COURSE PLANER
Department of Chemistry
Basirhat College
Session: 2017-18
CEMG I-Year

Paper I
Courses: CEMGT 11A, 11B, 11C, 11D
Total Marks: 100

Course coordinator: DR. Swastik Karmakar
CO1: Students will get basic ideas about all the braches of chemistry like organic, inorganic and physical chemistry.
Co2: This provides ideas about gases their properties, kinetics organic reactions and their mechanism and atomic structures.
Course planner

SL	Course Topic	Teacher	Class No	Remarks
Jul-	**CEMGT 11C** **Unit I. Basic organic chemistry I** Inductive effect.	SK	1	
	CEMGT 11A **Unit I. Basic physical chemistry I** Physical states of matter: (a) Gaseous state: Kinetic theory of gas, collision and gas pressure, average kinetic energy of translation, Boltzmann constant.	BD	1	
	CEMGT 11A **Unit II. Basic physical chemistry II** Thermodynamics I: Definition of thermodynamic terms: Intensive and extensive variables, isolated, closed and open systems.	SG	1	
	CEMGT 11B **Unit I. General Chemistry** **Extra-nuclear Structure of atoms:** Bohr's theory for hydrogen atom (simple mathematical treatment).	SM	2	
Aug	**CEMGT 11C** **Unit I. Basic organic chemistry I** Resonance and resonance energy. Homolytic and heterolytic bond breaking, electrophiles and nucleophiles; carbocations, carbanions and radicals (stability and reactivity)	SK	4	
	CEMGT 11A **Unit I. Basic physical chemistry I** Physical states of matter: (a)Maxwell's distribution law of molecular speeds (without derivation), most probable, average and root mean square speed of gas molecules, concept of degrees of freedom and principle of equipartition of energy (without derivation).	BD	4	
	CEMGT 11A **Unit II. Basic physical chemistry II** Cyclic, reversible and irreversible processes. Thermodynamic functions and their differentials. Zeroth law of thermodynamics, concept of heat (q) and work (w); IUPAC nomenclature of work and heat.	SG	4	
	CEMGT 11B **Unit I. General Chemistry** **Extra-nuclear Structure of atoms:**	SM	8	

	Atomic spectra of hydrogen and Bohr's model, Sommerfeld's model, quantum numbers and their significance, Pauli's exclusion principle, Hund's rule, electronic configuration of many-electron atoms, *Aufbau*principle and its limitations.			
Sept	**CEMGT 11C** **Unit I. Basic organic chemistry I** Alkanes, alkenes and alkynes: Synthesis and chemical reactivity of alkanes, mechanism of free-radical halogenation of alkanes, general methods of synthesis of alkenes, electrophilic addition reaction, mechanism of bromination and hydrohalogenation,	SK	4	
	CEMGT 11A **Unit I. Basic physical chemistry I** Physical states of matter: (a) Mean free path and collision frequencies. Heat capacity of gases (molecular basis); viscosity of gases. Real gases, compressibility factor, deviation from ideality, van der Waals equation of state, critical phenomena, (principle of continuity of states), critical constants.	BD	4	
	CEMGT 11A **Unit II. Basic physical chemistry II** First law of thermodynamics, internal energy (U) and enthalpy (H); relation between Cp and Cv, calculation of w, q, ΔU and ΔH for expansion of ideal gas under isothermal and adiabatic conditions for reversible and irreversible processes including free expansion.	SG	4	
	CEMGT 11B **Unit I. General Chemistry** **Radioactivity and Nuclear Structure of Atoms**: Natural radioactivity; radioactive disintegration series, group displacement law, law of radioactive decay, half-life of radio elements. Atomic Nucleus: Stability of atomic nucleus, n/p ratio, nuclear binding energy, mass defect. Nuclear reactions: fission, fusion, transmutation of elements.	SM	8	
Oct				
Nov	**CEMGT 11C** **Unit I. Basic organic chemistry I** Markownikoff's addition, peroxide effect, hydroboration, ozonide formation, polymerization reaction of alkenes (definition and examples only), general methods of synthesis, acidity, hydration and substitution reactions of alkynes.	SK	4	
	CEMGT 11A **Unit I. Basic physical chemistry I** Physical states of matter: (b) Liquid state: Physical properties of liquids and their measurements: surface tension and viscosity.	BD	4	
	CEMGT 11A **Unit II. Basic physical chemistry II** P, V, T relationship for adiabatic reversible process, Joule's Law Joule-Thomson Coefficient and inversion temperature.	SG	4	
	CEMGT 11B **Unit II: Principles of organic and Inorganic qualitative analysis:** 19 Reactions involving the detection of special elements N, S and Cl in an organic compound (only Lassaigne's test). Reactions involving the detection of the following functional groups: Aromatic primary amino group (Diazo-coupling reaction); Nitro group (Mulliken Barker's test).	SM	8	
Dec	**CEMGT 11C** **Unit I. Basic organic chemistry I** Aromatic Hydrocarbons: Structure of benzene, general mechanism of electrophilic substitution, reactions of benzene, synthesis of aromatic compounds using nitration, halogenation, Friedel-Craft's reactions.	SK	4	

