**Academic Calendar 2022-2023**

 Department of Chemistry

 Odd Semester

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| Semester | Syllabus Module/Unit | Topic | No. of lectures (Hours) | Teachers | Distribution |
| 1st semester(H) | Bonding and physical properties (CEMACORET1) | 1. Valance Bond Theory
2. Electronic Displacement
3. MO Theory
4. Physical properties
 | 25L | SB+AB | 4 weeks  |
|  | General Treatment of Reaction Mechanism (CEMACORE01T) | 1. Mechanistic classification
2. Reactive intermediates
 | 10L | DC+AD | 2 weeks  |
|  | Stereochemistry I(CEMACORE01T) | 1. Concept of chirality and symmetry
2. Relative and absolute configuration
3. Optical activity of chiral compounds
 | 25L | DC+AD | 4 weeks  |
|  | Organic chemistry I (Lab)(CEMACORE 01P) | 1. Separation
2. Determination of boiling point
3. Identification of a pure Organic compound
 | 60L | DC+AD | 10 weeks  |
|  | Physical Chemistry-IKinetic Theory and Gaseous State(CEMACORE02T) | 1. Kinetic Theory of gases
2. Maxwell’s distribution of speed and energy
3. Real gas and virial equation
 | 20L | SB | 4 weeks  |
|  | Chemical Thermodynamics(CEMACORE02T) | 1. Zeroth and 1st law of thermodynamics
2. Thermochemistry
3. 2nd law
 | 25L | AB | 5 weeks  |
|  | Chemical Kinetics(CEMACORE02T) | 1. Rate law, order and molecularity
2. Role of T and theories of reaction rate
3. Homogeneous catalysis
 | 15L | SB | 3 weeks  |
|  | Physical Chemistry -I Lab(CEMACOR02P) | 1. Experiment 1
2. Experiment 3
3. Experiment 4
 | 60L | SB+AB | 10 weeks  |

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| Semester | Syllabus Module/Unit | Topic | No of lectures (Hours) | Teachers | Distribution |
| 1st Semester (G) | Section A: Inorganic Chemistry-I(CEMGCORE01T) | 1. Atomic structure
2. Chemical periodicity
3. Acids and bases
4. Redox reaction
 | 30L | SB+AB |  **6 weeks**  |
|  | Section B: Organic Chemistry- I (CEMGCORE01T) | 1. Fundamentals of organic chemistry
2. Stereochemistry
3. Nucleophilic substitution and Elimination reaction
4. Aliphatic Hydrocarbons
 | 30L |  | **6 weeks**  |
|  | Hydrocarbons Lab(CEMGCORE01P) | Inorganic Chemistry lab | 30L | SB | **6 weeks**  |
|  | Hydrocarbons Lab(CEMGCORE01P) | Organic chemistry lab | 30L |  |  |

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| 3rd semester (H) | Physical Chemistry -IITransport Process(CEMACOR05T) | 1. Ficks Law
2. Viscosity
3. Conductance and transport number
 | 15L | AB | 4 weeks  |
|  | Application of Thermodynamics-I(CEMACOR05T) | 1. Partial properties and chemical potential
2. Chemi Experiment 1
3. cal Equilibrium
4. Chemical potential and other properties
 | 25L | AB+SB | 6 weeks  |
|  | Foundation of Quantum Mechanics(CEMACOR05T) | 1. Beginning of Quantum mechanics
2. Wave function
3. Concept of Operators
4. Particle in a Box
5. Simple Harmonic Oscillator
 | 20 L | SB | 6 weeks  |
|  | Physical Chemistry lab-II(CEMACOR05P) | 1. Experiment 1
2. Experiment 2
3. Experiment 3
4. Experiment 4
5. Experiment 5
6. Experiment 6
 | 60L | SB+AB | 10 weeks  |
|  | Inorganic Chemistry-II(CEMACOR06T)Chemical Bonding-I | 1. Ionic Bond
2. Covalent Bond
 | 24L | GK+CP | 6 weeks  |
|  | Chemical Bonding-II(CEMACOR06T) | 1. MO concept of bonding
2. Metallic Bond
3. Weak Chemical Forces
 | 24L | GK+CP | 6 weeks  |
|  | Radioactivity(CEMACOR06T) | Radioactivity | 12L | GK+CP | 3 weeks  |
|  | Inorganic Chemistry-II Lab(CEMACOR06P) | Indo/Iodimetric titration | 60L | GK+CP | 10 weeks  |
|  | Organic Chemistry-III(CEMACOR07T) | Chemistry of alkenes and alkynes | 15L | AD+DC | 4 weeks  |
|  | Organic Chemistry-III(CEMACOR07T) | Aromatic Substitution | 10L | AD | 2 weeks  |
|  | Organic Chemistry-III(CEMACOR07T) | Carbonyl and Related compounds | 30L | DC | 6 weeks  |
|  | Organic Chemistry-III(CEMACOR07T) | Organometallics | 5L | AD | 2 weeks  |
|  | Organic Chemistry-III Lab(CEMACOR07P) | Qualitative Analysis of Single Solid Organic Compounds | 60L | AD+ DC | 10 weeks  |

