# DEPARTMENT OF CHEMISTRY
# LESSION PLAN
# SESSION 2023-24
# SEMESTER – II

## NAME OF TEACHER: SUBHOJIT GHOSH

### PAPERALLOTTED: CHEMISTRY MAJOR [DS -2], CHEMISTRY MINOR [MA-2]

| Month | Paper | Content | No of classes |
|---|---|---|---|
| May 2024 (13.05.2024) | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Molecular representations | 2 |
| | CEMMIN202T (Minor) | Unit 2: Stereochemistry<br>Molecular representations | 1 |
| | CEMMIN202P (Minor) | Determination of Solubility product of KHTa | 8 |
| June 2024 | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Concept of chirality, types of stereoisomerism | 2 |
| | CEMMIN202P (Minor) | Estimation of Fe(II) in Mohr's salt<br>Estimation of Cu (II) by iodometry | 12 |
| July 2024 | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Configuration and configurational nomenclature, invertomerism | 4 |
| | CEMMIN202T (Minor) | Unit 2: Stereochemistry<br>Configurational nomenclature<br>Substitution reactions: $S_N1$ and $S_N2$ | 4 |
| | CEMMIN202P (Minor) | Analysis of unknown organic compounds | 16 |
| August 2024 06.08.2024 | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Optical rotation, specific rotation, concept of stereogenicity and chirotopicity | 4 |
| | Internal Examination (Theory and Practical) | | |
| | CEMMIN202P (Minor) | Analysis of unknown organic compounds | 12 |
| August 2024 20.08.2024 | CEMMIN202P (Minor) | Analysis of unknown organic compounds | 12 |
| | End Semester Examination | | |
| Total Classes | | | 77 |

## NAME OF TEACHER: **DR.MADHUSHREE DAS SARMA**

### PAPER ALLOTTED: CHEMISTRY MAJOR [DS -2], CHEMISTRY MINOR [MA-2]

| Month | Paper | Content | No of classes |
|---|---|---|---|
| May 2024 (13.05.2024) | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Conformational nomenclature | 1 |
| | CEMMIN202P (Minor) | Determination of Solubility product of KHTa | 8 |
| June 2024 | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Dihedral angle, Torsional angle, Klyne-Prelog Terminology | 1 |
| | CEMMIN202P (Minor) | Estimation of Fe(II) in Mohr's salt<br>Estimation of Cu (II) by iodometry | 12 |
| July 2024 | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Energy barrier of rotation | 1 |
| | CEMMIN202P (Minor) | Analysis of unknown organic compounds | 16 |
| August 2024 06.08.2024 | CEMDSC202T (Major) | Unit 2: Stereochemistry<br>Relative stability of conformers | 2 |
| | Internal Examination (Theory and Practical) | | |
| | CEMMIN202P (Minor) | Analysis of unknown organic compounds | 12 |
| August 2024 20.08.2024 | CEMMIN202P (Minor) | Analysis of unknown organic compounds | 12 |
| | End Semester Examination | | |
| Total Classes | | | 65 |

## NAME OF TEACHER: DR NIMAIRATAN ADHIKARI

## PAPER ALLOTTED: CEMDSC102T, CEMDSC102P, CEMMIN102T, CEMMIN102P

| Month | Paper | Content | No of classes |
|---|---|---|---|
| May 2024 13.05.2024 | CEMDSC102T | Acid-Base reactions (15 Lectures) Acid-Base concept: Arrhenius concept, theory of solvent system ($H_2O$, $NH_3$, $SO_2$ and HF), Bronsted-Lowry's concept, relative strength of acids, Pauling's rules. Lux-Flood concept, Lewis concept, group characteristics of Lewis acids, solvent levelling and differentiating effects. | 4 |
| | CEMDSC102P | Acid-Base Titration: a) NaOH − $Na_2CO_3$ mixture b) $Na_2CO_3$ – $NaHCO_3$ mixture c) Oxalate − Oxalic Acid mixture | 6 |
| June 2024 | CEMDSC102T | Superacids, proton affinity; HSAB principle. Acid-baseequilibria in aqueous solution (Proton transfer equilibria in water), pH, buffer. Acid-base neutralization curves; indicator, choice of indicators. Solubility product, common ion effect and their application in analytical chemistry. (Gr. II A, B & Gr. III A, B). | 8 |