	CEMGT 11A **Unit I. Basic physical chemistry I** Physical states of matter: (c) Crystalline state: Types of bonding in solids, law of constancy of angles, concept and types of unit cell (viz. simple cubic, bcc, fcc) coordination number, law of rational indices, Miller indices.	BD	4	
	CEMGT 11A **Unit II. Basic physical chemistry II** Application of First law of thermodynamics: standard state, standard enthalpy changes of physical and chemical transformations: fusion, sublimation, vaporization, solution, dilution, neutralization, ionization.	SG	4	
	CEMGT 11B **Unit II: Principles of organic qualitative analysis.** Reactions involving the detection of the following functional groups: Carboxylic acid group (reaction with $NaHCO_3$); Phenolic OH ($FeCl_3$ test); Carbonyl (aldehyde and ketone) group (DNP Test, etc.). **CEMGT 11B** **Unit II: Principles of Inorganic qualitative analysis:** Formation of sublimates; principle of flame test, borax-bead test, cobalt nitrate test, fusion test, chromyl chloride test, analytical reactions for the detection of nitrate, nitrite, halides, phosphate, sulphide, sulphate, borate, boric acid. Analytical reactions for the detection of Cr^{3+}, Fe^{3+}, Ni^{2+}, Cu^{2+}, Mn^{2+}.	SM	8	
Jan	**CEMGT 11C** **Unit II. Basic organic chemistry II** Stereochemistry of carbon compounds: Different types of isomerism, geometrical and optical isomerism, optical activity, asymmetric carbon atom, elements of symmetry (plane and centre).	SK	4	
	CEMGT 11D **Unit II. Basic inorganic chemistry II** Chemical Periodicity: classification of elements on the basis of electronic configuration: general characteristics of s-, p-, d- and f-block elements.	BD	4	
	CEMGT 11A **Unit II. Basic physical chemistry II** Hess's law of constant heat summation. Bond- dissociation energy, Kirchhoff's equation, relation between ΔH and ΔU of a reaction. 2	SG	4	
	CEMGT 11B **Unit II: Principles of Inorganic qualitative analysis:** Importance of common-ion effect in the separation of Group II cations and Group III cations. **CEMGT 11D** **Unit I. Basic inorganic chemistry I** Ionic bonding: General characteristics of ionic compounds, sizes of ions, radius ratio rule and its limitation. Lattice energy, Born Haber cycle. Covalent bonding: General characteristics of covalent compounds, valence-bond approach, directional character of covalent bond,	SM	8	
Feb	**CEMGT 11C** **Unit II. Basic organic chemistry II** Chirality, enantiomers and diastereomers, R and S nomenclature, E and Z nomenclature, D and L nomenclature, Fischer projection formula of simple molecules containing one and two asymmetric carbon atoms.	SK	4	
	CEMGT 11D **Unit II. Basic inorganic chemistry II** Positions of hydrogen and noble gases. Atomic and ionic radii, ionization potential, electron affinity, and electronegativity; periodic and group-wise variation of above properties in respect of s- and p- block elements.	BD	4	
	CEMGT 11D	SG	4	

	Unit II. Basic inorganic chemistry II Comparative study of p-block elements: Group trends in electronic configuration, modification of pure elements, common oxidation states.			
	CEMGT 11D **Unit I. Basic inorganic chemistry I** Hybridization involving s-, p-, d orbitals, multiple bonding, Valence Shell Electron Pair Repulsion (VSEPR) concept, shapes of simple molecules and ions (examples from main group chemistry). Bond moment and dipole moment, partial ionic character of covalent bonds, Fajan's rules. Hydrogen bonding and its effect on physical and chemical properties.	SM	8	
Mar	**CEMGT 11C** **Unit II. Basic organic chemistry II** Alkyl and Aryl halides: SN1, SN2, E1 and E2 reactions (elementary mechanistic aspects), Saytzeff and Hoffmann elimination reactions. Nucleophilic aromatic substitution.	SK	4	
	CEMGT 11C **Unit II. Basic organic chemistry II** Alcohol and Ether : Method of synthesis , physical properties , distinction of primary, secondary and tertiary alcohol and their chemical reactions and uses of ethers .	BD	4	
	CEMGT 11C **Unit II. Basic organic chemistry II** Organometallic compounds: Grignard reagents – preparations and reactions, application of Grignard reagents in organic synthesis. [1^0, 2^0 and 3^0 alcohols, aldehydes, ketones and carboxylic acids.]	SG	4	
	CEMGT 11D **Unit II. Basic inorganic chemistry II** Comparative study of p-block elements: Group trends in electronic configuration, modification of pure elements, common oxidation states, inert pair effect, and their important compounds in respect of the following groups of elements: i) B-Al-Ga-In-Tl ii) C-Si-Ge-Sn-Pb iii) N-P-As-Sb-Bi iv) O-S-Se-Te v) F-Cl-Br-I	SM	8	
Apr-				
	Total Class:		**144**	

