**A.B.V. GDC SUNNI, SHIMLA (H.P)**

**Teaching Learning Schedule of CHEM102 Th and CHEM102 PR (2023-24)**

**STATES OF MATTER, CHEMICAL KINETICS & FUNCTIONAL ORGANIC CHEMISTRY**

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| **Date** | **Topics to be Covered** | **Teaching Method** |
| 25-07-23 To 11 -08-23 | **102 TH**  **Kinetic Theory of Gases**  Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation.  Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation. van der Waals equation of state for real gases. Boyle temperature (derivation not required). Critical phenomena, critical constants and their calculation from van der Waals equation. Andrew’s isotherms of CO2.  **102 PR**  **Surface tension measurement** (use of organic solvents excluded).  (a) Determination of the surface tension of a liquid or a dilute solution using a stalagmometer. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 13-08-23 To 26-08-23 | **102 TH**  Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation – derivation not required) and their importance.  Temperature dependence of these distributions. Most probable, average and root mean square velocities (no derivation). Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules. Viscosity of gases and effect of temperature and pressure on coefficient of viscosity (qualitative treatment only).  **102 PR**  **Surface tension measurement** (use of organic solvents excluded).  (b) Study of the variation of surface tension of a detergent solution with concentration. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 28-08-23 To 16-09-23 | **Liquids**  Surface tension and its determination using stalagmometer. Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).  **102 PR**  **Chemical Kinetics**  Study the kinetics of the following reaction:  (i). Acid hydrolysis of methyl acetate with hydrochloric acid. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-23 To 30-09-23 | **Solids**  Forms of solids. Symmetry elements, unit cells, crystal systems, Bravais lattice types and identification of lattice planes. Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices. Miller indices. X–Ray diffraction by crystals, Bragg’s law. Structures of NaCl, KCl and CsCl (qualitative treatment only). Defects in crystals.  **102 PR**  **Chemical Kinetics**  Study the kinetics of the following reaction:  (ii). Saponification of ethyl acetate. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-24 To 30-09-24 | **Chemical Kinetics**  The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction. Derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants). Half–life of a reaction. General methods for determination of order of a reaction. Concept of activation energy and its calculation from Arrhenius equation.  Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories (qualitative treatment only).  **102 PR**  **Chemical Kinetics**  Study the kinetics of the following reaction:  iii). Compare the strengths of HCl and H2SO4 by studying kinetics of hydrolysis of methyl acetate | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 16-10-23 To 28-10-24 | **Organic Chemistry**  Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.  **Aromatic hydrocarbons**  Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid.  Reactions: (Case benzene): Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft’s reaction (alkylation and acylation) (upto 4 carbons on benzene). Side chain oxidation of alkyl benzenes (upto 4 carbons on benzene).  **102 PR**  **Organic Chemistry**  Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (-COOH, phenolic and preparation of one derivative and melting point determination. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 30-10-23 To 9-11 -24 | **Alkyl Halides** (Upto 5 Carbons) Types of Nucleophilic Substitution (SN1, SN2 and SNi) reactions.  **Preparation**: from alkenes and alcohols.  **Reactions:** hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation, Williamson’s ether synthesis. Aryl Halides Preparation: (Chloro, bromo and iodo-benzene case): from phenol, Sandmeyer & Gattermann reactions.  **Reactions (Chlorobenzene)**: Aromatic nucleophilic substitution (replacement by –OH group) and effect of nitro substituent. Benzyne Mechanism: KNH2/NH3 (or NaNH2/NH3).  Reactivity and Relative strength of C-Halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.  **102 PR**  **Organic Chemistry**  Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (Aldehydic, ketonic and preparation of one derivative and melting point determination. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-24 | **Alcohols, Phenols and Ethers (Upto 5 Carbons)**  **Alcohols:** Preparation: Preparation of 1о, 2о and 3о alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters.  **Reactions:** With sodium, HX (Lucas test), esterification, oxidation (with PCC, alk. KMnO4, acidic dichromate, conc. HNO3). Oppeneauer oxidation Diols: (Upto 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement.  **102 PR**  **Organic Chemistry**  Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups amide, nitro, amines and preparation of one derivative and melting point determination. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-23 | **Phenols:** (Phenol case) Preparation: Cumene hydroperoxide method, from diazonium salts. Reactions: Electrophilic substitution: Nitration, halogenation and sulphonation. Reimer - Tiemann Reaction, Gattermann-Koch Reaction, Houben–Hoesch Condensation, Schotten – Baumann Reaction.  **Ethers (aliphatic and aromatic):** Cleavage of ethers with HI.  **Aldehydes and ketones (aliphatic and aromatic):** (Formaldehye, acetaldehyde, acetone and benzaldehyde)  **Preparation:** From acid chlorides and from nitriles.  **Reactions:** Reaction with HCN, ROH, NaHSO3, NH2-G derivatives. Iodoform test. Aldol Condensation, Cannizzaro’s reaction, Wittig reaction, Benzoin condensation. Clemensen reduction and Wolff Kishner reduction. Meerwein-Pondorff Verley reduction. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 4-02-24 To 17-02-24 | **Revision**: Kinetic Theory of Gases, Liquids, Solids, Chemical Kinetics | Class Test, Student Presentation, Problem Solving |
| 18-02-24 To 29-02-24 | **Revision**: Aromatic hydrocarbons, Alkyl Halides, Alcohols, Phenols and Ethers | Class Test, Student Presentation, Problem Solving |
| March 2024 | **Final Practical** |  |