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|---|---|---|---|
| | **CEMMIN102T** | **Ionic bonding: General characteristics of ionic bonding. Energy consideration in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Lande equation for calculation of lattice energy, Born Haber cycle and its application, polarizing power and polarizability, Fajan's rule, ionic character in covalent compounds, bond moment, dipole moment and percentage of ionic character.** | **5** |
| **July 2024** | **CEMMIN102T** | **. Covalent bonding: VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonalbipyramidal and octahedral arrangements. Concept of resonance and resonating structures in various inorganic and organic compounds. Redox reactions. Balancing of equations by oxidation number and ion-electron method, oxidimetry and reductimetry** | **6** |
| | **CEMMIN102P** | **Estimation of (a) Fe2+ ion in Mohr's salt (permanganometry and dichromometry) (b) Cu2+ by iodometry** | **6** |
| **August 2024 06.08.2024** | | **Internal Examination& Class for Slow Learners** | **5** |
| **20.08.2024** | | **END SEMESTER EXAMINATION** | |
| **Total Classes** | | | **40** |

## Name of Teacher: Dr. Kallol Mukherjee

## Paper Allotted:CEMMIN102T, CEMMIN102P

| Month | Paper | Content | No of classes |
|---|---|---|---|
| **May 2024 13.05.2024** | **CEMMIN102T** | **Intensive and extensive variables, state and path functions, isolated, closed and open systems, zeroth law of thermodynamics, concept of heat, work internal energy and statement of first law, enthalpy, H, relation between heat capacities, calculations of q, w, U and H for the reversible, irreversible and free expansion of gases.** | **3** |
| **June 2024** | **CEMMIN102T** | **Standard states, Heats of reaction, enthalpy of formation of molecules and ions and enthalpy of combustion and its applications, laws of thermochemistry, bond energy, bond dissociation energy and resonance energy from thermochemical data, Kirchoff's equation, and effect of pressure on enthalpy of reaction** | **5** |
| | **CEMMIN102P** | **Determination of solubility product of KHTa** | **4** |
| **July 2024** | **CEMDSC102T** | **Statement of the second law of thermodynamics, Concept of heat reservoirs and heat engines, Carnot cycle, Physical concept of Entropy, Carnot engine, refrigerator and efficiency, Entropy change of systems and surroundings for various processes and transformations, Auxiliary state functions (G and A) and** | **6** |

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| | | criteria for spontaneity and equilibriu | |
| August<br>2024<br>06.08.2024 | | Internal Examination&<br>Class for Slow Learners | 5 |
| 20.08.2024 | | END SEMESTER EXAMINATION | |
| Total Classes | | | 23 |

## Name of Teacher: Dr. MADHUMITA DANDOPATH PATRA

### Paper Allotted: CEMDSC102T, CEMCOR102T

| Month | Paper | Topic | No of classes |
|---|---|---|---|
| May<br>2024<br>(13.05.2024) | CEMDSC102T | Conformation, conformational nomenclature | 2 |
| June<br>2024 | CEMDSC102T | Relative stability of conformers | 3 |
| | CEMCOR102T | Nucleophilic substitution and elimination reactions | 3 |
| July<br>2024 | CEMDSC102T | Conformational analysis | 4 |
| | CEMCOR102T | Nucleophilic substitution and elimination reactions | 3 |
| August<br>2024<br>06.08.2024 | | Internal Examination | 7 |
| August<br>2024 | | Class for Slow Learners | 6 |
| 20.08.2024 | | END SEMESTER EXAMINATION | |
| Total Classes | | | 28 |

