Academic Plan of Chemistry Department_NEP_ 2023-2024

Semester	Time Frame	**Paper CHEM-MD-IDC-Th&Tu/ Module/ Assessments**	Teachers	Other Activities
1	July	Dairy Products, Food Additives	CB	Class Tests
		Vitamins, Oils & Fats	CH	
		Primary & Secondary Batteries	GN	
	August	Food Adulterants	CB	Class Tests
		Soaps	CH	
		Solar Energy	GN	
	September	Food Contaminants	CB	Class Tests
		Detergents	CH	
		Fuel Cells	GN	
	October (Puja Vacation 21^{st}-31^{st})	Tutorial: Estimation of Vitamin C, Iodine Value	CB	Class Tests
		Tutorial: Determination of Saponification Value	CH	
		Tutorial: Determination of Methanol in Beverages	GN	
	November (Puja Vacation 1^{st}-16^{th})	Food Colorants	CB	Class Tests
		Polymers	CH	
		Future Energy Storage	GN	
	December (Christmas 24^{th} – 31^{st})	Revision, Tutorial- Projects	CB, CH, GN	Class Tests
		Semester- end Exams	CB, CH, GN	

Semester	Time Frame	**CHEM-H-CC1-1-Th&Pr / Module/ Assessments**	Teachers	Other Activities
1	July	Concept of Atomic Orbital and related principles to it: Hydrogen, Hydrogen like and multielectronic systems. Calibration and use of apparatus.	CB	Class Tests
		Valence Bond Theory Calibration and use of apparatus	CH	
		Thermodynamics –I. Preparation of primary standard solutions (Oxalic Acid and K2Cr2O7)	GN	
	August	Wave-Particle duality and related theories. Estimation of carbonate and bicarbonate present together in a mixture	CB	Class Tests
		Electronic displacement Estimation of acetic acid in commercial Vinegar	CH	
		Thermodynamics –I. Standardization of NaOH standard oxalic acid solution.	GN	
	September	The general idea about modern periodic table and related things	CB	Class Tests
		MO Theory	CH	
		Thermodynamics –I.	GN	
	October (Puja Vacation 21^{st}-31^{st})	The general idea about modern periodic table and related things	CB	Class Tests
		Physical properties	CH	
		Chemical Kinetics-I.	GN	
	November (Puja Vacation 1^{st}-16^{th})	Estimation of Fe(II) using standardized KMnO4 solution Estimation of Fe(III) using standard K2Cr2O7 solution Estimation of Fe(II) and Fe(III) in a given mixture using standard K2Cr2O7 solution	CB	Class Tests
		Stereochemistry – I	CH	
		Chemical Kinetics-I. Standardization of KMnO4 standard oxalic acid solution	GN	
	December (Christmas 24^{th} – 31^{st})	Revision and Class Tests	CB	Class Tests
		Revision and Class Tests	CH	
		Revision and Class Tests	GN	

Semester	Time Frame	**CHEM-H-SEC1-1-Th &Tu / Module/ Assessments**	Teachers	Other Activities
1	July	Titrimetric analysis Safety Practices in the Chemistry Laboratory, knowledge about common toxic chemicals and safety measures in their handling, cleaning and drying of glass wares.	CB	Class Tests
		Water analysis Calibration of glassware, pipette, burette and volumetric flask	CH	
		Introduction to Quantitative analysis and its interdisciplinary nature Calibration of instruments like colorimeter, pH-meter, conductivity meter, spectrophotometer using reference standards or reference materials.	GN	
	August	Acid-base titrimetry Safety Practices in the Chemistry Laboratory, knowledge about common toxic chemicals and safety measures in their handling, cleaning and drying of glass wares.	CB	Class Tests
		Water treatment technologies Preparation of TLC plates and separation of amino acids	CH	
		Introduction to Quantitative analysis and its interdisciplinary nature Calibration of instruments like colorimeter, pH-meter, conductivity meter, spectrophotometer using reference standards or reference materials.	GN	
	September	Redox titrimetry:	CB	Class Tests
		Basic laboratory practices Preparation of TLC plates and separation of amino acids	CH	
		Introduction to Quantitative analysis and its interdisciplinary nature Calibration of instruments like colorimeter, pH-meter, conductivity meter, spectrophotometer using reference standards or reference materials.	GN	
	October (Puja Vacation 21^{st}-31^{st})	Precipitation titrimetry	CB	Class Tests
		Basic laboratory practices	CH	
		Introduction to Quantitative analysis and its interdisciplinary nature	GN	
	November (Puja Vacation 1^{st}-16^{th})	Complexometric titrimetry:	CB	Class Tests
		Determination of alkali present in soaps/detergents	CH	
		Introduction to Quantitative analysis and its interdisciplinary nature Conductometric titration between HCl and NaOH	GN	
	December (Christmas 24^{th} – 31^{st})	Gravimetric Analysis: Revision and Class Tests	CB	Class Tests
		Revision and Class Tests	CH	
		Revision and Class Tests	GN	

