BSAC - SN101
[w.e.f. 2020-21 Admitted Batch]

SEMESTER – I

Course I (ANALYTICAL CHEMISTRY-1) **60 hrs. (4h/w)**

Objectives

The objective of this course is to make students aware about the SI Units, concentration terms, various analytical methods, types of errors in chemical analysis, statistical tests of data and safe usage of chemicals and its waste. And Thermal Gravimetry

Course Learning Outcomes:

By the end of the course, the students will be able to:

Understand about SI units
Learn use of analytical equipment
Know types of errors in chemical analysis
Handle statistical tests of data
Know safety with chemicals and waste.

BASIC PRINCIPLES & LABORATORY OPERATIONS

UNIT – I

I. Basic Concepts: **12hrs**

A. SI Units

i) Definitions of the Seven Basic Units (Mass, Length, Time, Temperature, Amount of substance, Electrical current and Luminous intensity), Derived units, Conversion between units, Significant figures.

B. Chemical concentrations

i) Mole, molar mass

ii) Calculations in grams and moles iii) Solutions and their concentrations:

a) Molar concentration b) Analytical molarity c) Equilibrium molarity of a particular species d) Percent concentration e) Parts per million/billion (ppm, ppb) f) Volume ratios for dilution procedures g) p-functions.

C. Preparation of solutions: standard solutions, primary standards, secondary standards.

UNIT – II **12hrs**

Introduction to Analytical Chemistry and Analytical Methods -I

i) General steps in chemical analysis

ii) Introduction to methods of detecting analytes

Physical, Electromagnetic radiations and Electric charge

iii) Single pan analytical balance: (operation and theory of the balance, construction details, errors in weighing, care of an analytical balance).

UNIT III **12hrs**

Introduction to Analytical Chemistry and Analytical Methods - Ii

Description and use of common laboratory apparatus: Volumetric flasks, burettes, pipettes, meniscus readers, weighing bottles, different types of funnels chromatographic columns, chromatographic jars, desiccators, drying ovens, filter crucibles, rubber policeman.

Calibration and use of volumetric glass ware.

pH meter: components of pH meter, use of pH Meter, maintenance of pH meter, application of data. Laboratory notebook

UNIT – IV **12hrs**

Errors in Chemical Analysis

Types of errors, Accuracy and Precision, Absolute and relative uncertainty, propagation of uncertainty. The Gaussian distribution, mean and standard deviation, confidence intervals. Statistical tests of data (the F test, the t test, Q test for bad data, the method of least squares). Calibration curve. Laboratory notebook. Safety with chemicals and waste.

UNIT – V **12hrs**

Principles of Thermogravimetry:

Thermometric methods – Principles of TGA, DTA and Thermometric titrations – application of $CaC_2O.H_2O$, $(CH_3COO)_2$ Ca. H_2O and HCl Vs NaOH Thermometric titrations.

Teaching Learning Process:

Conventional chalk and board teaching,

Visit chemical industries/ Drug industries to get information about the various instruments used in industries

ICT enabled classes.

Power point presentations. Interactive sessions

To get recent information through the internet.

Assessment Methods:

Presentations by Individual Student

Class tests Laboratory test written assignment(s)