

## **Certificate Course on Water Quality Management**

**This course contains modules which focus on employability and skill enhancement**

### **Syllabus**

**Credits -2**

**Hours 30**

#### **Learning objectives:**

- To create awareness on the different sources of water and their pollution
- To provide a knowledge on water quality parameters and their relevance
- To expertise the learners in sampling and analysis of potable water samples
- To familiarize the various treatment methods – conventional and modern methods
- To focus on the recent advances in water quality management.

#### **Expected outcomes:**

By the end of this course, the student will be able to

- Know water quality characteristics of water sources including: Groundwater sources, Aquifers, Surface Water sources etc.
- Describe the sampling procedures for different parameters
- Analyze water samples and interpret the results to ensure adequate water quality
- Apply the various treatment methods to required samples to maintain water quality

### **Theory paper - Water Quality Management for Sustainable Development**

**(15 hours)**

#### **Module I- Water Quality Management**

**(3 hours)**

Surface water, water quality evaluation and criteria- Ground water - ground water contamination-Principal sources- harmful effects in man, Soil- Groundwater Protection- Source control and regulatory measures, Recent advances in water quality management.

#### **Module II- Water Quality Parameters and its Assessment**

**(6 hours)**

Water Sampling and preservation, Sampling methods, Water quality parameters- temperature, pH, EC, Colour, turbidity, total dissolved solids(TDS), acidity, alkalinity, total hardness, chloride, fluoride, sulphate, phosphate, nitrate, DO, BOD, COD, Total Coliforms.

#### **Module III- Water Treatment**

**(6 hours)**

Introduction, traditional methods of water treatment, modern treatment methods- separation of suspended matter, Decolourisation of water, Removal of iron and manganese - ion exchange, oxidation, chlorination, aeration, flotation. Sedimentation, filtration, ion exchange, desalination, reverse osmosis, electrodialysis. Disinfection- boiling and chlorination, UV light disinfection, ozone in water treatment, wastewater reuse.

### Practical paper - **Water Quality Analysis**

**(15 hours)**

Analysis of water quality parameters-temperature, pH, EC, Colour, turbidity, total dissolved solids(TDS), acidity, alkalinity, total hardness, chloride, fluoride, sulphate, phosphate, nitrate, DO, BOD, COD, total coliform.

#### **References:**

1. APHA (American Public Health Association, American water works Association and water pollution control federation). (1992), Standard methods for the examination of water and waste water, Am. Publication Health Association, Washington, DC, USA.
2. NEERI, Manual on water and waste water Analysis, National Environment Engineering Research Institute Nagpur, (3402) (1986).
3. WHO, guideline for drinking water quality Geneva (1984).
4. Environmental Protection Agency (EPA). 1990. Fact sheet: drinking water regulations under the Safe Drinking Water Act. Washington, DC: EPA Office of Drinking Water Criteria and Standards Division.
5. American Water Works Association (AWWA). 2001. Reinvesting in drinking water structure: dawn of the replacement era. Denver, CO: AWWA.

#### **Method of Evaluation:**

Written Examination – Objective Type Questions

(1 hour - 30 Marks)

Skill Test – Analysis of any one water quality parameter

(30 minutes – 20 marks)