Semester	Time Frame	**CHEM-H-CC2-2-Th &Tu / Module/ Assessments**	Teachers	Other Activities
2	January	Chemical Bonding: Ionic bond Estimation of (i) arsenite and (ii) antimony iodimetrically	CB	Class Tests
		Stereochemistry – II Estimation of Vitamin C	CH	
		Kinetic Theory and Gaseous state Standardization of $Na_2S_2O_3$ solution against standard $K_2Cr_2O_7$ solution.	GN	
	February	Chemical Bonding:Ionic bond Estimation of Cu in brass	CB	Class Tests
		General Treatment of Reaction Mechanism-1: Reactive intermediates Estimation of available chlorine in bleaching powder	CH	
		Kinetic Theory and Gaseous state:	GN	
	March	Chemical Bonding: Covalent bond Estimation of Cr and Mn in Steel.	CB	Class Tests
		General Treatment of Reaction Mechanism-1: Reaction thermodynamics	CH	
		Kinetic Theory and Gaseous state:	GN	
	April	Chemical Bonding: Covalent bond Estimation of Fe in cement	CB	Class Tests
		General Treatment of Reaction Mechanism-1: Reaction kinetics	CH	
		Real gas and Virial equation	GN	
	May	Revision &Class Tests	CB	Class Tests
		General Treatment of Reaction Mechanism-1: Substitution Reaction	CH	
		Real gas and Virial equation	GN	
	June	Revision &Class Tests	CB, CH, GN	Class Tests
		Revision &Class Tests		
		Revision &Class Tests		

Semester	Time Frame	**CHEM-H-SEC2-2-Th / Module/ Assessments**	Teachers	Other Activities
2	January	Definition and scope of AI Historical overview and key milestones	CB	Class Tests
		AI in healthcare: Diagnosis, treatment, and medical imaging	CH	
		Ethical guidelines and responsible AI practices	GN	
	February	Differentiating AI from human intelligence	CB	Class Tests
		AI in finance: Fraud detection, algorithmic trading, and risk assessment	CH	
		AI and Innovation	GN	
	March	Machine learning: Supervised, unsupervised, and reinforcement learning	CB	Class Tests
		AI in transportation: Autonomous vehicles and traffic optimization	CH	
		Emerging trends and future directions in AI	GN	
	April	Deep learning and neural networks	CB	Class Tests
		AI in customer service and chatbots	CH	
		AI and creativity: Generative models and artistic applications	GN	
	May	Natural language processing (NLP) and computer vision	CB	Class Tests
		AI in education: Personalized learning and intelligent tutoring systems	CH	
		Impact of AI on employment and the workforce	GN	
	June	Privacy and data protection concerns	CB	Class Tests
		Bias and fairness in AI systems	CH	
		AI and social inequality	GN	

Academic Plan of Department of Chemistry_CBCS_2023-2024:

Semester	Time Frame	Paper	Topics	Teachers	Other Activities
3	July	CEMA-CC-3-6 Th & Pr	Chemical periodicity **Complexometric titration**	CB	Class Test
		CEMA-CC-3-7 Th & Pr	Chemistry of alkenes and alkynes **Identification** of a Pure Organic Compound: Solid compounds	CH	
		CEMA-CC-3-5 Th & Pr	Chemical Thermodynamics I Conductometric titration of an acid	GN	
		SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY	Carbohydrates **Identification and estimation:** Carbohydrates and Lipids	CB	
	August	CEMA-CC-3-6 Th & Pr	Chemistry of s and p Block Elements **Complexometric titration**	CB	Class Test
		CEMA-CC-3-7 Th & Pr	Aromatic Substitution **Identification** of a Pure Organic Compound: Liquid Compounds	CH	
		CEMA-CC-3-5 Th & Pr	Chemical Thermodynamics II Study of saponification reaction conductometrically	GN	
		SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY	Proteins **Identification and estimation:** Iodine number and Saponification Number	CB	
	September	CEMA-CC-3-6 Th & Pr	Noble Gases Chromatography of metal ions	CB	Class Test
		CEMA-CC-3-7 Th & Pr	Carbonyl and Related Compounds **Quantitative Estimations:**	CH	
		CEMA-CC-3-5 Th & Pr	Systems of Variable Composition Applications of Thermodynamics – I Verification of Ostwald's dilution law	GN	
		SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY	Enzymes **Identification and estimation:** Determination of cholesterol	CB	
	October (Puja Vacation 21^{st}-31^{st})	CEMA-CC-3-6-Th & Pr	Inorganic Polymers Gravimetry	CB	Class Test
		CEMA-CC-3-7 Th & Pr	Carbonyl and Related Compounds **Quantitative Estimations**	CH	
		CEMA-CC-3-5 Th & Pr	ELECTROCHEMISTRY: Determination of heat of neutralization	GN	
		SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY	Lipids & Lipoproteins	CB	
	November (Puja Vacation 1^{st}-16^{th})	CEMA-CC-3-6 Th & Pr	Coordination Chemistry-I Gravimetry	CB	Class Test
		CEMA-CC-3-7 Th & Pr	Organometallics **Quantitative Estimations:**	CH	
		CEMA-CC-3-5 Th & Pr	ELECTROCHEMISTRY: Potentiometric titration	GN	
		SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY	Biochemistry of disease **Identification and estimation:** Determination of protein and nucleic acids	CB	
	December (Christmas 24^{th} – 31^{st})	CEMA-CC-3-6 Th & Pr	Revision	CB	Class Test
		CEMA-CC-3-7 Th & Pr	Revision	CH	
		CEMA-CC-3-5 Th & Pr	Revision	GN	
		SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY	Revision	CB	

