



SECOND-YEAR OF BACHELOR OF SCIENCE
CHEMISTRY (MAJOR AND MINOR)
REVISED SYLLABUS ACCORDING TO CBCS
NEP2020

COURSE TITLE: CHEMISTRY-I
SEMESTER-III
W.E.F. 2024-2025

**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:

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	:	Second Year
Semester	:	Third
No. of Credits	:	02
Title of the Course	:	Chemistry-I
Course Code	:	S201CHT
Name of the Vertical in adherence to NEP 2020	:	Major and Minor
Eligibility for Admission	:	Any student admitted to Second 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	:	UG
Pattern of Marks Distribution for SEE and CIA	:	40:60
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2024-2025
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 Second Year of Bachelor of Science in Chemistry

(With effect from the academic year 2024-2025)

SEMESTER-III

Paper No.– 1

Course Title: Chemistry-I

No. of Credits - 02

Type of Vertical: Major and Minor

COURSE CODE: S201CHT

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 Kohlrausch law and its independent migration of ions.
CLO-02	Understand	explain SN1, SN2, SNi mechanism.
CLO-03	Apply	compare atomic and molecular orbitals.

Syllabus for Second Year of Bachelor of Science in Chemistry**(With effect from the academic year 2024-2025)****SEMESTER-III****Paper No.– 1****Course Title: Chemistry-I****No. of Credits - 02****Type of Vertical: Major and Minor****COURSE CODE: S201CHT**

COURSE CONTENT			
Module No.	Content	Credits	No. of Hours
1	<p>1.1 Chemical Thermodynamics-II (6 hr)</p> <p>Free Energy Functions: Helmholtz Free Energy, Gibb's Free Energy, Gibbs-Helmholtz equation, Van't Hoff reaction isotherm and Van't Hoff reaction isochore. (Numericals expected). Partial Molal Properties, Gibb's Duhem equation.</p> <p>1.2 Electrochemistry (4 hr)</p> <p>Conductivity, equivalent and molar conductivity. Kohlrausch law and its independent migration of ions. Applications for determination of degree of ionization and ionization constant of weak electrolyte, solubility and solubility product of sparingly soluble salts. (Numericals expected). Transference number.</p> <p>1.3 Chemical Bonding</p> <p>Directional Bonding: Orbital Approach (5 hr)</p> <p>Covalent Bonding, The Valence Bond Theory-Introduction; Bonding in Polyatomic Species: The role of Hybridization. And types of hybrid orbitals-sp, sp², sp³, sp³d, sp²d² and sp²d sp³d². Equivalent and Non-Equivalent hybrid orbitals Contribution of a given atomic orbital to the hybrid orbitals (with reference to sp³ hybridization as in CH₄, NH₃ and H₂O)</p>	01	15
2	<p>2.1 Reactions and reactivity of halogenated hydrocarbons (3 hr)</p> <p>Alkyl halides: Nucleophilic substitution reactions: SN1, SN2 and SNi mechanisms with stereochemical aspects</p>	01	15

	<p>2.2 Alcohols and Phenols (7 hr)</p> <p>Alcohols: Nomenclature, Preparation: Hydration of alkenes, hydrolysis of alkyl halides, reduction of aldehydes and ketones, using Grignard reagent. Properties: Hydrogen bonding, types and effect of hydrogen bonding on different properties. Acidity of alcohols, Reactions of alcohols</p> <p>Phenols: Preparation, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols.</p> <p>2.3 Molecular Orbital Theory (5 hr)</p> <p>Comparing Atomic Orbitals and Molecular Orbitals. Molecular orbital Theory and Bond Order and magnetic property for Hydrogen to Neon Molecule.</p>		
	Total	02	30

Access to the Course

The course is available for all the students admitted for Second 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. A. Bhal, B.S. Bahl, G.D. Tuli- Essentials of Physical Chemistry: Thermodynamics- Page No. 359-362.
2. Gurdeep Raj, Advanced Physical Chemistry, GOEL Publishing House (2012): Electrochemistry- Page No. 1110-1120.
3. Lee, J.D. Concise Inorganic Chemistry, 5th edition (2011): Molecular Orbital Theory- Page No. 98-107.
4. Bahl and Bahl, A Textbook of Organic Chemistry, S. Chand Publication (2014): Halogenated Hydrocarbons- Page No. 274-300; Alcohols & Phenols- Page No. 314-346.
5. R. L. Madan, Organic Chemistry (2010): Alcohols & Epoxides- Page No. 343-381; Phenols- Page No. 382-407.
6. Brown, Foote, Iverson & Anslyn, Organic Chemistry, 6th edition, Brooks-Cole Publication: Alcohols- Page No. 390-424.

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