Resources:

Books:

1. Sethi, A. *Conceptual Organic Chemistry;* New Age InternationalPublisher.
2. Parmar, V. S. *A Text Book of Organic Chemistry*, S. Chand &Sons.
3. Madan, R. L. *Organic Chemistry*, S. Chand &Sons.
4. Lee, J.D. *Concise Inorganic Chemistry* ELBS,1991.
5. Eliel, E. L. &Wilen, S. H. *Stereochemistry of Organic Compounds*, Wiley: London, 1994.
6. Sen Gupta, Subrata. *Basic Stereochemistry of Organicmolecules.*
7. Kalsi, P. S. *Stereochemistry Conformation and Mechanism*, Eighth edition, New Age International,2014.
8. Bahl, A. &Bahl, B.S. *Advanced Organic Chemistry,* S. Chand,2010.

Other resources :

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).

- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).

COURSE PLANER
Department of Chemistry
Basirhat College
Session: 2017-18
CEMG II-Year

Paper II

Courses: CEMGT 22A, 22B, 22C, 22D / Total Marks: 100

Course coordinator: Dr. Bidyut Debnath

CO1: Students will learn about Acids bases, buffer solution and PH.

CO2: The course provides ideas about kinetics and catalyst.

Course planner

SL	Course Topic	Teacher	Class No	Remarks
Jul-	CEMGT 22A Unit I. Basic physical chemistry III Thermodynamics II: (a) Spontaneous processes, heat engine, Carnot cycle and its efficiency, Second law of thermodynamics, Entropy (S) as a state function, molecular interpretation of entropy.	BD	2	
	CEMGT 22A Unit II. Basic physical chemistry IV Chemical kinetics and catalysis: Order and molecularity of reactions, rate laws and rate equations for first order and second order reactions (differential and integrated forms).	SM	2	
	CEMGT 22C Unit I. Basic organic chemistry III a) Aldehydes and ketones: the nature of carbonyl group, methods of synthesis, physical properties, Cannizzaro reaction, relative reactivities and distinction of aldehydes and ketones	SK	2	
	CEMGT 22C Unit I. Basic organic chemistry III Aldol condensation (with mechanism), Perkin reaction, Benzoin condensation, Claisen condensation, Oxidation and reduction reactions.	SG	2	
Aug	CEMGT 22A Unit I. Basic physical chemistry III Thermodynamics II: Entropy changes in simple transformations; including entropy change of ideal gas during expansion, Free energy: Gibbs function (G) and Helmholtz function (A), Gibbs-Helmholtz equation, criteria for thermodynamic equilibrium and spontaneity of a process.	BD	4	
	CEMGT 22A Unit II. Basic physical chemistry IV Chemical kinetics and catalysis: Zero order reactions. Determination of order of reactions. Temperature dependence of reaction rate, the Arrhenius equation; special emphasis on temperature coefficient, energy of activation.	SM	4	
	CEMGT 22C Unit I. Basic organic chemistry III b) Carboxylic acids and their derivatives: acidity of carboxylic acids and effects of substituents on acidity, chemical reactivity, mechanism of esterification of carboxylic acids and hydrolysis of esters (BAC2 and AAC2 only)	SK	4	
	CEMGT 22C Unit I. Basic organic chemistry III c) Carbohydrates: Introduction, occurrence and classification of	SG	4	

