



Vitthalbhai Patel & Rajratna P. T. Patel Science College  
(Autonomous)

(Reaccredited with 'A' Grade by NAAC (CGPA 3.13))

Affiliated to SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar, Gujarat

Syllabus effective from the Academic Year 2024-2025



Course Code (Minor)	<b>US02MICHE01</b>	Title of the Course	<b>BASIC CHEMISTRY- II</b>
Total Credits of the Course	2	Hours per Week	2

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, and bonding in inorganic compounds.
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Course Content		
Unit	Description	Weightage* (%)
1.	<b>ALKYL AND ARYL HALIDES</b> Homolytic and Heterolytic chemistry, Classification, Preparation, Reaction: Nucleophilic aliphatic substitution, $SN^2$ Reaction: Mechanism, kinetics and stereochemistry, Reactivity and steric hindrance, $SN^1$ 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, Benzyne.	<b>50</b>
2.	<b>CHEMICAL BONDING</b> Valence bond theory and its limitation, The Lewis Theory and exceptions to the octet rule, Sidgwick-Powell Theory, Valence shell Electron pair Repulsion Theory (VSEPR), Effect of Lone Pair, Effect of electron negativity, Isoelectronic molecules and principle, shape and hybridization	<b>50</b>

	of some molecules based on VSEPR theory like BeF <sub>2</sub> , BF <sub>3</sub> (or BH <sub>3</sub> ), [BF <sub>4</sub> ] <sup>-</sup> ion, NH <sub>3</sub> , H <sub>2</sub> O, PCl <sub>5</sub> , ClF <sub>3</sub> , SF <sub>4</sub> , SF <sub>6</sub> , I <sub>3</sub> and IF <sub>7</sub> . Hybridization, Types of hybridisation (SP, SP <sup>2</sup> , SP <sup>3</sup> ). Molecular orbital method 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 (H <sub>2</sub> <sup>+</sup> , He <sub>2</sub> , B <sub>2</sub> , C <sub>2</sub> , N <sub>2</sub> , O <sub>2</sub> , O <sub>2</sub> <sup>-</sup> , O <sub>2</sub> <sup>-2</sup> , F <sub>2</sub> ). Treatment for Hetero Nuclear Diatomic Molecules (CO, CO <sup>+</sup> , NO).	
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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.	Continuous and compression evaluation : Class test/Internal written test 10 Marks (40%), Quiz 05 Marks (20%), Home Assignments 05 Marks (20%), Attendance 05 Marks (20%), (As per SPU Letter No. E-3/2748 dated 02/02/2024) [Total 25 Marks (100%)].	50
2.	Semester End Examination [Total 25 Marks (100%)].	50

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about basic concepts of alkyl and aryl halides, 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.

Suggested References:
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Sr. No.	References
1.	Morrison, R. T. & Boyd, R. N., <i>Organic chemistry</i> (6 <sup>th</sup> edition).
2.	Lee J. D., <i>Concise Inorganic Chemistry</i> (4 <sup>th</sup> Edition).
3	Prakash S., Tuli, G. D., Basu, S. K., Madan R. D., <i>Advance inorganic chemistry</i> (Vol. - II).
4	Cotton, F.A. & Wilkinson, G. <i>Basic Inorganic Chemistry</i> , Wiley.
5	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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