

**Certificate Course in Water Analysis and Softening Treatment**  
**Department of Chemistry**

**NARMADA COLLEGE OF SCIENCE AND COMMERCE, ZADESHWAR, BHARUCH**

1. Title of the Course: Certificate Course in Water Analysis
2. Duration: 30 hours (Theory: 10 hours + Field work: 5 hours + Practical: 15 Hours)
3. Pre-requisites: Intermediate or Graduate
4. Coordinator: Dr. Deepika Shah
5. Target Group: UG and PG students

**Course Objective:**

This certificate course is designed to familiarize students with the methods of water analysis and the analytical instruments used to measure the quality of drinking water, industrial waste water and water collected from different sources

The purpose of the course is to develop understanding of water quality criteria, standards, and treatment methods

This course on water quality analysis is an attempt to equip students with theoretical background and practical skills to participate in water quality ensuring practices.

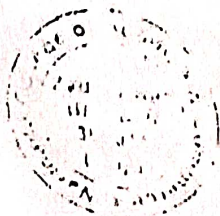
**Course Outcome:**

After the completion of course, students will be able,

1. To define the quality parameters used to characterize drinking water and waste water
2. To explain the general properties of water
3. To understand water resources and water conservation
4. To be familiar with the method for the determination of water quality parameters
5. To analyze the standard water quality parameters
6. To make solution of different concentration, handling glassware, equipment and instruments

**Content:**

Sr. No.	Topic	Teaching Hours
Unit 1:	Introduction Physical and Chemical properties of water, Water resources, Water pollution, Types of water pollutants, sources of water pollutants, Trace element in water	02



Unit 2:	Need for water quality analysis, Water quality guideline and standards (Drinking/Industrial/Agricultural use), Water quality parameters like turbidity, color, taste, pH, acidity, alkalinity, chemical constituents, hardness, dissolved oxygen etc.	03
Unit 3:	Hard and Soft water Hardness of water, Degree of Hardness, Methods to express the hardness of water	02
Unit 4:	Water purification treatment: Industrial water treatment (Softening of water), Household water treatment, Municipal water treatment, Disinfection of water, Desalination process	03
Unit 5:	Field work Collection of water samples from open well, tap, bore well, river, water treatment plant, waste water treatment plant, different industries like sugar factory, Pulp and Paper mill, Textile Industry, Food industry, Domestic waste water etc.. (Field work)	05
Unit 6:	Practical 1. Determination of total hardness of water 2. Determination of pH of water 3. Determination of conductivity of water 4. Determination of TDS in water 5. Determination of TSS in water 6. Determination of acidity in water 7. Determination of alkalinity of water 8. Determination of BOD 9. Determination of COD 10. Determination of DO 11. Determination of turbidity 12. Determination of Oil and Grease 13. Determination of ammonical nitrogen	15

Reference Book:

1. Standard methods for examination of water & waste water APHA-AWWA-WPCF
2. Manual of water & waste water analysis, NEERI, Nagpur
3. Text book of water and waste water engineering by H.K. Hussen
4. Environmental Chemistry by Anil Kumar De
5. Standard Methods for the Examination of Water and Wastewater by E.W. Rice (Editor), R.B. Baird (Editor), A.D. Eaton (Editor), American Public Health Association.