	carbohydrates, constitution of glucose, osazone formation, reactions of glucose and fructose.			
Sept	CEMGT 22A Unit I. Basic physical chemistry III Thermodynamics II: (b) Chemical equilibrium: chemical equlibria of homogeneous and heterogeneous systems, derivation of expression of equilibrium constants; temperature, pressure and concentration dependence of equilibrium constants (K_P, K_C, K_X); Le Chatelier's Principle of dynamic equilibrium.	BD	4	
	CEMGT 22A Unit II. Basic physical chemistry IV Catalytic reactions: homogeneous and heterogeneous catalytic reactions, autocatalytic reactions, catalyst poisons, catalyst promoters (typical examples)	SM	4	
	CEMGT 22C Unit I. Basic organic chemistry III Mutarotation, cyclic structures – pyranose and furanose forms (determination of ring-size excluded), epimerization, chain-lengthening (Kiliani –Fischer method) and chainshortening (Ruff's method) in aldoses.	SK	4	
	Unit II. Basic organic chemistry IV a) Phenols: synthesis, acidic character and chemical reactions of phenols, Kolbe reactions, Reimer-Tiemann reaction, Fries rearrangement, Claisen rearrangement. b) Organic compounds containing nitrogen: aromatic nitro compounds – reduction under different conditions. [acidic, neutral and alkaline]. Methods of synthesis of aliphatic amines.	SG	4	
Oct	CEMGT 22A Unit I. Basic physical chemistry III Thermodynamics II: (c) Phase equilibrium Definitions of phase, component and degrees of freedom. Phase rule. Definition of phase diagram.	BD	1	
	CEMGT 22A Unit II. Basic physical chemistry IV Photochemistry Grothus-Draper Law, Lambert-Beer's Law.	SM	1	
	CEMGT 22C Unit II. Basic organic chemistry IV b) Heinsberg's method of amine separation, Hofmann degradation, Gabriel's phthalimide synthesis.	SK	1	
	Distinction of primary, secondary and tertiary amines.	SG	1	
Nov	CEMGT 22A Unit I. Basic physical chemistry III Thermodynamics II: (c) Phase equilibrium Phase equilibria for one component system – water, CO2. Heterogeneous systems: Nernst Distribution Law, miscibility and distillation of binary liquid mixtures, azeotropic mixture, Critical Solution temperature, steam distillation.	BD	4	
	CEMGT 22A Unit II. Basic physical chemistry IV Photochemistry Molar extinction coefficient, Stark- Einstein Law of photochemical equivalence and quantum yield, examples of low and high quantum yields, Luminiscence: Fluorescence and phosphorescence.	SM	4	
	CEMGT 22C Unit II. Basic organic chemistry IV Methods of synthesis of aromatic amines, basicity of aliphatic and aromatic amines. Diazotization and coupling reactions and their mechanisms; synthetic applications of benzene diazonium salts. [Sandmeyer's reaction, preparation of nitro compounds, phenols, carboxylic acids and hydrocarbons thereby].	SK	4	

	CEMGT 22C Unit II. Basic organic chemistry IV c) Amino acids, Proteins: methods of synthesis of α –amino acids (glycine and alanine using Gabriel's phthalimide synthesis and Strecker synthesis). Physical properties. Zwitterion structures, isoelectric point.	SG	4	
Dec	CEMGT 22B Unit I. Basic physical chemistry V a) Acids-bases and solvents: Modern aspects of acids and bases: Arrhenius theory, theory of solvent system, Bronsted and Lowry's concept, Lewis concept with typical examples, applications and limitations. Strengths of acids and bases (elementary idea).	SM	4	
	CEMGT 22B Unit II. Basic physical chemistry VI a) Solutions of non-electrolytes: Colligative properties of solution, Henry's Law, Raoult's Law, relative lowering of vapor pressure, osmosis and osmotic pressure; Elevation of boiling point.	BD	4	
	CEMGT 22 D: Unit I. Basic inorganic chemistry III Coordinate bonds and Coordination compounds: complex salts and double salts, Warner's theory of coordination	SK	4	
	CEMGT 22 D: Unit I. Basic inorganic chemistry III Chelate complexes, stereochemistry of coordination numbers 4 and 6. IUPAC nomenclature of coordination complexes (mononuclear complexes only).	SG	4	
Jan	CEMGT 22B Unit I. Basic physical chemistry V Ionization of weak acids and bases in aqueous solutions, application of Ostwald's dilution law, ionization constants, ionic product of water, pH-scale, buffer solutions and calculation of pH values, buffer actions; hydrolysis of salts.	SM	4	
	CEMGT 22B Unit II. Basic physical chemistry VI a) Solutions of non-electrolytes: Depression of freezing point of solvents – (without deduction), calculation of molecular weight of solute from measurement of colligative properties of solutions.	BD	4	
	CEMGT 22 D: Unit I. Basic inorganic chemistry III Preparation and uses of the following compounds: Sodium borohydride, lithium aluminium hydride, calcium carbide, hydrazine, hydroxylamine, sodium bismuthate, sodium thiosulphate, potassium peroxydisulphate,	SK	4	
	CEMGT 22 D: Unit I. Basic inorganic chemistry III Perchloric acid, potassium bromate, potassium ferrocyanide, Mohr`s salt, potassium chromate, potassium dichromate and potassium permanganate.	SG	4	
Feb	CEMGT 22B Unit I. Basic physical chemistry V b) Solutions of electrolytes: Electrolytic conductance, specific conductance, equivalent conductance and molar conductance of electrolytic solutions. Influence of temperature and dilution on conductivity of strong and weak electrolytes, conductometric titration – acid-base, precipitation.	SM	4	
	CEMGT 22B Unit II. Basic physical chemistry VI b) Colloids: Colloids and crystalloids, classification of colloids, preparation and purification of colloids: ferric hydroxide sol and gold sol. Properties of colloids: Brownian motion, peptization, dialysis.	BD	4	
	CEMGT 22 D: Unit II: Basic inorganic chemistry IV	SG+ SK	6	