Semester	Time Frame	Paper	Topics	Teachers	Other Activities
4	January	CEMA-CC-4-10-TH & Pr	**Coordination Chemistry-II** **Inorganic preparations**	CB	Class Test
		CEMA-CC-4-8-TH & Pr	Nitrogen compounds Qualitative Analysis of Solid Organic Compounds	CH	
		CEMA-CC-4-9-TH & Pr	Application of Thermodynamics – II Kinetic study of inversion of cane sugar	GN	
		SEC 3 – PHARMACEUTICALS CHEMISTRY	Drugs & Pharmaceuticals	CB	
	February	CEMA-CC-4-10-TH & Pr	**Coordination Chemistry-II** **Inorganic preparations**	CB	Class Test
		CEMA-CC-4-8-TH & Pr	Rearrangements Qualitative Analysis of Single Solid Organic Compounds	CH	
		CEMA-CC-4-9-TH & Pr	Application of Thermodynamics – II Study of Phase diagram	GN	
		SEC 3 – PHARMACEUTICALS CHEMISTRY	Drugs & Pharmaceuticals	CB	
	March	CEMA-CC-4-10-TH & Pr	**Chemistry of d- and f- block elements** **Inorganic preparations**	CB	Class Test
		CEMA-CC-4-8-TH & Pr	The Logic of Organic Synthesis Qualitative Analysis of Single Solid Organic Compounds	CH	
		CEMA-CC-4-9-TH & Pr	Foundation of Quantum Mechanics Determination of partition coefficient	GN	
		SEC 3 – PHARMACEUTICALS CHEMISTRY	Drugs & Pharmaceuticals	CB	
	April	CEMA-CC-4-10-TH & Pr	Chemistry of d- and f- block elements **Inorganic preparations**	CB	Class Test
		CEMA-CC-4-8-TH & Pr	Organic Spectroscopy Qualitative Analysis of Single Solid Organic Compounds	CH	
		CEMA-CC-4-9-TH & Pr	Foundation of Quantum Mechanics Determination of pH of unknown solution	GN	
		SEC 3 – PHARMACEUTICALS CHEMISTRY	Fermentation	CB	
	May	CEMA-CC-4-10-TH & Pr	Reaction Kinetics and Mechanism Instrumental Techniques	CB	Class Test
		CEMA-CC-4-8-TH & Pr	Organic Spectroscopy Qualitative Analysis of Single Solid Organic Compounds	CH	
		CEMA-CC-4-9-TH & Pr	Crystal Structure pH-metric titration of acids	GN	
		SEC 3 – PHARMACEUTICALS CHEMISTRY	Preparation of Aspirin and its analysis. Preparation of magnesium bisilicate (Antacid).	CB	
	June	CEMA-CC-4-10-TH & Pr	Revision	CB	Class Test
		CEMA-CC-4-8-TH & Pr	Revision	CH	
		CEMA-CC-4-9-TH & Pr	Revision	GN	
		SEC 3 – PHARMACEUTICALS CHEMISTRY	Revision	CB	

