



**Shiksha Mandal's
Bajaj College of Science, Wardha
(An Autonomous Institution)
Department of Chemistry**

**Proposed Syllabus for B.Sc. Honors with Chemistry
as Major**

VOCATIONAL SKILL COURSE (VSC)

Course in Chemistry

Syllabus under Autonomy

**(Discussed and approved in BOS Meeting 18-April-2023 to be implemented
from Academic Session 2023-24)**

**Shiksha Mandal's
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VOCATIONAL SKILL COURSE (VSC)

UCH112P - Systematic Chemistry Laboratory Techniques

[60 hrs]

[Credits 2]

Course Outcome

1. To introduce the learners about the basic chemistry laboratory facilities.
2. To train the learners about purification of organic compounds.
3. To train them to purify solids and liquids using simple techniques.
4. To develop the laboratory skills of students.

Course Learning Objective

At the end of this course, the student will be able to:

1. understand theoretical aspects and working principles of chemistry labware and equipment.
2. Synthesize, crystallize, and purify organic compounds
3. Determine melting point and boiling points.
4. Prepare distilled/ deionized water.

Practical list:

- 1) Introduction to common laboratory apparatus and equipment's.
- 2) Purification of organic compounds by crystallization using the following solvents:
 - a) Water
 - b) Alcohol
 - c) Alcohol-Water
- 3) Preparation of Benzoic acid.
- 4) Determination of melting point of crystallized organic compound.
- 5) Effect of impurities on the melting point–mixed melting point of two unknown organic compounds
- 6) Purification of liquid mixture.
- 7) Determination of boiling point of liquid compounds. (Boiling point lower than and more than 100 °C by distillation and capillary method).
- 8) Preparation of distilled/ deionized water.



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SKILL ENHANCEMENT COURSE (SEC)

Course in Chemistry

Syllabus under Autonomy

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Skill Enhancement Course

UCH123P- General Analytical Chemistry

[45 hrs]

[Credits 2]

Course description:

Analytical chemistry is the science of obtaining, processing, and communicating information about the composition and structure of matter. In other words, it is the art and science of determining what matter is and how much of it exists. It is the introduction to the science of making chemical measurements. Learn the fundamentals of information and sample gathering, measuring, and minimizing experimental error. It deals with the principle and techniques of quantitative analysis, that is how to determine how much of a specific substance is contained in a sample.

Course Objectives

The Course is aimed at

- Studying Introduction to analytical chemistry.
- Knowing fundamentals of information and sample gathering, measuring, and minimizing experimental error.
- Understanding the methods of expressing the concentrations of the solution.
- Gaining knowledge of various classical methods of analysis.

Course Learning Outcomes

At the end of this course, the student will be able to:

- explain the fundamentals of analytical chemistry and steps of a characteristic analysis.
- acquire how to make analysis faster, better, and cheaper.
- compare qualitative and quantitative analyses.
- define the general properties of volumetry.
- express the titrimetric & gravimetric analysis methods.
- employ stoichiometric calculations.

Syllabus: -

1. Preparation of standard solution of an acid, base, salt, oxidizing agent, reducing agent by weighing and dilution. Also calculate concentrations in terms of strength, normality, molarity, molality, formality, % by weight, % by volume, ppm, ppb, and mole fraction.
2. Determination of strength of HCl & CH₃COOH using NaOH volumetrically (Discussion of acid-base indicator theories is expected).

3. Determination of acetic acid in commercial vinegar using NaOH.
4. Determination of alkali content in antacid tablet using HCl.
5. Estimation of chloride in given solution by Mohr's titration
6. Determination of volume strength of commercial hydrogen peroxide by redox titration with KMnO_4 .
7. Estimation of nickel in given solution by direct complexometric titration with EDTA using bromopyrogallol red.
8. Determination of total, permanent and temporary hardness of water by EDTA
9. Estimation of sodium carbonate content of washing soda

Reference Books:

1. Quantitative analysis: Day and Underwood (Prentice-Hall of India)
2. Vogel's Textbook of Quantitative Inorganic Analysis-Bassett, Denney, Jeffery and Mendham (ELBS).
3. Analytical Chemistry: Gary D. Christian (Wiley India).
4. Instrumental Methods of Analysis: Willard, Merrit, Dean, Settle (CBS Publishers, Delhi, 1986).
5. Sample Pre-treatment and Separation: R. Anderson (John Wiley and Sons).
6. Stoichiometry: B.I.Bhatt and S.M. Vora, 2nd Edition (Tata Mc-Graw Hill publication)
7. Instrumental Methods of Chemical Analysis: Braun (Tata McGraw-Hill)
8. Advanced Analytical Chemistry: Meites and Thomas (McGraw-Hill)
9. Instrumental Methods of Analysis: G. Chatwal and S. Anand (Himalaya Publishing House)
10. Analytical Chemistry: Problems and Solution- S. M. Khopkar (New Age International Publication)
11. Basic Concepts in Analytical Chemistry: S. M. Khopkar (New Age International Publication)
12. Advance Analytical Chemistry: Meites and Thomas: (Mc Graw Hill)

Mode of evaluation:

Continuous Internal Assessment (No end semester examination)

(Poster presentation / PPT Presentation/ Assignment/ MCQ Test)

Total Mark: 100