## Name of Teacher: Mr. AJAY TAMANG

### Paper Allotted: CEMDSC102T, CEMDSC102P, CEMMIN102T, CEMMIN102P

| Month | Paper | Topic | No of classes |
|---|---|---|---|
| May<br>2024<br>13.05.2024 | CEMDSC102T | Chemical Kinetics: Rate law, order and molecularity:<br>Introduction of rate law, Extent of reaction; rate constants, order; Forms of rates of First, second and n-th order reactions; | 4 |
| | CEMDSC102P | Study of kinetics of simple chemical reactions<br>Study of kinetics of acid-catalyzed hydrolysis of methyl acetate | 3 |

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|---|---|---|---|
| June 2024 | CEMDSC102T | Chemical Kinetics: Pseudo first order reactions (example using acid catalyzed hydrolysis of methyl acetate); Determination of order of a reaction by half-life and differential method. Role of T and theories of reaction rate: Temperature dependence of rate constant; Arrhenius equation, energy of activation; Rate-determining step and steady-state approximation – explanation with suitable examples. | 8 |
| | CEMMIN102T | Chemical equilibrium: Thermodynamic conditions for equilibrium, degree of advancement, variation of free energy with degree of advancement, Equilibrium constant and standard Gibb's free energy change, Definitions of Kp, Kc and Kx and relation among them, Le Chatelier's principle. | 5 |
| July 2024 | CEMDSC102T | Collision theory; outline of Lindemann theory of unimolecular reaction; outline of Transition State theory (classical treatment) Homogeneous catalysis: Homogeneous catalysis with reference to acid base catalysis; Primary kinetic salt effect; Enzyme catalysis. | 6 |
| | CEMDSC102P | Study of kinetics of simple chemical reactions<br>a. Study of kinetics of acid-catalyzed hydrolysis of methyl acetate<br>b. Study of kinetics of decomposition of $H_2O_2$ | 9 |
| | CEMMIN102T | Determination of solubility product of KHTa | 3 |
| August 2024 06.08.2024 | | Internal Examination&<br>Class for Slow Learners | 5 |
| 20.08.2024 | | END SEMESTER EXAMINATION | |
| Total Classes | | | 37 |

## Name of Teacher: Dr. Sandip Saha

## Paper Allotted: CEMDSC102T, CEMDSC102P, CEMMIN102T, CEMMIN102P

| Month | Paper | Topic | No of classes |
|---|---|---|---|
| May 2024 13.05.2024 | CEMDSC102T | Acid-Base reactions (15 Lectures) Acid-Base concept: Arrhenius concept, theory of solvent system ($H_2O$, $NH_3$, $SO_2$ and HF), Bronsted-Lowry's concept, relative strength of acids, Pauling's rules. Lux-Flood concept, Lewis concept, group characteristics of Lewis acids, solvent levelling and differentiating effects. | 4 |
| | CEMDSC102P | Acid-Base Titration: a) NaOH − $Na_2CO_3$ mixture b) $Na_2CO_3$ – $NaHCO_3$ mixture c) Oxalate − Oxalic Acid mixtur | 6 |
| June 2024 | CEMDSC102T | Superacids, proton affinity; HSAB principle. Acid-base equilibria in aqueous solution (Proton transfer equilibria in water), pH, buffer. Acid-base neutralization curves; indicator, choice of indicators. Solubility product, common ion effect and their application in analytical chemistry. (Gr. II A, B & Gr. III A, B). | 8 |

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|---|---|---|---|
| | **CEMMIN102T** | **Ionic bonding: General characteristics of ionic bonding. Energy consideration in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Lande equation for calculation of lattice energy, Born Haber cycle and its application.** | **5** |
| **July 2024** | **CEMMIN102T** | **Covalent bonding: VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements** | **6** |
| | **CEMMIN102P** | **Estimation of (a) Fe2+ ion in Mohr's salt (permanganometry and dichromometry) (b) Cu2+ by iodometry** | **6** |
| **August 2024 06.08.2024** | | **Internal Examination& Class for Slow Learners** | **5** |
| **20.08.2024** | | **END SEMESTER EXAMINATION** | |
| **Total Classes** | | | **40** |