Semester	Time Frame	Paper	Topics	Teachers	Other Activities
5	July	CEMA-CC-5-12-TH & Pr	Carbocyles and Heterocycles Chromatographic Separations	CH	Class Test
		CEMA-CC-5-11-Th & Pr	Quantum Chemistry II Numerical Analysis Programming 1: Roots of equations	GN	
		DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY	Computer Programming Basics (FORTRAN): Practicals	GN	
		DSE-B-1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE	Silicate Industries, Fertilizers Practicals	CB	
	August	CEMA-CC-5-12-TH & Pr	Cyclic Stereochemistry Chromatographic Separations	CH	Class Test
		CEMA-CC-5-11-Th & Pr	Quantum Chemistry II Numerical Analysis Programming 1: Roots of equations	GN	
		DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY	Computer Programming Basics (FORTRAN): Practicals	GN	
		DSE-B-1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE	Surface Coatings, Batteries Practicals	CB	
	September	CEMA-CC-5-12-TH & Pr	Pericyclic reactions Carbohydrates Spectroscopic Analysis of Organic Compounds	CH	Class Test
		CEMA-CC-5-11-Th & Pr	Quantum Chemistry II Programming 2: Numerical differentiation	GN	
		DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY	Introduction to Spreadsheet Software(MS Excel) Practicals	GN	
		DSE-B-1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE	Alloys Practicals	CB	
	October (Puja Vacation 21^{st}-31^{st})	CEMA-CC-5-12-TH & Pr	Carbohydrates Spectroscopic Analysis of Organic Compounds	CH	Class Test
		CEMA-CC-5-11-Th & Pr	Statistical Thermodynamics Programming 3: Numerical integration	GN	
		DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY	Introduction to Spreadsheet Software(MS Excel) Practicals	GN	
		DSE-B-1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE	Catalysis Practicals	CB	
	November (Puja Vacation 1^{st}-16^{th})	CEMA-CC-5-12-TH & Pr	Biomolecules Spectroscopic Analysis of Organic Compounds	CH	Class Test
		CEMA-CC-5-11-Th & Pr	Statistical Thermodynamics Programming 3: Numerical integration	GN	
		DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY	Statistical Analysis Practicals	GN	
		DSE-B-1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE	Chemical explosives Practicals	CB	
	December (Christmas 24^{th} – 31^{st})	CEMA-CC-5-12-TH & Pr	Revision	CH	Class Test
		CEMA-CC-5-11-Th & Pr	Revision	GN	
		DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY	Revision	GN	
		DSE-B-1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE	Revision	CB	

Semester	Time Frame	Paper	Topics	Teachers	Other Activities
6	January	CEMA-CC-6-13-Th & Pr	Theoretical Principles in Qualitative Analysis Qualitative semimicro analysis of mixtures	CB	Class Test
		CEMA-CC-6-14-Th & Pr	Molecular Spectroscopy Determination of surface tension Determination of the indicator constant	GN	
		DSE-A-3: GREEN CHEMISTRY	Introduction to Green Chemistry, Principles of Green Chemistry and Designing a Chemical synthesis Practicals	CH	
		DSE B-4 :	Dissertation	CB,CH, GN	
	February	CEMA-CC-6-13-Th & Pr	Bioinorganic Chemistry Qualitative semimicro analysis of mixtures	CB	Class Test
		CEMA-CC-6-14-Th & Pr	Molecular Spectroscopy Verification of Beer and Lambert's Law	GN	
		DSE-A-3: GREEN CHEMISTRY	Examples of Green Synthesis/ Reactions and some real world cases Practicals	CH	
		DSE B-4 :	Dissertation	CB,CH, GN	
	March	CEMA-CC-6-13-Th & Pr	Organometallic Chemistry Qualitative semimicro analysis of mixtures	CB	Class Test
		CEMA-CC-6-14-Th & Pr	Photochemistry and Theory of reaction rate Study of kinetics of K2S2O8 + KI reaction	GN	
		DSE-A-3: GREEN CHEMISTRY	Future Trends in Green Chemistry Practicals	CH	
		DSE B-4 :	Dissertation	CB,CH, GN	
	April	CEMA-CC-6-13-Th & Pr	Catalysis by Organometallic Compounds Qualitative semimicro analysis of mixtures	CB	Class Test
		CEMA-CC-6-14-Th & Pr	Photochemistry and Theory of reaction rate Determination of pH of unknown buffer	GN	
		DSE-A-3: GREEN CHEMISTRY	Alkaloids Practicals	CH	
		DSE B-4 :	Dissertation	CB,CH, GN	
	May	CEMA-CC-6-13-Th & Pr	Qualitative semimicro analysis of mixtures	CB	Class Test
		CEMA-CC-6-14-Th & Pr	Surface phenomenon Determination of CMC of a micelle	GN	
		DSE-A-3: GREEN CHEMISTRY	Terpenes Practicals	CH	
		DSE B-4 :	Dissertation	CB,CH, GN	
	June	CEMA-CC-6-13-Th & Pr	Revision	CB	Class Test
		CEMA-CC-6-14-Th & Pr	Revision	GN	
		DSE-A-3: GREEN CHEMISTRY	Revision	CH	
		DSE B-4 :	Dissertation	CB,CH, GN	