**A.B.V. GDC SUNNI, SHIMLA (H.P)**

**Teaching Learning Schedule of CHEM202Th and CHEM202PR (2023-24)**

**CHEMISTRY OF MAIN GROUP ELEMENTS, CHEMICAL ENERGETICS AND EQUILIBRIA**

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| **Date** | **Topics to be Covered** | **Teaching Method** |
| 25-07-23 To 11 -08-23 | **202 TH**  **Hydrogen**  Unique position of Hydrogen in the periodic table, isotopes, ortho and para hydrogen, Industrial production, Hydrides and their chemistry, Heavy water, Hydrogen bonding, Hydrates.  **202 PR**  **Inorganic Mixture Analysis** - Semi-micro qualitative analysis of inorganic mixture using H2S of mixtures - not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following: Cations: NH4+, Pb2+, Ag+, Bi3+, Cu2+, Cd2+, Sn2+  (Spot tests should be carried out wherever feasible) | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 13-08-23 To 26-08-23 | **202 TH**  **S-Block Elements**  Periodicity of elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electron gain enthalpy, electronegativity (Pauling Scale). General characteristics of s-block elements like density, melting points, flame colouration and reducing character, solvation and complexation tendencies and solutions of metals in liquid ammonia.  **202 PR**  **Inorganic Mixture Analysis** - Semi-micro qualitative analysis of inorganic mixture using H2S of mixtures - not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following: Cations: Fe3+, Al3+, Co2+, Cr3+, Ni2+, Mn2+, Zn2+, Ba2+, Sr2+, Ca2+, K+ (Spot tests should be carried out wherever feasible) | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 28-08-23 To 16-09-23 | **202 TH**  **p- Block Elements**  Comparative studies including diagonal relationship of group 13 and 14 elements. Borohydrides, Hydrides, oxide and oxy-acids and halides of boron, borax, Borazine, allotropic forms of carbon, fullerenes, carbides of calcium and silicon.  **202 PR**  **Inorganic Mixture Analysis** - Semi-micro qualitative analysis of inorganic mixture using H2S of mixtures - not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following: Anions: CO32–, S2–, SO32–, S2O32–, NO2–, CH3COO–,  (Spot tests should be carried out wherever feasible) | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-23 To 30-09-23 | **202 TH**  **p- Block Elements**  Hydrides, oxides, oxoacids and halides of nitrogen. Allotropic forms of phosphorous. Hydrides, halides, oxides and oxyacids of phosphorous. Basic properties of halogens and inter halogen compounds, pseudohalogens and poly halides.  **202 PR**  **Inorganic Mixture Analysis** - Semi-micro qualitative analysis of inorganic mixture using H2S of mixtures - not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following: Anions: Cl–, Br–, I–, NO3–,SO42-, PO43-, BO33-, C2O42- (Spot tests should be carried out wherever feasible)  . | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-24 To 30-09-24 | **202 TH**  **Noble Gases**  Occurrence of noble gases, History of discovery of noble gases and isolation of noble gases form air. Preparation properties and structure of important compounds of noble gases-flourides, oxides, oxyflorides of xenon (valence bond structure only). Krypton difloride and clatherate compounds of noble gases.  **202 PR**  **Thermochemistry**  (1) Determination of heat capacity of calorimeter for different volumes.  (2) Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 16-10-23 To 28-10-24 | **202 TH**  **Chemical Energetics**  Review of thermodynamics and the Laws of Thermodynamics. Important principles and definitions of thermochemistry. Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution.  **202 PR**  **Thermochemistry**  (3) Determination of integral enthalpy of solution of salts (KNO3, NH4Cl).  (4) Determination of enthalpy of hydration of copper sulphate.  . | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 30-10-23 To 9-11 -24 | **202 TH**  **Chemical Energetics:**  Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data. Variation of enthalpy of a reaction with temperature – Kirchhoff’s equation. Statement of Third Law of thermodynamics and calculation of absolute entropies of substances. **202 PR**  **Ionic Equilibria: pH measurements**  (a) Measurement of pH of different solutions like aerated drinks, fruit juices, shampoos and soaps (use dilute solutions of soaps and shampoos to prevent damage to the glass electrode) using pH-meter values. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-24 | **202 TH**  **Chemical Equilibrium:**  Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. Distinction between ΔG and ΔGo, Le Chatelier’s principle. Relationships between Kp, Kc and Kx for reactions involving ideal gases.  **202 PR**  **Ionic Equilibria: pH measurements**  (b) Preparation of buffer solutions: (i) Sodium acetate-acetic acid (ii) Ammonium chloride-ammonium hydroxide Measurement of the pH of buffer solutions and comparison of the values with theoretical values. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-23 | **202 TH**  **Ionic Equilibria:**  Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect. Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 4-02-24 To 17-02-24 | **Revision**: Hydrogen, S-Block Elements, p- Block Elements, Noble Gases | Class Test, Student Presentation, Problem Solving |
| 18-02-24 To 29-02-24 | **Revision**: Chemical Energetics, Chemical Equilibrium, Ionic Equilibria: | Class Test, Student Presentation, Problem Solving |
| March 2024 | **Final Practical** |  |

