Syllabus:

UNIT-I: **9 Hrs.**

A. SI Units:

1. Definitions of the Seven Base Units: Mass, Length, Time, Temperature, Amount Of substance, Electrical current and luminous intensity
2. Derived units and Conversion between units.

B. CHEMICAL CONCENTRATIONS:

1. Mole, molar mass; Calculations in grams and moles;
2. Solutions and their concentrations:
   i. Molar concentrations;
   ii. Analytical Molarity;
   iii. Equilibrium molarity of a particular species;
   iv. Percent concentration;
   v. Parts per million/ billion (ppm, ppb);
   vi. Volume ratios for dilution procedures;
   vii. p-functions;

C. Preparation of standard Solutions and Experimental procedure:

Standard solutions, Primary standard solutions and Secondary Standard solutions

UNIT-II: **9 Hrs.**

INTRODUCTION TO ANALYTICAL CHEMISTRY AND ANALYTICAL METHODS – I:

1. Introduction to Chemical analysis
2. General steps involved in chemical analysis
3. Quantitative Chemical analysis
4. Types of Quantitative Chemical Analysis: Classical methods of analysis and Instrumental methods of analysis with examples
5. Methods of detecting analytes based on,
   a. Physical properties,
   b. Electromagnetic radiations
   c. Electric charge

UNIT-III: **9 Hrs.**

INTRODUCTION TO ANALYTICAL CHEMISTRY AND ANALYTICAL METHODS – II:

1. Description, use and calibration of common laboratory apparatus: Volumetric flask, Burettes and Pipettes
2. Description and use of common laboratory apparatus
   Conical Flask, Weighing bottles, Funnels, Desiccators, Drying ovens
3. pH meter - components, use, maintenance, applications
4. Single pan analytical balance - operation and construction, Errors in weighing and care of an analytical balance.

UNIT-IV: **9 Hrs.**

ERRORS IN CHEMICAL ANALYSIS:

1. Errors and Types of Errors
2. Accuracy and Precision
3. Propagation of uncertainty: Gaussian distribution
4. Mean and Standard deviation;
5. Statistical tests of data: F-test, t-test, Q-test for bad data
6. Calibration curve;
7. Significant figures and their computation rules
8. Laboratory note book
9. Safety with chemicals and Wastes.

UNIT – V:

VOLUMETRICANALYSIS: **9Hours**

1. Titrimetric analysis: Volumetric titrimetry introduction
2. Different terms involved in titrimetric analysis: Titrant, Titrand, The equivalence point, the end point and Indicator.
3. Classification and principles of volumetric methods with examples:
    i. Acid-Base titrations,
    ii. Redox Titrations
    iii. Complexometric Titrations
    iv. PrecipitationTitrations.
4. Indicator; Definition, theories of indicators, different types of indicators
5. Buffer Solutions

Text Books:

1. Douglas A. Skoog and Donald M.West: Fundamentals of Analytical Chemistry.
2. Quantitative chemical analysis by Vogel's 6^{th} and 7^{th} editions

List of Reference Books:

1. Seamus P.J. Higson: Analytical Chemistry.
2. Douglas A. Skoog and Donald M.West: Fundamentals of Analytical Chemistry.
3. Adion A. Gordus: Schaum's Outline of Analytical Chemistry, Tata McGraw-Hill.
4. GaryD.Christian: Analytical Chemistry.
5. Freifelder and Kealy: Analytical Chemistry.
6. Daniel C Harris: Exploring Chemical Analysis.
7. Daniel C Harris: Quantitative Chemical Analysis.
8. Quantitative chemical analysis by Vogel's 6^{th} and 7^{th} editions