

GAUR BRAHMAN DEGREE COLLEGE, ROHTAK

Subject Name: Fundamental Chemistry – II (MAJOR)

Subject Code: 24CHEM402DS01

Sr.No	Unit	Lesson Plan: Bachelor of Science: 2025-26 (Semester-2 ND) Theory & Practical		Month
1	Unit-2	Thermodynamics	Brief discussion upto first law of thermodynamics, heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law, Joule–Thomson coefficient for ideal gases and real gases and inversion temperature, calculation of work and heat, dU & dH for the expansion of ideal gases and real gases under isothermal and adiabatic conditions for reversible and irreversible processes, enthalpy and internal energy change at constant P, V & T, Kirchhoff's equation.	January
			Second law of thermodynamics and its limitations, different statements of the law, Carnot's cycle and its efficiency, Carnot's theorem, thermodynamics scale of temperature. Concept of entropy – entropy as a state function, entropy change in ideal gases, entropy as a function of V & T, entropy as a function of P & T, entropy as a function of P & V, entropy as a criterion of spontaneity and equilibrium.	February
	Unit-3	Aromatic Hydrocarbons and Dienes	Concept of aromaticity, Huckel's rule, aromatic character of arenes, cyclic carbocations and carbanions with suitable examples and heterocyclic compounds with suitable examples, electrophilic aromatic substitution: halogenation, nitration, sulphonation,	March
			Friedel Crafts alkylation/ acylation with their mechanism, directing effects of groups in electrophilic substitution, nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene, chemical reactions- 1, 2 and 1, 4 additions (electrophilic and free radical mechanism), Diels – Alder reaction.	April

Dr. Vinod Kumar (Assistant Professor, Deptt. of Science)

Date: 5/1/2026

GAUR BRAHMAN DEGREE COLLEGE, ROHTAK

Subject Name: Fundamental Chemistry – IV (MAJOR)

Subject Code: 25CHEM404DS01

Sr.No	Unit	Lesson Plan: Bachelor of Science: 2025-26 (Semester-4 th) Theory & Practical		Month
1	Unit-3	Kinetics and Chemical Equilibrium	Integrated rate expression for first, second and third order reaction and their half-life period. Methods of determination of order of reaction. Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate–Simple collision theory for unimolecular and bimolecular collision. Transition state theory of bimolecular reactions.	January
			Equilibrium constant and free energy, concept of chemical potential, thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium constant, Van’ t Hoff reaction isochores, Van’ t Hoff reaction isotherm. Le-Chatelier’ s principle and its applications, Clapeyron equation and Clausius - Clapeyron equation & its applications.	February
3	Unit-4	Alcohols, Phenols and Ethers	Alcohols: General methods of preparation using Grignard reagent, ester hydrolysis, reduction of aldehydes, ketones, carboxylic acid and esters. Reactions: with sodium, HX (Lucas test), esterification, oxidation (with PCC, alk. KMnO ₄ , acid. dichromate, con. HNO ₃). Oppeneauer oxidation. Diols: Oxidation of diols. Pinacol-Pinacolone rearrangement.	March
			Phenols: Methods of preparation, physical properties and acidic character. 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.	April

Dr. VinodKumar (Assistant Professor, Deptt. of Science)

Date: 05/1/2026

GAUR BRAHMAN DEGREE COLLEGE, ROHTAK

Subject Name: Physical Chemistry

Subject Code:

Sr.No	Unit	Lesson Plan: Bachelor of Science: 2025-26 (Semester-6 th) Theory & Practical		Month
1	Unit-1			January
2	Unit-2			February
3	Unit-3			March
4	Unit-4			April

Dr. VinodKumar (Assistant Professor, Deptt. of Science)

Date: 05/01/2026

GAUR BRAHMAN DEGREE COLLEGE, ROHTAK

Subject Name: Physical Chemistry

Subject Code:

Sr.No	Unit	Lesson Plan: Bachelor of Science: 2025-26 (Semester-6 th) Theory & Practical		Month
1	Unit-1	Electronic Spectrum Spectroscopy	Concept of posn. energy curve for bonding, anti-bonding molecular orbital. Selection Rule and Franck-Condon Principle. M.O. energy level and transition.	January
2	Unit-2	photo-chemistry	Diff Bln Thermal and photochemical process. Law of photochemistry. Grotthuss-Draper law, Stark - Einstein law. Jablonski diagram and various process. Fluorescence phosphorescence, Non-Radiative process. photosensitized Rxn.	February
3	Unit-3	Oilyle solution and colligative Prop	Ideal and Non-ideal solution, activity and activity coefficient Oilyle soln colligative Prop, Raoult's law, osmotic pressure and measurement. Elevation in B.P. & f.p. Sph method of det various colligative Prop. Degree of Association.	March
4	Unit-4	phase Equilibrium	phase component and degree of freedom, Thermodynamic derivation of Gibbs-phase Rule, one component system water/sulphur system. phase Equilibria of two component system e.g. Pb-Ag system.	April

Dr. VinodKumar (Assistant Professor, Deptt. of Science)

Date: 05/01/2026

// Bsc Ist year IInd Semester Syllabus : —

- Theory: — Unit — Ist Month
- 1) Non-Aqueous Solvents and Noble Gases — Ist — January
- Practicals: —
- 1) Volumetric Analysis — January
- 1) Iodometric titrations
- 2) Complexometric titration
- 2) Unit — IInd
- 1) Thermodynamics — Ist — February
- Practicals: —
- 1) Viscometry: — Ostwald viscometer, — February
- 2) Refractometry
- 3) Unit — IIIrd
- 1) Thermodynamics — IInd, IIIrd — March
- Practicals: —
- 1) Preparation and Purification of — March
Organic Compound
- 4) Unit — IVth
- Noble Gases — IInd — April
- Practicals: —
- 1) Determination of Boiling Point of — April
Organic Compound
- 2) Study the Process of Sublimation

Bsc. 2nd — IVth Semester Bsc. 2nd — IVth Sem (Chemistry) (Major)

Theory	Unit — Ist	Month
1)	Kinetics and chemical Equilibrium — Practicals: — 1) Colorimetry — Beer-Lambert law — 2) Complexometric titrations	January
2)	Unit — II nd Alcohols — Practicals: — 1) Preparations: — Preparation of cuprous chloride, prussian blue from iron filings	February
3)	Unit — III rd Phenols: — Practicals: — 1) Conductometry titration — 2) Solution: — Determine <u>CST</u>	March
4)	Unit — IV th Ethers: — Practicals: — 1) Identifications of given Organic compound	April

→ Bsc. 2nd year (IVth Semester)
Name of Course — Minor Course

Unit — Ist

Chemical Bonding and Molecular structure — Jan-Feb

Unit — IInd

Alkyl halide — March-April

Practicals: —

- 1) Determine the TDS of Different water samples — Jan
- 2) Determine the reaction of water with quick lime — Feb
- 3) Determine the CST of Phenol — water system — March
- 4) Systematic sketching of extra element of the simple organic compound. — April

Bsc. Med - 6th Semester (Chemistry)

Theory: -1) ^{Unit - Ist} Organometallic chemistry —

Month
January

2) Acid and Bases, HSAB Concept —

January

Unit - IInd

1) Bioinorganic chemistry —

February

2) Silicones and Phosphazenes —

February

Unit - IIIrd

1) Organic Synthesis via Enolates —

March

2) Synthetic Polymers —

March

Unit - IVth

1) Amino Acid, Peptides and
Proteins —

April