



**FIRST-YEAR OF BACHELOR OF SCIENCE  
CHEMISTRY SKILL COURSE RELATED TO DSC  
REVISED SYLLABUS ACCORDING TO CBCS  
NEP2020**

**COURSE TITLE: SOIL AND WATER ANALYSIS  
SEMESTER-II  
W.E.F. 2023-2024**

**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: 03 dated 08 July 2023

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	:	First Year
Semester	:	Second
No. of Credits	:	02
Title of the Course	:	Soil and Water Analysis
Course Code	:	CHSE102
Name of the Vertical in adherence to NEP 2020	:	Skill Enhancement Course (SEC)
Eligibility for Admission	:	Any 12 <sup>th</sup> Pass seeking Admission to Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Summative at the end of semester
Level	:	UG
Pattern of Marks Distribution for SEE	:	100 %
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2023-2024
Ordinances /Regulations (if any)		

## Syllabus for First Year of Bachelor of Science in Chemistry

(With effect from the academic year 2023-2024)

### SEMESTER-II

Course Title: Soil and Water Analysis

No. of Credits - 02

Type of Vertical: Skill Enhancement Courses

COURSE CODE: CHSE102

### 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	Understand	describe the basic structure, properties of soil and standard parameters of water.
CLO-02	Apply	perform water and soil testing.
CLO-03	Analyse	analyse soil and water in the laboratory and correlate between quality parameters.
CLO-04	Evaluate	explain the quality parameters for the soil and water.

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(With effect from the academic year 2023-2024)

### SEMESTER-II

**Course Title: Soil and Water Analysis**

**No. of Credits - 02**

**Type of Vertical: Skill Enhancement Courses**

**COURSE CODE: CHSE102**

<b>COURSE CONTENT</b>			
<b>Module No.</b>	<b>Content</b>	<b>Credits</b>	<b>No. of Hours</b>
1	<p><b>Water: Resources, Quality and Analysis</b></p> <ul style="list-style-type: none"> <li>○ Introduction: Hydrology World water resource; water resources of India - Different ecosystem of Hydrology Riverine, Estuarine and marine - Status of water quality in India</li> <li>○ Water Quality Water quality parameters and their interaction- physical and chemical characteristics - turbidity, colour – temperature - chemical constituents, taste, colour, acidity, alkalinity - CO<sub>2</sub>, hardness, pH – Methods of testing.</li> <li>○ Environmental pollution - Definition-Types – Water pollution- Causes- Industrial and Domestic effluents – Pesticides –Health Hazards- Control measures- Abatement.</li> </ul> <p><b>Soil: Resources, Quality and Conservation</b></p> <ul style="list-style-type: none"> <li>○ Introduction: Definition of Soil, Concept of Lithosphere, Soil as a natural body, Soil Components: Air, Water, inorganic and organic solids, Formation of Soil, Types of Soils &amp; Basic Concepts.</li> <li>○ Introduction to properties of Soil: A) Physical Properties B) Chemical Properties C) Biological Properties</li> <li>○ Fertility Status of Soils: Fertility status of soils, soil deficiency with respect to macro and micro nutrient components, brief study of micronutrient &amp; macronutrient sources &amp; Importance, remedial measures to overcome deficiency</li> </ul>	01	15
2	<p><b>Practicals on Soil and Water Analysis</b></p> <ul style="list-style-type: none"> <li>○ <b>Soil Analysis</b></li> <li>○ Collection and preservation of samples from general field, horticultural field and green house.</li> <li>○ Study of Instruments in analysis- pH meter, Conductivity meter, Flame photometer,</li> </ul>	01	15

	<p>Spectrophotometer</p> <ul style="list-style-type: none"> <li>○ Determination of pH and Electrical Conductivity of soil</li> <li>○ <b>Water Analysis</b></li> <li>○ Collection and preservation of samples from open well, tap, bore well, river</li> <li>○ Determination of pH and Electrical Conductivity of water</li> <li>○ Determination of Alkalinity</li> <li>○ Determination of Hardness                             <ul style="list-style-type: none"> <li>a. Visits to the sites of Environmental interest's land pollution and water pollution.</li> <li>b. Writing field visit report</li> </ul> </li> </ul>		
	<b>Total</b>	<b>02</b>	<b>30</b>

### Access to the Course

The course is available for all the students who have selected Chemistry as a major DSC.

### Methods of Assessment

Vocational Skill Courses, Skill Enhancement Courses and the courses having laboratory sessions shall be assessed at the end of each semester.

### References:

1. AOAC. 1990. Official Methods of Analysis. Association of Analytical Chemists, Virginia, USA. APHA, 1998. Standard methods for the examination of waters and wastewaters. APHA/AAWWA-WEF, Washington, DC.
2. Text book of soil chemical analysis by Murray Hesse P.R.
3. Chemistry of soil by Firman E. Bear 3. A text book of analysis by T.C. Barua
4. Analytical agricultural chemistry by J.S. Kanwar, S.L. Chopra
5. Practical methods in ecology & Environmental science by R.K. Trivedi, P.K. Goel, C.L. Trisal.
6. Handbook of agricultural sciences By I.C.A.R.
7. Standard Methods for Examination of Water & waste water APHA-AWWAWPCF
8. Manual of Water & waste water analysis, NEERI, Nagpur
9. Text book of water and waste water engineering by H.K. Hussen
10. Water supply & sanitary engineering by Birdie
11. Practical methods in ecology & Environmental science by R.K. Trivedi, P.K. Goel, C.L. Trisal.

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