



SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2021-2022

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

Course Code	US01CCHE51	Title of the Course	GENERAL CHEMISTRY- I
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Historic development and scope of chemistry 3. Basic concepts related to organic, inorganic, analytical and physical chemistry.
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Course Content		
Unit	Description	Weightage* (%)
1.	ALKANE, ALKENE AND ALKYNE Hydrocarbons : Physical properties of alkanes, alkene and alkynes, Common and IUPAC nomenclature of alkanes, alkenes and alkynes. Alkanes : Preparation from alkene by hydrogenation, reduction of alkyl halide, The Grignard reagent, Corey-House reaction, Wurtz reaction. Mechanism of halogenations, Orientation of halogenations: n-propane, n-butane, isopentane, isobutane, and n-pentane, 2,3-dimethylbutane. Alkenes : Preparation from dehydrohalogenation of alkyl halide with Mechanism, dehydration of alcohol. The E2 mechanism, Evidence : Absence of hydrogen exchange, The E1 mechanism, Evidence accompanied by rearrangement, Electrophilic addition Mechanism, Electrophilic addition rearrangement, Mechanism of addition of halogen, Halohydrin formation, Free-radical addition, Hydroxylation, Ozonolysis [problems]. Alkynes : Preparation from dehydrohalogenation of alkyl halide, Reaction of metal acetylide with primary alkyl halides, Hydration of alkynes, Acidity of alkynes, Analysis of alkynes.	25%
2.	PERIODIC PROPERTIES Periodic Table : Brief introduction and types of elements, Shielding effect and effective nuclear charge, Factor affecting the magnitude of σ and Z_{eff} and their variation in the periodic table, Slater's rule for calculation σ and Z_{eff} .	25%



	<p>Ionization Energy: Successive ionization energy, Factor affecting magnitude of Ionization Energy, Variation of IE values in main group element, Variation of IE values in different element groups, Ionization energies of isoelectronic species, Find out the order of second IE values of the element of second period, Difference between Ionization potential and Electrode potential of a metal.</p> <p>Electron Affinity: Relation between EA of X(g) atom and IE of X-(g) ion, EA₂ represents energy required, Factor affecting the magnitude of electron affinity, Variation of electron affinity in main group elements of the periodic table, Variation of electron affinity values of different groups.</p> <p>Electronegativity : Different methods used for calculating electronegativity (like Pauling, Mulliken, Allred-Rachow), Factor affecting the magnitude of electronegativity, Role of electronegativity in chemical behaviour, Variation of electronegativity of the elements of different group, Variation of electronegativity in a period of s and p Block elements, Application of electronegativity. Numerical based on above topics.</p>	
3.	<p>IONIC EQUILIBRIA IN AQUEOUS SOLUTIONS Acids & Bases, Arrhenius theory of Acids and Bases, The Lowry – Bronsted Concept, Strength of Acids and Bases, The Lewis concept, pH Scale, Self Ionization of water, Hydrolysis, Buffer Solutions, Indicator, Sparingly Soluble Salts, Common ion effect, Selective Precipitation, Numericals based on above topics.</p>	25%
4.	<p>ANALYTICAL CHEMISTRY Introduction, Qualitative and Quantitative analysis, Instrumental and Chemical Methods of analysis, Applications of Chemical Analytical Chemistry, Sampling of Solid, Liquid and Gas, Hazards in sampling, Stages of Analysis, Interferences, Selection of Methods, limitations of Analytical Methods, Classification of Errors, Accuracy and Precision, Absolute and Relative Error, Minimization of Error, rules of assigning significant figure, Significant Figure, Rounding off, Mean, Median, Standard Deviation, Distribution of Random Error, Reliability of Results (Q-test), Comparison of Results: Student's t-test and F-test, confidence limit (interval), Numericals based on above topics.</p>	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).
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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.	Gain the knowledge of Chemistry using various fundamental aspects of all four major branches of chemical sciences.
2.	Explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions.
3.	To have knowledge of basic aspects of inorganic chemistry comprising of various aspects of periodic table.
4.	Gain knowledge about various acid base theory and their applications.
5.	Know about use of various theoretical analytical methods and their applications.

Suggested References:	
Sr. No.	References
1.	Vogel, A. I., <i>Textbook Quantitative Chemical Analysis</i> , Prentice-Hall, 5th edition.
2.	Day, R. A. and Underwood A. L., <i>Quantitative Analysis</i> 6 th Edition.
3.	Prakash S., Tuli, G. D., Basu, S. K., Madan R. D., <i>Advance inorganic chemistry</i> (Vol. - I).
4.	Mahan, B.H. <i>University Chemistry</i> , 3 rd Edition Narosa.
5.	Morrison, R. T. & Boyd, R. N., <i>Organic chemistry</i> (6 th edition).



6	Cotton, F.A. & Wilkinson, G. <i>Basic Inorganic Chemistry</i> , Wiley.
7	Lee J. D., <i>Concise Inorganic Chemistry</i> (4 th Edition).
8	Clayden, J., Greeves, N., Warren, S., <i>Organic Chemistry</i> 2 nd Edition, Oxford University Press.

On-line resources to be used if available as reference material

On-line Resources : Google books, INFLIBNET, Google Web