**A.B.V. GDC SUNNI, SHIMLA (H.P)**

**Teaching Learning Schedule of CHEM304Th and CHEM304PR (2023-24)**

**CHEMISTRY OF TRANSITION AND INNER TRANSITION ELEMENTS, COORDINATION CHEMISTRY, ACIDS and BASES**

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| **Date** | **Topics to be Covered** | **Teaching Method** |
| 25-07-23 To 11 -08-23 | **304TH**  Transition Elements (3d series) - Chemistry of elements of 3d metals  Oxidation states displayed by Cr, Fe, Co, Ni and Co. A study of the following compounds (including preparation and important properties); Peroxo compounds of Cr, K2Cr2O7, KMnO4, K4[Fe(CN)6], sodium nitroprusside, [Co(NH3)6]Cl3, Na3[Co(NO2)6].  **304PR**  (i) Iodometric estimation of potassium dichromate and copper estimate.  (ii) Iodimetric estimation of antimony in tartaremetic. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 13-08-23 To 26-08-23 | **304TH**  Transition Elements (3d series) - Chemistry of elements of 3d metals  General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn, Fe and Cu.  **304PR**  (i) Estimation of amount of available chlorine in bleaching powder and household bleachers.  (ii) Estimation of iodine in iodized salts | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 28-08-23 To 16-09-23 | **304TH**  Lanthanides and actinides:  Electronic configurations, oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides and actinides (ion exchange method only).  **304PR**  (i) Iodimetric estimation of ascorbic acid in fruit juices.  (ii) Gravimetric estimation of sulphate in barium sulphate. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-23 To 30-09-23 | **304TH**  Coordination Chemistry  Valence Bond Theory (VBT): Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6). Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Drawbacks of VBT. IUPAC nomenclature of coordination compounds.  **304PR**  (i) Gravimetric estimation of aluminum in oximato complex.  **Inorganic preparation of**  (i) Potash alum | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-24 To 30-09-24 | **304TH**  Organometallic Compounds  Definition and Classification with appropriate examples based on nature of metal-carbon bond (ionic, s, p and multicentre bonds). Structures of methyl lithium, Zeiss salt and ferrocene. EAN rule as applied to carbonyls.  **304PR**  **Inorganic preparation of**  (ii) Chrome alum  (iii) tetraamminecopper(II) sulphate | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 16-10-23 To 28-10-24 | **304TH**  Organometallic Compounds  Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. p-acceptor behaviour of carbon monoxide. Synergic effects (VB approach)- (MO diagram of CO can be referred to for synergic effect to IR frequencies).  **304PR**  Inorganic preparation of  (iv) potassium trioxalatoferrate(III)  (v) hexaammine nickel(II) chloride  . | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 30-10-23 To 9-11 -24 | **304TH**  Crystal Field Theory  Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry. Factors affecting the magnitude of CF splitting. Spectrochemical series  **304PR**  Complexometric titrations  (a) Estimation of (i) Mg2+ or (ii) Zn2+ by complexometric titrations using EDTA.  (b) Estimation of total hardness of a given sample of water by complexometric titration | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-24 | **304TH**  Crystal Field Theory  Comparison of CF Splitting for Octahedral and tetrahedral complexes, Tetragonal distortion of octahedral geometry. Jahn-Teller distortion, Square planar coordination.  **304PR**  **(e)** Estimation of total hardness of a given sample of water by complexometric titration | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-23 | **304TH**  **Acids and Bases**  Arrhenius, Bronsted and Lowry, Lewis, Lux flood and solvent system concepts of acids and bases. Classification of acids and bases as hard and soft. Pearson’s HSAB concept, application of HSAB principle. Relative strength of acids and bases and effect of substituents and solvent on their strength. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 4-02-24 To 17-02-24 | **Revision**: Transition Elements (3d series) - Chemistry of elements of 3d metals, Lanthanides and actinides. | Class Test, Student Presentation, Problem Solving, quiz. |
| 18-02-24 To 29-02-24 | **Revision**: Crystal Field Theory, Organometallic Compounds, Coordination Chemistry, | Class Test, Student Presentation, Problem Solving |
| March 2024 | **Final Practical** |  |