	Comparative study of s-block elements: Group trends, electronic configuration, isolation of pure elements, common oxidation states, inert pair effect.			
Mar	CEMGT 22B Unit I. Basic physical chemistry V Electrode potential: Electrode potentials, Nernst Equation, Reference electrodes, Normal Hydrogen Electrode and calomel electrodes, Emf of electrochemical cells and its measurement, electrode potential series and its applications, measurement of pH using glass calomel electrode.	SM	4	
	CEMGT 22B Unit II. Basic physical chemistry VI b) Colloids: Tyndal effect and its applications. Protecting colloids, gold number, isoelectric points, coagulation of colloids by electrolytes, Schulze-Hardy rule.	BD	3	
	CEMGT 22 D: Unit II: Basic inorganic chemistry IV chemical properties and reactions in respect of the following group elements: i) Li-Na-K	SK	4	
	CEMGT 22 D: Unit II: Basic inorganic chemistry IV chemical properties and reactions in respect of the following group elements: ii) Be-Mg-Ca-Sr-Ba	SG	4	
Apr -	CEMGT 22 D: Unit II: Basic inorganic chemistry IV Extraction and purification of elements from natural sources: Li, Cr, Ni, Ag, Au. Electroplating, galvanizing and anodizing.	BD + SG + SM	6	
		Total: 127		

Resources:

9. Books:
   10. Sethi, A. *Conceptual Organic Chemistry;* New Age InternationalPublisher.
   11. Parmar, V. S. *A Text Book of Organic Chemistry*, S. Chand &Sons.
   12. Madan, R. L. *Organic Chemistry*, S. Chand &Sons.
   13. Lee, J.D. *Concise Inorganic Chemistry* ELBS,1991.
   14. Cotton, F.A., Wilkinson, G. &Gaus, P.L. *Basic Inorganic Chemistry*, 3rd ed.,Wiley.
   15. Barrow, G.M. *Physical Chemistry* Tata McGraw-Hill(2007).
   16. Castellan, G.W. *Physical Chemistry* 4th Ed. Narosa(2004).
   17. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry* Cengage Learning India Pvt. Ltd., New Delhi (2009).
   18. Mahan, B.H. *University Chemistry* 3rd Ed. Narosa(1998).
   19. Petrucci, R.H. *General Chemistry* 5th Ed. Macmillan Publishing Co.: New York(1985).
   20. Chugh, K.L., Agnish, S.L. *A Text Book of Physical Chemistry* Kalyani Publishers7.Bahl, B.S., Bahl, A., Tuli, G.D., *Essentials of Physical Chemistry* S. Chand & Co.ltd.
   21. Palit, S. R., *Elementary Physical Chemistry* Book Syndicate Pvt.Ltd.
   22. Mandal, A. K. *Degree Physical and General Chemistry* Sarat BookHouse
   23. Pahari, S., *Physical Chemistry* New Central BookAgency
   24. Pahari, S., Pahari, D., *Problems in Physical Chemistry* New Central BookAgency

Other resources :

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).

- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms)

COURSE PLANER
Department of Chemistry
Basirhat College
Session: 2018-19
CEMG II-Year

Paper III

Courses: CEMGP 23A, 23B Total Marks: 100

Course coordinator: Dr. BidyutDebnath

CO1: Student will learn about the experimental ideas about functional group analysis.

CO2: This course provides about ideas about qualitative and quantitative analysis of various inorganic samples.

