SKILL COURSE ON 'SOIL AND WATER ANALYSIS'

Open for Third Year Graduate Student w.e.f. 2022-23

Approved by the Board of Studies in Chemistry
And
Finalized 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.Sangmeshwar, 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. Sangmeshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Class to Which the course is Open	:	Third Year, Fifth Semester
No. of Credits	:	03
Title of the Course	:	Soil and Water Analysis
Course Code	:	UCHSK51
Passing Marks		40%
Nature of Course	:	Skill Course
Level	:	UG
Pattern	:	70:30
Status	:	Multidisciplinary- Open to all in the Third Year
To be implemented from Academic Year	:	2022-2023

Syllabus for Skill Course on Soil and Water Analysis

(With effect from the academic year 2022-2023)

Title of the Course: Soil and Water analysis

COURSE CODE: UCHSK51 **Credits - 03**

COURSE CONTENT			
Module No.	**Content**	**Theory Lectures**	**Practical**
1	**Unit I: Water: Resources, Quality and Analysis** ❖ Introduction: Hydrology World water resource; water resources of India - Different ecosystem of Hydrology Riverine, Estuarine and marine - Status of water quality in India ❖ Water Quality Water quality parameters and their interaction- physical and chemical characteristics - turbidity, colour – temperature - chemical constituents, taste, colour, acidity, alkalinity - Co2, hardness, pH – Methods of testing. ❖ Environmental pollution - Definition-Types – Water pollution- Causes- Industrial and Domestic effluents –Pesticides –Health Hazards- Control measures- Abatement.	07	---
2	**Unit II: Soil: Resources, Quality and Conservation** ❖ 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 & Basic Concepts. ❖ Introduction to properties of Soil: A) Physical Properties B) Chemical Properties C) Biological Properties ❖ Fertility Status of Soils: Fertility status of soils, soil deficiency with respect to macro and micro nutrient components, brief study of micronutrient & macronutrient sources & Importance, remedial measures to overcome deficiency ❖	08	---
3	**Unit III: Practical's** **Soil analysis** 1. Collection and preservation of samples from general field, horticultural field and green house. 2. Study of Instruments in analysis -pH meter, Conductivity meter, Flame photometer,	---	

	Spectrophotometer, Atomic absorption spectrophotometer, Kjeldahl's apparatus, Soxhlet apparatus, Muffle furnace, Hot air oven, Bacteriological incubator, BOD incubator, Centrifuge, Autoclave. 3. Determination of pH and Electrical Conductivity of soil 4. Determination of Water holding capacity 5. Determination of Lime and Gypsum requirement 6. Determination Nitrogen 7. Determination of Phosphorus 8. Determination of Potassium 9. Determination of Organic carbon 10. Determination of Total and differential count of microorganisms Water analysis- 1. Collection and preservation of samples from open well, tap, bore well, river, water treatment plants, waste water treatment plants 2. Determination of pH and Electrical Conductivity of water 3. Determination of Alkalinity 4. Determination of Hardness (Total, Permanent & Temporary) a. Determination of Calcium b. Determination of Magnesium c. Determination of Carbonates & Bi-carbonates d. Determination of Chemical Oxygen demand (C.O.D.) e. Determination of Biochemical Oxygen Demand (B.O.D.) f. Determination of M.P.N. of water 5. Identification of fresh water algae & protozoa by MicroscopyField visits for the study of lands and rocks ❖ Visits to the sites of Environmental interests land pollution and water pollution. ❖ Writing field visit report		60

	Total	15	60

Practical Record: A journal comprising one exercise each needs to be submitted by the student at the end of the semester.

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

Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	Remember the Basic structure, properties of soil and standard parameters of water.
CLO-02	Understand	Understand the Quality parameters for the soil and water
CLO-03	Apply	Apply knowledge on water and soil testing
CLO-04	Analyze	Analysis of soil and water in the laboratory
CLO-05	Evaluate	Evaluate and check the different parameters of soil and water to check quality
CLO-06	Create	Create the correlation between quality parameters

Detail Assessment Scheme
The assessment will be in the form of a Continuous Assessment.

A) Theory Component- 30 marks

a) Continuous Internal Assessment (CIA)- 10 marks
One 30 marks test shall be conducted for given semester and the marks obtained shall be converted to 10 marks. The duration for the test shall be of 1 hrs.

b) Semester End Assessment (SEA)- 20 marks
The semester End Examination of 50 marks and 2 hrs duration shall be conducted for each semester and the marks obtained shall be converted to 20 marks.

B) Practical Component- 70 marks

a) Continuous Internal Assessment (CIA)- 40 marks
1) Attendance- 10 marks
2) Journal/ workbook/assignment book- 20 marks
3) Viva- 10 marks

c) Semester End Assessment (SEA)- 30 marks
Semester End Examination comprises one practical/ project/presentation shall be conducted for each semester for 30 marks.

Eligibility for the Course: Candidates pass in SYBSc level with Biology/ Physics/ Chemistry/ Biochemistry/ Microbiology/ Agriculture
Grading Scale

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. APHAAWWA-WEF, Washington, DC.
2. Text book of soil chemical analysis by Murray Heses 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.