(Bachelor of Science) (Undergraduate)
B. Sc. (UG) Semester - II

Course Code	**US02CCHE51**	Title of the Course	**GENERAL CHEMISTRY- II**
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Some advanced topics of basic chemistry. 2. Historic development and scope of various branches of chemistry. 3. Basic concepts related to alkyl and aryl halides, bonding in inorganic compounds and fundamental aspects of chemical aspects.

Course Content		
Unit	Description	Weightage* (%)
1.	**ALKYL AND ARYL HALIDES** Homolytic and Heterolytic chemistry, Classification, Preparation, Reaction: Nucleophilic aliphatic substitution, S_N^2 Reaction: Mechanism, kinetics, stereochemistry, Reactivity & steric hindrance, S_N^1 Reaction: Mechanism, kinetics, stereochemistry, Carbocation, Structure of carbocation, Relative stability of carbocations, Stability of carbocation: polar effect, Rearrangement of carbocation, Reaction, Low reactivity of aryl and vinyl halides, Structure of aryl and vinyl halides, Nucleophilic aromatic substitution, Bimolecular displacement for nucleophilic aromatic substitution, Reactivity in nucleophilic aromatic substitution, Orientation in nucleophilic aromatic substitution, Electron withdrawal by resonance, Elimination-Addition mechanism, Benzynes, Problems.	**25%**
2.	**CHEMICAL BONDING** The Lewis Theory, Sidgwick-Powell Theory, Valance shell Electron pair Repulsion Theory (VSEPR), Effect of Lone Pair, Effect of electron negativity, Isoelectronic Principle, some examples using VSEPR Theory like BF_3 and the $[BF_4]$- ion, Ammonia NH_3, Water H_2O, Phosphorus pentachloride PCl_5, Chloride trifluoride ClF_3, Sulphur tetrafluoride SF_6, The triiodide ion I_3^-, Sulphur tetrafluoride SF_4, Iodine heptafluoride IF_7. LCAO method, s-s combination of orbitals, s-p combination of orbitals, p-p combination of orbitals, Rules of linear combination of atomic orbitals, Examples of molecular orbital Treatment for Homo Nuclear Diatomic Molecules (B_2, C_2, N_2, F_2**).**	**25%**

	Treatment for Hetero Nuclear Diatomic Molecules (CO^+, NO^+ CN^- and HF)	
3.	**[A]** Noble Gases : Electronic configuration, Physical properties, chemical properties, Compound formed under excited conditions, Clathrate compounds, Chemistry of xenon, Xenon fluoride preparation & properties, Structure and bonding in Xenon fluorides. **[B] FUNDAMENTAL CONCEPT OF COORDINATION CHEMISTRY** Definition of some terms, Classification of ligands, Chelate, chelating ligand and Chelation, Classification of chelates, Uses of Chelates, Co-ordination number and Stereochemistry of complexes, Nomenclature of co-ordination compounds.	**25%**
4.	**CHEMICAL KINETICS** Introduction, Concentration Effects, Differential Rate Laws, The Integrated Rate Laws, Experimental Determination of rate laws, Reaction Mechanisms, Elementary Processes, Mechanism and rate laws, Collision Theory of Gaseous Reactions, Temperature effects, Numerical Problems based on above topics.	**25%**

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about basic concepts of alkyl and aryl halides, co-ordination chemistry, chemical kinetics, d-block elements and chemical bonding. This learning will be helpful in understanding second and third year B.Sc. chemistry course.

2.	Gain knowledge of various electrophilic and nucleophilic reactions of aromatic compounds.
3.	Have knowledge of nomenclature of complexes and ligands.
4	To gain knowledge of d-block elements and various bonds in inorganic complexes.

Suggested References:	
Sr. No.	References
1.	Barrow, G. M., *Physical chemistry* (6^{th} Edition).
2.	Bahl, B.S., Tuli J. D., and Bahl, A, *Essentials of Physical Chemistry*.
3	Prakash S., Tuli, G. D., Basu, S. K., Madan R. D., *Advance inorganic chemistry* (Vol. - II).
4	Mahan, B.H. *University Chemistry*, 3^{rd} Edition Narosa.
5	Morrison, R. T. & Boyd, R. N., *Organic chemistry* (6^{th} edition).
6	Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
7	Lee J. D., *Concise Inorganic Chemistry* (4^{th} Edition).
8	Sharma K. K and Sharma L. K. *A Text Book of Physical chemistry*, (5^{th} Edition), Vikas Publishing House.
9	Selected Topics in Inorganic Chemistry, Wahid U. Malik, G. D. Tuli, R. D. Madan.

On-line resources to be used if available as reference material
On-line Resources : Google books, INFLIBNET, Google Web

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