Course planner

SL	Course Topic	Teacher	Class No	Remarks
July	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Experiment A: Test for special element (N, S, Cl, Br and I) Experiment B: Solubility tests and solubility classification.	MS +PD	2	
	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Experiment C: Test for the following functional groups. Aromatic $-NO_2$, Aromatic $-NH_2$, -OH (phenolic), Carbonyl (aldehyde and ketone), --COOH and olefinic unsaturation.	BD +SG	2	
Aug	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Experiment C: Test for the following functional groups. Aromatic $-NO_2$, Aromatic $-NH_2$, -OH (phenolic), Carbonyl (aldehyde and ketone), --COOH and olefinic unsaturation. Experiment D: Determination of the melting point of the compound.	MS +PD	8	
	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Experiment C: Test for the following functional groups. Aromatic $-NO_2$, Aromatic $-NH_2$, -OH (phenolic), Carbonyl (aldehyde and ketone), --COOH and olefinic unsaturation. Experiment D: Determination of the melting point of the compound.	BD +SG	8	
Sept	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Analysis of unknown organic samples	MS +PD	8	
	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Analysis of unknown organic samples	BD +SG	8	
Oct	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Analysis of unknown organic samples	MS +PD	2	
	UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid) Analysis of unknown organic samples	BD +SG	2	
Nov	UNIT-2 : Qualitative Analysis of Inorganic Mixture Experiments A: Preliminary Tests for Acid and Basic radicals in given samples. Acid Radicals: Cl^-, Br^-, I^-, NO_3^{1-}, S^{2-}, SO_4^{-2},$S_2O_3^{2-}$ PO_4^{-3}, BO_3^{3-}, H_3BO_3. Basic Radicals: Cu^{+2}, Cr^{+3}, Fe^{+3}, Ni^{+2}, Mn^{+2},Co^{+2} , Ca^{+2}, Sr^{+2}, Ba^{+2}, Na^+, K^+, , NH_4^+	MS +PD	8	
	UNIT-2 : Qualitative Analysis of Inorganic Mixture Experiments A: Preliminary Tests for Acid and Basic radicals in given samples. Acid Radicals: Cl^-, Br^-, I^-, NO_3^{1-}, S^{2-}, SO_4^{-2},$S_2O_3^{2-}$ PO_4^{-3}, BO_3^{3-}, H_3BO_3. Basic Radicals: Cu^{+2}, Cr^{+3}, Fe^{+3}, Ni^{+2}, Mn^{+2},Co^{+2} , Ca^{+2}, Sr^{+2}, Ba^{+2}, Na^+, K^+, , NH_4^+	BD +SG	8	

Dec	UNIT-2 : Qualitative Analysis of Inorganic Mixture Experiments B: Wet tests for Acid and Basic radicals in given samples. Experiments C: Confirmatory tests. Experiments D: Insoluble Treatment Acid Radicals: Cl^-, Br^-, I^-, NO_3^{1-}, S^{2-}, SO_4^{-2},$S_2O_3^{2-}$ PO_4^{-3}, BO_3^{3-}, H_3BO_3. Basic Radicals: Cu^{+2}, Cr^{+3}, Fe^{+3}, Ni^{+2}, Mn^{+2},Co^{+2} , Ca^{+2}, Sr^{+2}, Ba^{+2}, Na^+, K^+, , NH_4^+ Insoluble: $BaSO_4$, $SrSO_4$, Cr_2O_3.	MS +PD	8	
	UNIT-2 : Qualitative Analysis of Inorganic Mixture Experiments B: Wet tests for Acid and Basic radicals in given samples. Experiments C: Confirmatory tests. Experiments D: Insoluble Treatment Acid Radicals: Cl^-, Br^-, I^-, NO_3^{1-}, S^{2-}, SO_4^{-2},$S_2O_3^{2-}$ PO_4^{-3}, BO_3^{3-}, H_3BO_3. Basic Radicals: Cu^{+2}, Cr^{+3}, Fe^{+3}, Ni^{+2}, Mn^{+2},Co^{+2} , Ca^{+2}, Sr^{+2}, Ba^{+2}, Na^+, K^+, , NH_4^+ Insoluble: $BaSO_4$, $SrSO_4$, Cr_2O_3.	BD +SG	8	
Jan	UNIT-2 : Qualitative Analysis of Inorganic Mixture Analysis of unknown Inorganic Mixture samples	MS +PD	8	
	UNIT-2 : Qualitative Analysis of Inorganic Mixture Analysis of unknown Inorganic Mixture samples	BD +SG	8	
Feb	UNIT-2 : Qualitative Analysis of Inorganic Mixture Analysis of unknown Inorganic Mixture samples	MS +PD	8	
	UNIT-2 : Qualitative Analysis of Inorganic Mixture Analysis of unknown Inorganic Mixture samples	BD +SG	8	
Mar	UNIT-2 : Qualitative Analysis of Inorganic Mixture Analysis of unknown Inorganic Mixture samples	MS +PD	8	
	UNIT-2 : Qualitative Analysis of Inorganic Mixture Analysis of unknown Inorganic Mixture samples	BD +SG	8	
Apr	Revision of UNIT 1 : Qualitative Analysis of Single Organic Compound (Solid)	MS +PD	4	
	Revision of UNIT-2 : Qualitative Analysis of Inorganic Mixture	BD +SG	4	
		Total:128		

Resources:
Other resources :

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).

