3

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name : **B. Sc. Chemistry** **Semester : I**
PROGRAM CODE : SCIUG102
COURSE CODE : SC23MIDSCCHE102

Type of course : Minor Elective course MIDSC
Name of course : Fundamentals of chemistry I
Total Marks : 50

Effective from June 2023 Under NEP 2020

Total Credits : 02	Teaching Hours per Week: 02 Teaching Hours per Semester: 30	Theory	External 25 Marks Internal 25 Marks

Course Objectives:

1. To understand the core concepts of valence bond theories.
2. To understand organic chemistry i.e. resonance, hyperconjugation, inductive effect etc. and their application.

Course Outcome:

1. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries.
2. Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
3. Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

Unit	Topic	Credit	Hr
1	**CHEMICAL BONDING** HKP **(A) Valence Bond Theory:** Introduction; Hitler-London theory (energy changes taking place during the formation of H_2 Molecule, Pauling-Slater's Theory (orbital Overlap theory of Covalent Bond). Types of Bond, Covent bond, ionic bond, Coordination covalent bond Coordination bond and Wanderwals force bond. Hybridization and	1	15

Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.

	types of hybridization. SP, Sp^2, Sp^3, dsp^2,sp^3d, sp^3d^2 **(B) Molecular Orbital Theory:** Introduction. M.O. Treatment for H_2 molecules Bonding molecular orbitals and Anti-boding molecular orbitals, Sigma and Pi Molecular orbitals. Formation and configuration of Molecular orbital in a Homo-nuclear diatomic species of A_2 type (H_2; H_2^+; N_2 ;N_2^+ ;O_2 ;O_2^+; O_2^{-2}) Formation and configuration of Molecular orbiral in a Hetero-nuclear diatomic species of AB type (CO; CN; CN^-; NO; NO^-)		
2	**(A) Structure And Properties** Factors affecting to the properties of organic molecule: Intramolecular forces (dipole-dipole interaction, vander waals forces), Electromeric effect, Inductive effect, Resonance effect(draw resonating structures of Nitro benzene, Chlorobenzene, Phenoxide ion, Anillinium ion, Acetate ion), Hyper conjugation (O,P-directing effect of Alkyl group, Stability of Carbonium ion and Free radicals) **(B) Reaction Mechanism** Fission of Covalent bond (With at least one example of each intermediates), Types of reagents.: Nucleophile, electrophile, Free Radical, Types of organic reaction with mechanism, Substitution reactions Nucleophilic & Electrophilic), Elimination reactions (E1& E2), Addition reactions (Nucleophilic & Electrophilic)	1	15

Books Recommended:

Inorganic Chemistry

1.Modern Inorganic Chemistry' by G.F.Liporni, ELBS, 4th edn. coilingEducational. 1983.

2. 'Inorganic Chemistry' D.F.Shriver. P.W.Atkinss and C.H.Longford, 3rd edn, ELPS Oxford University Press, 1999..

3. 'Concise Inorganic Chemistry' J.D.Lee. 5thedn.

4. 'Inorganic Chemistry', D.F.Slirjver, P.W.Atkinss, 3rdedn, Oxferd. 1999.

5. 'Concise Inorganic Chemistry' J.D.Lee, 4thedn, Champman and hall ELBS,1991.

6. 'Inorganic Chemistry' by A.G.Sharp, 3rdedn, ELBS, Longman, 1990.

Organic Chemistry

1. 'Organic reaction and mechanism, P.S.Kalsi, New Age internationalPublishers.

Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.

2. Text book of organic Chemistry. P.S.Kalsi, New Age international Publishers.

3. Organic Chemistry Vol. I&II.S.M.Muklierji, S.P.Singh.R.P.Kapoor.

4, Reaction mechanism in Organic Chemistry, S.M.Mukhergi. S.P.Singh. 3rdedn. Macmillan.