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| 3rd Semester(G) | Section A: Physical Chemistry-II(CEMGCORE03T) | 1. Chemical Energetics
2. Chemical Equilibrium
3. Ionic Equilibrium
 | 30L | AB+SB | 6 weeks  |
|  | Section B: Organic Chemistry -II(CEMGCORE03T | 1. Aromatic Hydrocarbons
2. Organometallic compounds
3. Aryl Halides
4. Alcohols, Phenols and Ethers
5. Carbonyl Compounds
 | 30L | **AD+DC** | **6 Weeks**  |
|  | Section A: Physical Chemistry Lab(CEMGCORE03P) | Ionic Equilibria | 30L | **SB+AB** | **6 Weeks**  |
|  | Section B: Organic Chemistry Lab(CEMGCORE03P) | Identification of a pure organic compound | 30L | **DC+SS** | **6 weeks**  |

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| 5th semester (H) | Advanced physical chemistry : Crystal Structure(CEMADSE01T) | 1. Bravais Lattice and Laws of Crystallography
2. Crystal planes
 | 20L | SB | **5 weeks**  |
|  | Statistical Thermodynamics(CEMADSE01T) | 1. Configuration
2. Boltzmann distribution
3. Partition function
 | 20L | AB | **5 weeks**  |
|  | Special selected topics(CEMADSE01T) | 1. Specific heat of solid
2. 3rd law
3. Polymers
 | 20L | **SB** | **5 weeks**  |
|  | Advanced Physical Chemistry Lab(CEMADSE01P) | Computer programs based on numerical methods | 60L | AB | **10 weeks**  |
|  | Analytical methods in chemistry:Qualitative and quantitative aspects of analysis(CEMADSE02T) | Qualitative and quantitative aspects of analysis | 05L | **GK** | **2 weeks**  |
|  | Optical methods of analysis(CEMADSE02T) | 1. UV-Visible spectroscopy
2. Flame atomic absorption and emission spectroscopy
 | 25L | **CP** | **5 weeks**  |
|  | Thermal methods of analysis(CEMADSE02T) | Thermogravimetry | 05L | **CP** | **2 weeks**  |
|  | Electroanalytical methods(CEMADSE02T) | Electroanalytical methods | 10L | **CP** | **3 weeks**  |
|  | Separation techniques(CEMADSE02T) | 1. Solvent extraction
2. Mechanism of extraction
3. Chromatography
 | 15L | **CP** | **3 weeks**  |
|  | Analytical methods in chemistry-Lab(CEMADSE02P) | 1. Separation Technique
2. Solvent Extraction
3. Spectrophotometry
 | 60L | **CP+GK** | **10 weeks**  |
|  | Inorganic Chemistry- IV(CEMACOR11T) | 1. Coordination chemistry -II
 | 36L | **GK** | **6 weeks**  |
|  | Inorganic Chemistry- IV(CEMACOR11T) | 1. Lanthanoids and Actinoids
 | 24L | **GK** | **5 weeks**  |
|  | Inorganic Chemistry-IV Lab(CEMACOR11P) | 1. Chromatography of metal ions
2. Gravimetry
3. Spectrophotometry
 | 60L | **GK** | **10 weeks**  |
|  | Organic Chemistry-IV(CEMACOR12T)Carbocycles and Heterocycles | 1.Polynuclear hydrocarbons and their derivatives2.Heterocyclic compounds | 16L | **DC** | **3 weeks**  |
|  | Cyclic Stereochemistry(CEMACOR12T) | Alicyclic Compounds | 10L | **AD** | **3 weeks**  |
|  | Carbohydrates(CEMACOR12T) | Monosaccharides | 14L | **DC** | **3 weeks**  |
|  | Pericyclic reactions(CEMACORE12T) | Pericyclic reactions | 8L | **AD** | **2 weeks**  |
|  | Biomolecules(CEMACORE12T) | 1. Amino acids
2. Peptides
3. Nucleic acids
 | 12L | **DC** | **3 weeks**  |
|  | Organic Chemistry-V Lab(CEMACORE12P | 1. Chromatographic Separation
2. Spectroscopic Analysis of organic compounds
 | 60L | **AD+DC** | **10 Weeks**  |

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| 5th semester(G) | Polymer chemistry(CEMGDSE01T) | 1. Introduction and history of polymer chemistry
2. Functionality and its importance
3. Kinetics of polymerization
4. Crystallization and crystallinity
5. Nature and structure of polymers
6. Determination of molecular weight of polymers
7. Polymer solution
8. Properties of polymers
 | 60L | **AD+DC+SS** | **10 Weeks**  |
|  | Polymer chemistry(CEMGDSE01P) | 1. Polymer synthesis
2. Polymer characterization
3. Polymer analysis
 | 60L | **SB+SS** | **10 weeks**  |
|  | Green chemistry(CEMGDSE02T) | 1. Introduction to green chemistry
2. Principles of green chemistry and designing a chemical synthesis

3.Example of green synthesis/ reactions and some real world cases1. Future trends in green chemistry
 | 60L | **AD+DC** | **10 Weeks** |
|  | Green chemistry(CEMGDSE02P) | 1. Avoiding waste
2. Alternative green solvent
3. Alternative sources of energy
 | 60L | **AD+DC** | **10 weeks**  |