COURSE PLANER
Department of Chemistry
Basirhat College
Session: 2017-18
CEMG III-Year

Paper IV/ Paper Code: CEMGT 34A, 34B, 34C/ Total Marks: 75

Course coordinator: Dr. Bidyut Debnath

CO1: This course is about the theory on analysis like Error, Volumetric analysis.

CO2: It's a application based chemistry provides industrial application and environmental applications also.

Course planner

SL	Course Topic	Teacher	Class NO	Remarks
Jul-	**CEMGT 34A** **Unit I. Chemical analysis** Gravimetric Analysis: Solubility product and common ion effect.	SK	2	
	CEMGT 34A **Unit I. Chemical analysis** **Error analysis and computer applications** Accuracy and precision of quantitative analysis.	SM	1	
	CEMGT 34A **Unit II: Volumetric Analysis** Primary and secondary standard substances.	SG	1	
	CEMGT 34B **Unit I. Industrial chemistry I** a) Fuels: Classification of fuel, heating values.	BD	1	
Aug	**CEMGT 34A** **Unit I. Chemical analysis** Requirements of gravimetry. Gravimetric estimation of chloride, sulphate, lead, barium and nickel.	SK	4	
	CEMGT 34A **Unit I. Chemical analysis** **Error analysis and computer applications** Determinate-, indeterminate-, systematic- and random-errors. Methods of least squares and standard deviations.	SM	4	
	CEMGT 34A **Unit II: Volumetric Analysis** Principles of acid-base, oxidation –reduction, and complexometric titrations.	SG	4	
	CEMGT 34B **Unit I. Industrial chemistry I** Origin of coal, carbonization of coal, coal gas, producer gas, water gas, coal based chemicals. Origin and composition of petroleum, petroleum refining.	BD	4	
Sept	**CEMGT 34A** **Unit I. Chemical analysis** **Error analysis and computer applications** General introduction to computers, different components of a computer, hardware and software, input and output devices.	SM	4	
	CEMGT 34A **Unit II: Volumetric Analysis** Acid-base, redox and metal-ion indicators. Principles of estimation of mixtures of NaHCO3 and Na2CO3 (by acidimetry).	SG	4	
	CEMGT 34B **Unit I. Industrial chemistry I** Cracking, knocking, octane number, anti-knock compounds, Kerosene, liquefied petroleum gas (LPG), liquefied natural gas (LNG), petrochemicals (C1 to C3 compounds and their uses).	BD	4	
	CEMGT 34C **Unit I. Environmental chemistry** The Atmosphere:	SK	4	

	Composition and structure of the atmosphere: troposphere, stratosphere, mesosphere and thermosphere. Ozone layer and its role. Major air pollutants: CO, SO2, NO and particulate matters –their origins and harmful effects.			
Nov	**CEMGT 34A** **Unit I. Chemical analysis** **Error analysis and computer applications** binary numbers and arithmetic. Introduction to computer languages, programming and operating systems.	SM	4	
	CEMGT 34A **Unit II: Volumetric Analysis** Principles of estimation of iron, copper, manganese, chromium (by redox titration).	SG	4	
	CEMGT 34B **Unit I. Industrial chemistry I** b) Fertilizers: Manufacture of ammonia and ammonium salts, urea, superphosphate, biofertilizers.	BD	4	
	CEMGT 34C **Unit I. Environmental chemistry** Problems of ozone layer depletion, green house effect, acid rain and photochemical smog. Air pollution episodes. Air quality standard. Air pollution control measures: cyclone collector, electrostatic precipitator, catalytic converter.	SK	6	
Dec	**CEMGT 34A** **Unit II: Volumetric Analysis** Principles of estimation of zinc, calcium, magnesium (by complexometric EDTA titration).	SG	4	
	CEMGT 34B **Unit I. Industrial chemistry I** c) Glass and Ceramics: Definition and manufacture of glasses, optical glass and coloured glass. Clay and feldspar, glazing and vitrification, glazed porcelain, enamel. Portland cement: composition and setting of cement, white cement.	BD	4	
	CEMGT 34C **Unit I. Environmental chemistry** The Hydrosphere : Environmental role of water, natural water sources, water treatment for industrial, domestic and laboratory uses. Water pollutants: action of soaps and detergents, phosphates, industrial effluents, agricultural run off, domestic wastes.	SK	5	
	CEMGT 34C **Unit II. Industrial Chemistry III** Fats-Oils-Detergents : Fats and oils, natural fat, edible and inedible oil of vegetable origin. Common fatty acids, glycerides.	SM	4	
Jan	**CEMGT 34A** **Unit II: Volumetric Analysis** Chromatographic methods of analysis: column chromatography and thin layer chromatography	SG	4	
	CEMGT 34C **Unit I. Environmental chemistry** thermal pollution radioactive pollution and their effects on animal and plant life, water pollution episodes. Water pollution control measures: waste water treatment: chemical treatment and microbial treatment; water quality standards: DO. BOD, COD, TDS and hardness parameters. Desalination of sea water: reverse osmosis, electro dialysis.	SK	6	
	CEMGT 34C **Unit II. Industrial Chemistry III** Hydrogenation of unsaturated oil, production of vanaspati and margarine. Production of toilet and washing soaps, Enzyme based detergents, detergent powder, liquid soaps.	SM	4	
	CEMGT 34C **Unit II. Industrial Chemistry III**	BD	4	

