



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

**COURSE TITLE: 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
No. of Credits	:	02
Title of the Course	:	Chemistry-I
Course Code	:	S301CHT
Name of the Vertical in adherence to NEP 2020	:	Major
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.– I

Course Title: Chemistry-I

No. of Credits - 02

Type of Vertical: Major

COURSE CODE: S301CHT

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to...

Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	describe rotational spectrum of a rigid rotor.
CLO-02	Understand	explain relative lowering of vapour pressure.
CLO-03	Apply	compare nuclear fission and fusion reaction.
CLO-04	Analyse	classify between physical and chemical adsorption.

Syllabus for Third Year of Bachelor of Science in Chemistry

(With effect from the academic year 2025-2026)

SEMESTER-V

Paper No.– I

Course Title: Chemistry-I

No. of Credits - 02

Type of Vertical: Major

COURSE CODE: S301CHT

COURSE CONTENT			
Module No.	Content	Credits	No. of Hours
1	MOLECULAR SPECTROSCOPY Rotational Spectrum: Rotational spectrum of a diatomic molecule, rigid rotor, moment of inertia, selection rule, nature of spectrum. Vibrational spectrum: vibrational spectrum of a diatomic molecule, simple harmonic oscillator, energy levels, zero-point energy, conditions for obtaining vibrational spectrum, nature of spectrum. CHEMICAL THERMODYNAMICS Colligative properties: Vapour pressure and relative lowering of vapour pressure. Elevation in boiling point of a solution, thermodynamic derivation relating elevation in boiling point of the solution and molar mass of non-volatile solute.	01	15

2	NUCLEAR CHEMISTRY Introduction: Types and characteristics of nuclear radiations, measurement of nuclear radiations using G. M. Counter and Scintillation Counter. Nuclear reactions: nuclear transmutation (one example for each projectile), artificial radioactivity, Q - value of nuclear reaction, threshold energy. SURFACE CHEMISTRY Adsorption: Physical and Chemical Adsorption, types of adsorption isotherms. Langmuir's adsorption isotherm. COLLOIDAL STATE Introduction to colloids - Emulsions, Gels and Sols Electrical Properties: Electro-kinetic phenomena - Electrophoresis, Electro-osmosis, Streaming potential, Sedimentation potential.	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. Physical Chemistry, Ira Levine, 5th Edition, 2002 Tata McGraw., Hill Publishing Co. Ltd.
2. Physical Chemistry, P.C. Rakshit, 6th Edition, 2001, Sarat Book Distributors, Kolkata.
3. Physical Chemistry, R.J. Silbey, & R.A. Alberty, 3rd edition, John Wiley & Sons, Inc [part 1]
4. Physical Chemistry, G. Castellan, 3rd edition, 5th Reprint, 1995 Narosa Publishing House.
5. Modern Electrochemistry, J.O.M Bockris & A.K.N. Reddy, Maria Gamboa – Aldeco 2nd Edition, 1st Indian reprint, 2006 Springer
6. Fundamental of Molecular Spectroscopy, 4th Edn., Colin N Banwell and Elaine M McCash Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2008.
7. Physical Chemistry, G.M. Barrow, 6th Edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
8. The Elements of Physical Chemistry, P.W. Atkins, 2nd Edition, Oxford University Press Oxford.
9. Physical Chemistry, G.K. Vemullapallie, 1997, Prentice Hall of India, Pvt. Ltd. New Delhi.
10. Principles of Physical Chemistry B.R. Puri, L.R. Sharma, M.S. Pathania, VISHAL PUBLISHING Company, 2008.
11. Textbook of Polymer Science, Fred W Bilmeyer, John Wiley & Sons (Asia) Ple. Ltd., Singapore, 2007.
12. Polymer Science, V.R. Gowariker, N.V. Viswanathan, Jayadev Sreedhar, New Age International (P) Ltd., Publishers, 2005.
13. Essentials of Nuclear Chemistry, Arnikaar, Hari Jeevan, New Age International (P) Ltd., Publishers, 2011.
14. Chemical Kinetics, K. Laidler, Pearson Education India, 1987.
