Enclosure- IV A

Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot (Autonomous)

Affiliated to Saurashtra University, Rajkot

SCHEME OF INSTRUCTION AND EXAMINATIONS
For Students Admitted from A.Y. 2016-2017 & Onwards

Allied Course for other Programs

Semester – II

16UBTDA03 & 16UICDA03	**Chemistry-II**	**3 hrs./wk**	**3 credits**

Objectives:

- Understand & reproduce the Nomenclature, learn Physical & Chemical properties and plan the preparation of Organic compounds
- Understand & reproduce the Nomenclature, learn Physical & Chemical properties and plan the preparation of Heterocyclic compounds
- Use concepts of Chemical kinetics for making predictions and explanations of type, rate and order of reactions.
- Develop skills in the scientific method of conducting experiments and determining basic physical properties of chemical entities.

Unit – 1: Fundamental Inorganic Chemistry–II **(06 Hrs.)**

Chemical Bonding

- Types of Bonds: Covalent, Covalent Coordinate, Ionic, Metallic, Van der Waals Forces
- Hybridization:
  - sp – $BeCl_2$
  - sP^2 – BF_3
  - sp^3 – CH_4
  - sp^3d – PCl_5
  - sp^3d^2 – SF_6
- Sidgwick Powell rule
- Valence bond theory and its limitations
- VSEPR theory

Unit – 2: Fundamental Physical Chemistry–II **(08 Hrs.)**

Chemical Kinetics

- Introduction
- Reaction rate, Order and Molecularity of reaction
- Derivation, Characteristics, Half life time & Examples of
  - Zero order reaction
  - First order reaction
  - Second order reaction

- Method for determining the order of reaction: (I) Graphical method (II) Ostwald's isolation method (III) Method of half-life period (V) Integration method
- Energy of Activation and catalysis

Electro Chemistry

- Introduction,
- Reversible and Irreversible cell,
- Type of electrodes,
- Measurement of EMF of cells,
- Thermodynamics of electrode and cell potentials – Nernst equation,
- Standard electrode potential & measurement,
- Representation of electrochemical cell and cell reaction from single electrodes,

Unit – 3: Fundamental Organic Chemistry–II (08 Hrs.)

Heterocyclic Chemistry

- Nomenclature, Preparation and Properties of:
  - Pyrrole, Furan
  - Pyridine, Pyrimidine
  - Pyrazole, Imidazole
  - Quinoline, Isoquinoline
  - Indole

Unit – 4: Fundamental Analytical Chemistry–II (08 Hrs.)

Electro Analytical Techniques

- Basics of electro-analytical methods
- **Conductometry:** Conductance, factors affecting conductance, Kohlrausch law, conductivity cells, applications
- **Potentio and pH metric methods:** Standard reduction potentials, various electrodes, electrodes and cell potential, applications of Potentiometry and pH metry.

Basics of Quantitative Analysis

- Introduction
- Types of quantitative analysis
- Gravimetric analysis
- Volumetric analysis
  - Acid-base titration,
  - Redox titration,
  - Complexometric titration

Unit – 5: Applied Chemistry (06 Hrs.)

Pharmaceutical Chemistry

- Introduction to pharmaceutical chemistry and pharmacopeia.
- Impurities in pharmaceuticals:
  - Sources of impurities,
  - Tests for purity and identity,
  - Limit tests for iron, arsenic, lead, heavy metals, chloride, sulphate
- Pharmaceutical aids:
  - Anti-oxidants,
  - Preservatives
  - Adsorbent
  - Diluents

Semester – II

16UBTDA04 & 16UICDA04	Chemistry Practical -II	2hrs./wk	1 credits

- Titrimetric analysis: Redox & Complexometric (02)
- Organic QA (05)
- Chemical Kinetics (02)
  - First & Second Order kinetics
- Instrumental Methods of Analysis (03)
  - pH, Potentiometry
  - Conductometry

Reference Books:

1. Jeffery, G. H.; Bassett, J.; Mendham, J.; Denny, R. C. (1989) *Vogel's Textbook of Quantitative Chemical Analysis*. Hoboken: John Willey & Sons (ISBN: 0-582-44693-7).
2. Jerry R. Mohrig (2010, Third edition) *Techniques in Organic chemistry*. London: W. H. Freeman & Company (ISBN: 1-4292-1956-4).
3. Svehla, G. (1979, Fifth edition) *Textbook of macro and semi micro qualitative analysis*. London: Logman Publishing group (ISBN: 0-582-44367-9).