	Pesticides: Common pesticides : Production, applications and residual toxicity of gammaxane, aldrin, parathion, malathion, DDT, paraquat, decamethrin.			
Feb	**CEMGT 34C** **Unit I. Environmental chemistry** The Lithosphere: Water and air in soil, waste matters and pollutants in soil, waste classification, treatment and disposal. Soil pollution and control measures.	SK	4	
	CEMGT 34C **Unit II. Industrial Chemistry III** Food Additives: Food flavour, food colour, food preservatives, artificial sweeteners, acidulants, alkalies, edible emulsifiers and edible foaming agents, sequesterants – uses and abuses of these substances in food beverages.	BD	4	
	CEMGT 34C **Unit II. Industrial Chemistry III** Food Additives: Food flavour, food colour, food preservatives, artificial sweeteners, acidulants, alkalies,	SM	4	
	TOTAL CLASS	100		

Resources:

25. Books:

E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd.UK.

R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, NewDelhi.

W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics,* Wiley Publishers, NewDelhi.

J. A. Kent: Riegel's*Handbook of Industrial Chemistry*, CBS Publishers, NewDelhi.

P. C. Jain & M. Jain: *Engineering Chemistry,* DhanpatRai& Sons,Delhi.

R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry,* Vikas Publications, NewDelhi.

B. K. Sharma: *Engineering Chemistry*, Goel Publishing House,Meerut

26. Other resources :

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).

Paper IV/ Paper Code: CEMGP 34D/ Total Marks: 25

Course coordinator: Bidyut Debnath

Course planner

SL	Course Topic	Teacher	Class hour	Remarks
Jul-	Experiment –I. Preparation of standard (N/20) solution of oxalic acid and standardization of (a) NaOH solution (b) $KMnO_4$ solution (c) Mohr's salt solution (against $KMnO_4$).	SG+SM	3	
Aug	Experiment –II. Preparation of standard (N/20) $K_2Cr_2O_7$ solution of	SG+SM	12	

	oxalic acid and standardization of (a) Mohr's salt solution (b) $KMnO_4$ solution (c) sodium thiosulphate solution.			
Sept	Experiment –III. Preparation of standard (M/50) Zinc acetate solution and (a) standardization of Na_2EDTA solution and (b) Estimation of unknown solution of single metal ion ($Zn^{2+}/Ca^{2+}/Mg^{2+}$).	SG+SM	12	
Nov	Experiment –IV. Acidimetric estimation of $NaHCO_3$, Na_2CO_3 mixture using phenolphthalein and methyl orange.	SG+SM	12	
Dec	Experiment –V. Alkalimetric estimation of HCl, CH_3COOH mixture. Experiment –VI. Estimation of Fe (II) + Fe (III) mixture using standard (N/20) solution of (a) $K_2Cr_2O_7$ (b) $KMnO_4$ as titrants.	SG+SM	12	
Jan	Experiment –VII. Estimation of total hardness of water (EDTA method). Experiment –VIII. Estimation of Vitamin C by iodometric method	SG+SM	12	
Feb	Experiment –IX. Estimation of available oxygen in pyrolusite	SG+SM	12	
	TOTAL CLASS HOUR		75	

Resources:

27. Books:
    Advanced Practical Chemistry: S.C. Das.
28. Other resources :

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).