



**THIRD-YEAR OF BACHELOR OF SCIENCE
CHEMISTRY (MAJOR)
REVISED SYLLABUS ACCORDING TO CBCS
NEP2020**

**COURSE TITLE: ANALYTICAL CHEMISTRY-I
SEMESTER-V
W.E.F. 2025-2026**

**RECOMMENDED BY THE BOARD OF STUDIES IN CHEMISTRY
AND
APPROVED BY THE ACADEMIC COUNCIL
Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and
Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal. Sangameshwar, Dist. Ratnagiri-415804, Maharashtra, India**

Academic Council Item No: 02/2025

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangameshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Chemistry
Name of the Class	:	Third Year
Semester	:	Fifth (V)
No. of Credits	:	02
Title of the Course	:	Analytical Chemistry-I
Course Code	:	S306CHT
Name of the Vertical in adherence to NEP 2020	:	Elective
Eligibility for Admission	:	Any student admitted to Third Year of B.Sc. Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	5.5
Pattern of Marks Distribution for SEE and CIA	:	40:60%
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2025-2026
Ordinances /Regulations (if any)	:	

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce and Vid. Dadasaheb Pitre Science College, Devrukh (An Autonomous College Affiliated with University of Mumbai)

Syllabus for Third Year of Bachelor of Science in Chemistry

(With effect from the academic year 2025-2026)

SEMESTER-V

Paper No. IV

Course Title: Analytical Chemistry-I

No. of Credits - 02

Type of Vertical: Elective-I

COURSE CODE: S306CHT

Learning Outcomes Based on BLOOM's Taxonomy:

After Completing the Programme, Student will be able to,

Bloom Level	CO No.	Course Outcome
Remember	CO1	describe the error, accuracy and precision in analysis
Apply	CO2	calculate the measures of central tendency and dispersion
Apply	CO3	apply the theory of complexometric titrations for the estimations of metal ions
Understand	CO4	Understand the theory, principle, instrumentation and applications of FES, AAS, GC and HPLC

Syllabus for Third Year of Bachelor of Science in Chemistry

(With effect from the academic year 2025-2026)

SEMESTER-V

Paper No.– IV

Course Title: Analytical Chemistry-I

No. of Credits - 02

Type of Vertical: Elective-I

COURSE CODE: S306CHT

COURSE CONTENT			
Module No.	Content	Credits	No. of Hours
1	STATISTICAL TREATMENT OF ANALYTICAL DATA & COMPLEXOMETRIC TITRATIONS (15L) 1.1 Results of Analysis (4L) 1.1.1 Errors in analysis and their types 1.1.2 Precision and accuracy in analysis 1.1.3 Corrections for determinate errors 1.2. Nature of Indeterminate Errors (5L) 1.2.1. The true and acceptable value of a result of analysis 1.2.2. Measures of central tendency: mean, median, mode, average 1.2.3. Measures of dispersion: Absolute deviation, relative deviation, relative average deviation, standard deviation, (s, sigma) variance, coefficient of variation 1.3. Complexometric Titrations (6L) 1.3.1. Introduction, construction of titration curve 1.3.2. Use of EDTA as titrant and its standardization 1.3.3. Selectivity of EDTA as a titrant. Factors enhancing selectivity with examples. Advantages and limitations of EDTA as a titrant. 1.3.4. Types of EDTA titrations. 1.3.5. Metallochromic indicators, theory, examples and applications.	01	15

2	OPTICAL METHODS OF ANALYSIS AND METHODS OF SEPARATION (15L) 2.1. Atomic Spectroscopy: Flame Emission spectroscopy (FES) and Atomic Absorption Spectroscopy (AAS) (5L) 2.1.1. Introduction, Energy level diagrams, atomic spectra, Absorption and Emission Spectra 2.1.2. Flame Photometry– Principle, Instrumentation (Flame atomizers, types of Burners, Wavelength selectors, Detectors). 2.1.3. Atomic Absorption Spectroscopy– Principle, Instrumentation (Source, Chopper, Flame and Electrothermal Atomizer). 2.1.4. Quantification method of FES and AAS– Calibration curve method. 2.1.5. Comparison between FES and AAS 2.1.6. Applications, Advantages and Limitations 2.2 METHODS OF SEPARATION (10L) 2.2.1. Gas Chromatography (5L) 2.2.1.1. Introduction, Principle, Theory and terms involved 2.2.1.2. Instrumentation: Block diagram and components, types of columns, stationary phases in GSC and GLC, Detectors: TCD, FID, ECD 2.2.1.3. Qualitative, Quantitative analysis and applications 2.2.2 High Performance Liquid chromatography (HPLC) (5L) 2.2.2.1. Introduction and Principle 2.2.2.2. Instrumentation- components with their significance: Solvent Reservoir, Degassing system, Pumps- (reciprocating pumps, screw driven- syringe type pumps, pneumatic pumps), Precolumn, Sample injection system, HPLC Columns, Detectors (UV–Visible detector, Refractive index detector) 2.2.2.3. Qualitative and Quantitative Applications of HPLC.	01	15
	Total	02	30

Access to the Course

The course is available for all the students admitted for Third Year Bachelor of Science.

Methods of Assessment

The assessment pattern would be 40:60, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

References:

1. D. Harvey, Modern Analytical Chemistry, The McGraw-Hill Pub. 1st Edition (2000).
2. H.S. Ray, R Sridhar and K.P. Abraham, Extraction of Nonferrous Metals, Affiliated East-West Press Pvt. Ltd. New Delhi (1985) reprint 2007.
3. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, Vogel's Textbook of Quantitative Chemical Analysis, Fifth edition, ELBS Publication (1996).
4. D.A. Skoog D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 7th Edition (printed in India in 2001) ISBN Publication.
5. Analytical Chemistry, J.G. Dick, 1973 Tata McGraw Hill Publishing Co. Ltd. New Delhi.
6. Quantitative analysis, Dey & Underwood, Prentice Hall of India, Pvt. Ltd. New Delhi.
7. Fundamentals of Analytical Chemistry, Skoog 8th edition, Saunders college publishing.

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