**A.B.V. GDC SUNNI, SHIMLA (H.P)**

**Teaching Learning Schedule of CHEM203Th and CHEM203PR (2023-24)**

BASIC ANALYTICAL CHEMISTRY

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| **Date** | **Topics to be Covered** | **Teaching Method** |
| 25-07-23 To 11 -08-23 | **203TH**  Introduction  Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 13-08-23 To 26-08-23 | **203TH**  Analysis of soil  Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators. Determination of pH of soil samples.  (b) Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 28-08-23 To 16-09-23 | **203TH**  Analysis of water  Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods.  (a) Determination of pH, acidity and alkalinity of a water sample.  (b) Determination of dissolved oxygen (DO) of a water sample. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-23 To 30-09-23 | **203TH**  Analysis of food products  Nutritional value of foods, idea about food processing and food preservations and adulteration.  (a) Identification of adulterants in some common food items like coffee powder, asafoetida, chilli powder, turmeric powder, coriander powder and pulses, etc.  (b) Analysis of preservatives and colouring matter. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-24 To 30-09-24 | **203TH**  Chromatography:  Definition, general introduction on principles of chromatography, paper chromatography, TLC etc.  (a) Paper chromatographic separation of mixture of metal ion (Fe3+ and Al3+). | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 16-10-23 To 28-10-24 | **203TH**  Chromatography:  (b) To compare paint samples by TLC method. Ion-exchange: Column, ion-exchange chromatography etc. Determination of ion exchange capacity of anion / cation exchange resin (using batch procedure if use of column is not feasible). | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 30-10-23 To 9-11 -24 | **203TH**  Analysis of cosmetics:  Major and minor constituents and their function  (a) Analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulphate. | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-24 | **203TH**  Analysis of cosmetics:  (b) Determination of constituents of talcum powder: Magnesium oxide, Calcium oxide, Zinc oxide and Calcium carbonate by complexometric titration. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-23 | **203TH**  Applications:  (a) To study the use of phenolphthalein in trap cases.  (b) To analyse arson accelerants.  (c) To carry out analysis of gasoline. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 4-02-24 To 17-02-24 | **Revision**: Introduction to Analytical Chemistry, Analysis of soil, Analysis of water. | Student Presentation, Problem Solving, quiz. |
| 18-02-24 To 29-02-24 | **Revision** Analysis of food products**,** Chromatography, Analysis of cosmetics and Applications | Student Presentation, Problem Solving |
| March 2024 | Chapter wise Class Test |  |

**A.B.V. GDC SUNNI, SHIMLA (H.P)**

**Teaching Learning Schedule of CHEM307Th (2023-24)**

**CHEMICAL TECHNOLOGY & SOCIETY and BUSINESS SKILLS FOR** **CHEMISTRY**

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| **Date** | **Topics to be Covered** | **Teaching Method** |
| 25-07-23 To 11 -08-23 | **307TH**  Chemical Technology  Basic principles of distillation, solvent extraction, solid-liquid leaching and liquid-liquid extraction, separation by absorption and adsorption. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 13-08-23 To 26-08-23 | **307TH**  Chemical Technology  An introduction into the scope of different types of equipment needed in chemical technology, including reactors, distillation columns, extruders, pumps, mills, emulators. Scaling up operations in chemical industry. Introduction to clean technology. | • Lecture based instruction • Inquiry based learning • Laboratory Experiments • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 28-08-23 To 16-09-23 | **307TH**  Society  Exploration of societal and technological issues from a chemical perspective. Chemical and scientific literacy as a means to better understand topics like air and water (and the trace materials found in them that are referred to as pollutants). | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-23 To 30-09-23 | **307TH**  Society  Energy from natural sources (i.e. solar and renewable forms), from fossil fuels and from nuclear fission; materials like plastics and polymers and their natural analogues, | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 18-09-24 To 30-09-24 | **307TH**  Society  Proteins and nucleic acids, and molecular reactivity and interconversions from simple examples like combustion to complex instances like genetic engineering and the manufacture of drugs. | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 16-10-23 To 28-10-24 | **307TH**  Business Basics  Key business concepts: Business plans, market need, project management and routes to market. | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 30-10-23 To 9-11 -24 | **307TH**  Chemistry in Industry  Current challenges and opportunities for the chemistry-using industries, role of chemistry in India and global economies. | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-24 | **307TH**  Making money  Financial aspects of business with case studies | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 15-12-23 To 31 -12-23 | **307TH**  Intellectual property  Concept of intellectual property, patents. | • Lecture based instruction • Inquiry based learning • Flipped Classroom • Interactive simulations • Problem based learning • Blended learning |
| 4-02-24 To 17-02-24 | Revision: Chemical Technology, Society | Student Presentation, Problem Solving, quiz. |
| 18-02-24 To 29-02-24 | Revision: Business Basics, Chemistry in Industry, Making money, Intellectual property | Student Presentation, Problem Solving |
| March 2024 | Chapter wise Class Test |  |