Sankalchand Patel University

Faculty of Science & Humanities

B.Sc. Chemistry (SEM-IV)

In Effect from Academic Year 2022-23

Subject Code: 2SC1030402	**Subject Title: Chemistry- 402**

Course Objective:

Generally knowledge with the following areas in chemistry: analytical, inorganic, organic, physical and biochemistry. The faculty to job effectively and securely in a laboratory environment. Opportunities for student and faculty to interact with alumni and with professional chemists. The fundamental analytical and industrial skills to work and industrial skills to work effectively in the different fields of chemistry. The capacity to produce, divide and characterize compounds using published reactions, protocols, normal laboratory equipment, and current instrumentation.

Teaching scheme (hours) per week		**Credit**		**Theory Marks**		**Practical Marks**		**Total**
Theory	**Practical**	**Theory**	**Practical**	**University Assessment**	**Cont. Assessment**	**University Assessment**	**Cont. Assessment**	
3	**-**	**3**	**-**	**70**	**30**	**-**	**-**	**100**

Subject Contents			
Sr. No	**Topic**	**Total Hours**	**Weigh t(%)**
1	**Boron Hydrides:** • Introduction, Classification, Preparation, properties, structures and use of Diborane, Bridge bonding in B_2H_6 (M.O. and sp^3approach.), Structure of higher Boranes: B_4H_{10}, B_5H_9, B_5H_{11}, B_6H_{10}, $B_{10}H_{14}$.	16	25
2	**Electro Chemistry:** • Introduction of terms. • Oxidation, Reduction, Redox, Anode, Cathode, Electrode, Half Cell, Oxidation& Reduction Potential. • Electrochemical cell (Galvanic Cell) & Representation cell. • Electrochemical Series and its Significance. • Nernst Equation of Cell EMF and single electrode potential. • Describe the Electrode. 1) Metal-Metal ion Electrode. 2) Standard Hydrogen Electrode. 3) Calomel Electrode. 4) Weston standard Electrode. 5) Glass Electrode. 6) Quinhydrone Electrode. • Application of cell potential. 1) Equilibrium constant. 2) Free energy. 3) pH. • Numerical.	16	25
3	**Ultraviolet Spectroscopy:** • Type of electronic transitions.	16	25

	• Effect of conjugation. • Concept of Chromophore and Auxochrome. • Bathochromic, Hypsochromic, Hyperchromic, and Hypochromic shifts. • Woodward –fisher rules. • Problems of conjugated enes, enones and aromatic ketones, aldehydes, acids and esters using empirical rules.		
4	**Cycloalkane:** Nomenclature, Physical and Chemical properties, Preparation methods, Bayer"s Strain theory, Orbital picture of angle strain [Coulson and Moffitt's modification (Bent bond/Banana bond], Sachse Mohr's Concept of Strainless Rings Theory, Heats of combustion and relative stabilities of Cycloalkane. **Name Reactions and Mechanism:** Appel Reaction, Beckmann Rearrangement, Dieckmann Condensation, Friedel-Crafts Alkylation, Knoevenagel Condensation, Malonic Ester Synthesis, Michael Addition, Mannich Reaction, Oppenauer Oxidation, Reformatsky Reaction	12	25

Course Outcome:

- ❖ Have solid foundations in the fundamentals and purpose of current chemical and scientific theories.
- ❖ Are capable to design, carry out, record and analyze the results of chemical experiments.
- ❖ Are capable to use current instrumentation and classical techniques, to design experiments, and to properly record the results of their experiment.
- ❖ Are skillful in problems solving, significant thinking and analytical reasoning.
- ❖ Are capable to identify and solve chemical problems and explore new areas of research.
- ❖ Are capable to use up to date library searching and retrieval methods to obtain information about a topic, chemical, chemical technique, or an issue relating to chemistry.

List of References:

Inorganic Chemistry

1. Advance Inorganic chemistry – Satya Prakash . G.D.Tuli, S.K.Basu, R.D.Madan, S.Chand Voll-II.
2. Advance Inorganic chemistry – Satya Prakash, S.Chand Voll-I. Page No-819-828.

Organic Chemistry

1. Organic Chemistry by Morrison and Boyd.4th ed. Pearson Education- 2003
2. Organic Chemistry by pine, Hendriction, Cram and Hammond 4th ed. By P.S.Kalsi.
3. Advance Organic Chemistry by Jerry March.
4. Advance Organic Chemistry by Arun Bahal and B.S.Bahal.
5. Organic Chemistry Vol. I & II by S.M.Mukherji, S.P.Sing, R.P.Kapoor.
6. Reaction mechanism and Reagents in Organic Chemistry by Gurdeep R.Chatwal 4th ed. Himalayapublic House.
7. Text book of Organic Chemistry by Arun Bahal, B.S.Bhal, S.Chand.
8. Spectroscopy of Organic Compounds 6th ed. by P.S.Kalsi.
9. Organic Chemistry by I.R.Finar.
10. Organic Spectroscopy by Williams and Kemp.
11. Spectroscopic Methods in Organic Chemistry by Dudley H.Williams and Ian Fleming.

Physical Chemistry

1. Advance Physical Chemistry by Gurdeep Raj
2. Physical Chemistry (Question and Answers) by R.N.Madan, G.D.Tully, S.Chand.
3. Principal of Physical Chemistry by Puri, Sharma, Pathania.
4. Chemical Thermodynamics by R.P.Rastogy and R.R.Misra.

5. Essentials of Physical Chemistry by B.S.Bahal, Arun Bahal, G.D.Tully.
6. Physical Chemistry by P.W.Atkins, 5th ed. , Oxferd, 1994, 7th ed. ,2002
7. Physical Chemistry by R.A.Alberty and R.J.Silbey, John Wiley, 1995.
8. Physical Chemistry by G.H.Barrow, 5th ed.Mac Graw Hill,1998,6th ed.
9. Physical Chemistry by W.J.Moore, 4th ed. , Orient Longmans, 1969.
10. Qualitative Analysis by A.I.Vogel, 5th edn.

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