Further Reading:

1. Reaction Mechanism and Reagents in Organic Chemistry, GurdeepR.Chatwal 4thedn, Himalaya Publication House.

2. Text book of Organic Chemistry, ArunBahal, S.Chand.

3. Organic Chemistry, R.Morrison and R.Boyd, 6thedn, Pearson Education 2003.

4. Organic Chemistry. T.W.GrahamSolomons, 4thedn. John Wilay. 1998.

5. Nuclear Chemistry by C.V.Shekhar, Dominent-Publisher. New Delhi.

6. Essentials of physical Chemistr by B.S.Bahal, ArunBahal. G. D.Tuli.

7. Physical Chemistry by P.W.Atkins. 5th edn.Oxferd 1994 7thedn-2002.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Program Name : **B. Sc. Chemistry** **Semester : I**
PROGRAM CODE : SCIUG102
COURSE CODE : SC23PMIDSCCHE102

Type of Course : Practicals Minor (Elective) Discipline Specific Course PMIDSC
Name of Course : Practical's for Fundamentals of chemistry I
Total Marks : 50

Effective from June 2023 Under NEP 2020

Total Credits : 02 Teaching Hours per Week: 04 Lab Teaching Hours per semester:60 Minimum Number Practicals to be Performed: 10	Practicals	External 25 Marks Internal 25 Marks

Course Objectives:

1. To identify the organic components.
2. Preparation of solutions and their standardization.

Course Outcomes:

1. Students will gain a comprehensive knowledge and skills in standardization and preparation of solutions for carrying out reactions.
2. To understand basic methods to identify the compounds on the basis of M. Pt or b. Pt.

Sr.No.	List of Practicals	Credit	Hr
1	**Organic Chemistry (Any six)** 1) Identification of an organic compound through the functional group analysis, Determination of melting point and boiling point. Preparation of suitable derivative. 2) Candidate should perform the analysis of at least 06 compounds. List of compounds **Acids**: Benzoic acid. Cinnainic acid, Phthalic acid.Oxalic acid.Succinic acid. **Phenols**: α-Napthol. β-Naphthol. **Bases**: *p*-Toludine, Diphenylamine. Aniline.Methyl aniline. **Neutrals:** Naphthalene, Anthracene, Acetamide, Benzamide, Acetanilide, m-Dinitrobenzene, Urea, Thiourea, Toluene. Acetone,	1	30

	Benzaldehyde, Methy acetate, Ethyl acetate.Ethanol, 1-Propanol, Glycerol, Chloroform.Carbon tetrachloride, Chlorobenzene, Nitrobenzene.		
2	**Standardization : (Any Four)** 1. Preparation of standard solution of succinic acid and standardization of NaOH / KOH 2. Preparation of standard solution of Na_2S2O_3 and standardization of I_2 solution. 3 .Preparation of standard solution of EDTA and estimation of Ca^{+2} / Mg^{+2} in $CaCl_2$ / $MgCl_2$ solution. 4. Preparation of standard solution of Oxalic acid and standardization of $KMnO_4$ solution. 5. Preparation of standard solution of $K_2Cr_2O_7$ and standardization of $FeSO_4$ solution. 6. Preparation of standard stock (i.e. 0.1 N NaOH solution by w / v method and their different dilutions. 7. Preparation of standard stock solution of HCI by v/v method and their different dilutions.	1	30

Books Recommended:

1.Practical Chemistry : For B.Sc. I, II And III Year Students of All India Universities By Pandey O.P. & et Al. publisher S. Chand's, Paperback December 2010.

2.Basic Principles of Practical Chemistry,

by V. Venkateswaran (Author) publisher S. Chand's, Paperback – 1 January 2012

3. Chemistry In Laboratory-B.Sc.-Sem-I-Vi-Hons.

By Dr.Subhojit Ghosh (Author), Dr.Madhushree Das Sharma (Author), publisher CBCS, Paperback – 1 January 2019.

Further Reading:

1. Practical Chemistry, By Sonia Ratnani (Author), Swati Agrawal (Author), Sujeet Kumar Mishra (Author) publisger Mc Graw Hill, 1st Edition Paperback – 16 September 2020.

2. B.Sc. Practical Chemistry First Year By Paperback, Dr. M.M.N. Tandon, Publisher: Shiva Lal Agarwal & Company, 2020.

Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.