States of Matter & Chemical Kinetics; P: Practical Code: CEMMI 02/C2 (T+P) Credits- 3L+ 1P = 4 Full Marks : Full Marks: 75			On completing this course, the learners will be able to :
		C01	Gain the knowledge about different states of matter; Kinetic Theory of Gases, Collision of gas molecules; Maxwell's distribution law, equipartition Principle, Ideal and Real Gases. Law of corresponding states, Viscosity of gases.
		C02	Achieve the concept of properties of liquids ;knowledge of Surface tension , Viscosity and its determination.
		C03	Know about the properties and structure of Solids; crystal systems, unit cells, Symmetry elements; Laws of Crystallography. Defects in crystals; Glasses and liquid crystals.
		C04	Gain knowledge about Chemical Kinetics; ideas about rate law, Order and molecularity; Extent of reaction; Theories of different chemical reactions , Temperature dependence of rateconstant; Arrhenius equation, energy of activation; Collision theory; Lindemann theory of unimolecular reaction; outline of Transition State theory.
		C05	Explain the theoretical basis and practical concept of Surface tension measurement, Viscosity measurement of various solution and effect of temp, conc. on it.
		C06	Perform the study the kinetics of some specific reactions.
Course Type : SEC Course Title: P: Medicinal &Pharmaceutical Chemistry Code: CEMSEC 02 (P) Credits- .0L+ 3P = 3			On completing this course, the learners will be able to :
		C01	Know the basic knowledge about Medicinal &Pharmaceutical products, , that can be extracted from various sources of Plant Kingdom. Their usefulness in daily life, Scope of entrepreneurship.
		C02	Develop the skills of the extractions of essential oil from the eucalyptus leaf and its therapeutic use.
		C03	Learn about the extraction method of Extraction of eugenol from clove and its usefulness.
		C04	Know the extraction methods of nicotine from tobacco and as a pharmaceutical drug and its medicinal use.
		C05	understandthe extraction techniques of Curumine from turmeric, which is a safe substance that is used as food, cosmetic additive and pharmaceutical product.
		C06	gain a basic knowledge regarding extraction methods of caffeine from tea/coffee and its use as medicine..