

# **CERTIFICATE COURSE**

## **Title of the Certificate Course-Certificate Course in Analytical Chemistry**

### **Objectives:**

- 1) To provide thorough background of chemical principles that are practically important to analytical chemistry.
- 2) To introduce a wide range of techniques useful in modern analytical chemistry.
- 3) To develop skills in students necessary to solve analytical problems.
- 4) The students from Chemical Sciences, Life Sciences and Physical Sciences can opt for this course as it covers analytical techniques are useful in these areas.

**Duration of the Course** – 6 Month

### **Course Structure –**

Paper-I Fundamentals of Analytical Chemistry	100 Marks
Paper-II Practical Course	100 Marks
(80+20 Patterns – 80 External +20 Internal Examinations)	

**Eligibility** - 12th Science

**Mode of Examination** - Annual

# CERTIFICATE COURSE IN ANALYTICAL CHEMISTRY.

## Syllabus

### PAPER-I FUNDAMENTALS OF ANALYTICAL CHEMISTRY

100 Marks

#### **Unit - I Introduction to Analytical Chemistry Lectures - 10L**

Defination, Analytical Process, Range, Review of Fundamental Concepts, Concentration of Solutions, Expression of Analytical Result.

#### **Unit —II: Basic Tools of Analytical Chemistry 15L**

Laboratory Notebook, Laboratory Materials and Reagents, The Analytical Balance, Volumetric Glassware, Preparation of Standard Base Solutions, Preparation of Standard Acid Solutions, Other Apparatus- Handling and Treating Samples, Igniting Precipitates, Gravimetric Analysis, Laboratory Safety.

#### **Unit—III: Technique of Volumetric Analysis 15L**

Unit of Volume, Standard Temperature, Volumetric Apparatus, Measuring -Flasks, Pipettes, Burettes, Weight Burettes, Graduated Cylinders, Storage and Preservation of Solutions in Volumetric Analysis.

#### **Unit— IV: Technique of Gravimetric Analysis 20L**

Precipitation, Filtration, Filter papers, Macerated filter paper, Filter mats, Gooch crucibles, Preparation of Gooch crucible, Munroe Crucible, Crucible Fitted With Permanent Porous Plates, Washing of Precipitates, Technique of Filtration, Drying and Ignition of Precipitates , Care and Use of Platinum Vessels, Perforated Screens for Crucible.

References: . ~

1. Analytical Chemistry, Forth edition by G. D. Christian, John Wiley and Sons.
2. Analytical Chemistry, Sixth edition by G. D. Christian, John Wiley and Sons.
3. A text book of Quantitative Inorganic Analysis Theory and Practice by AI. Vogel
4. Instrumental methods of Chemical Analysis, by Chatwal and Anand, Himalaya Publishing.

## PAPER-II PRACTICAL COURSE

Perform any 12

100 Marks

- 1) Calibration of Glass Ware – Volumetric Flask, Pipette, Burette etc.
- 2) Calibration of Instruments – pH-Metter, Conductometer, Potentiometer, Polarimeter etc.
- 3) Preparation of Standard Solution- 0.1N, 0.05N, 0.1M, 0.05M etc.
- 4) Preparation of Indicators- Phenolphthalein, Methyl Orange, Erichrome Black-T etc.
- 5) Estimation of Ni as Ni-DMG
- 6) Determination of pH of Soil Sample/ water sample
- 7) Determination of conductance of water sample
- 8) Estimation of chloride from water sample (Mohr's Method)
- 9) Determination of Viscosity by using Ostwald Viscometer
- 10) Conductometric titration of Strong Acid with NaOH
- 11) Determination of refractive Index of Given Sample – Acetone, Benzene, Chloroform, Carbon Tetrachloride etc.
- 12) Estimation of Iron from Hematite Ore Gravimetrically.
- 13) Analysis of water for BOD/COD
- 14) Analysis of Aspirin by Conductometric analysis.

### References-

- 1) Textbook of Quantitative Inorganic Analysis 3<sup>rd</sup> Edition by. A. I. Vogel
- 2) Methods in Environmental Analysis- Water soil And Air by P. K. Gupta
- 3) Instrumental methods of Chemical Analysis, by Chatwal and Anand, Himalaya Publishing.