



Youth Employability Skill Training Co-operative Educational Society Ltd.
AN AUTONOMOUS VOCATIONAL TRAINING INSTITUTION
(NATIONAL YOUTH PROGRAMME)

COURSE NAME: DIPLOMA IN WATER QUALITY MANAGEMENT

DURATION : 6 Months

SUBJECTS:

<u>SL. NO</u>	<u>SUBJECTS</u>	<u>TOTAL MARKS</u>
1	POTABLE WATER MANAGEMENT	50
2	WASTE WATER MANAGEMENT SYSTEM	50
3	PRACTICAL/VIVA	100

SYLLABUS:

POTABLE WATER MANAGEMENT

Course Outcome

- To learn about the properties, types, sources, collection methods of water.
- Impart the knowledge about uses of water and their sources of biological contamination
- Provide the knowledge of chemical contaminations in water and their impact on human welfare.
- Giving technical details on biological and chemical analysis of water.
- Providing knowledge about treatment of potable water.

Unit I

Water – Importance and Properties. Sources of potable water: Ground water and types, Surface water and types - River, Lakes and Water reservoirs. Collection methods of water - Direct and indirect collection. Transport of water – Vehicles, Pipes and canals.

Unit II

Uses of water – Domestic usage for human and animals, industrial, agriculture, power generation and recreation. Sources of microbial contamination – Man made contaminations, biological industries and live stocks, agricultural. Water borne diseases – bacterial, fungal and viral diseases.

Unit III

Sources of Ground water chemical contents – Salt water, Hard water, Alkaline water and Soft water. Sources of chemical contamination of Surface water – Industrial, Agricultural and Man made contaminations. Types of chemical contaminants and their effect on human welfare.

Unit IV

Chemical analysis of water – Colour, pH, Total hardness, Alkalinity, Anions and Cations concentration. Total Dissolved Solids (TDS) and Total Suspended Solids (TSS), Biological and Chemical oxygen Demand. Microbial assessment of water- Total Viable Count (TVC) and Filtration count, Most Probable Number (MPN)Test.

Unit V

Potable water Treatment techniques – Screening, Aeration, Coagulation and Flocculation, Sedimentation, Filtration, Chlorination and Reverse Osmosis treatment.

Reference Books

1. Gurcharan Singh – Water Supply and Sanitary Engineering Vol: I & II , Standard Publishers & Distributors , New Delhi.
2. APHA, (2002), “Standard Methods for Examination of Water and Wastewater”; 21st Edition. APHA (American Public Health Association) Handbook, 1998.
3. Soil, Plant and Water Analysis - P. C. Jaiswal. Kalyani Publishers
4. Chemical and Biological Analysis of Water - Dr. R. K. Trivedy and P. K. Goel. Environmental Publications

WASTE WATER MANAGEMENT SYSTEM

Course Outcome

- Acquire the information about types of sewages and their source of contaminations.
- Impart the knowledge about the ill effect of sewage to human health and impact on environmental changes.
- Provide the technical knowledge about common and microbial pollution analysis.
- Giving broad technical details on waste water treatment methods.
- Providing knowledge about post treatment analysis of waste water.

Unit – I

Classification of waste water : Greywater, Blackwater and industrial wastewater. Major source of pollutants –Industrial waste, fertilizers and pesticides, radioactive, domestic waste, mining activities, marine, agricultural and animal wastes.

Unit – II

Biology of Sewage water – Indicator organisms and Planktons. Impact of sewage on public health - Diarrhea, Cholera, Dysentery, Typhoid, and Hepatitis A. Effects on environment – Eutrophication, Algal blooming and alteration in ecosystem. Domestic waste disposals and treatment – Septic tanks, Biogas, Composting.

Unit – III

Analysis of waste water: Indirect pollution analysis – BOD and COD. Microbial analysis – Most Probable Numbers. Total viable count of microbes and Filtration analysis. Analysis of Total Suspended Solids and Total Dissolved Solids.

Unit-IV

Primary treatment of sewage water – Screening, Sedimentation and Skimming. Secondary microbial treatment of waste water – Aerobic and Anaerobic treatments, Trickling filters, Fluidized and Packed bed reactors. Tertiary treatment – Aeration, Chlorination, Reverse Osmosis. Sludge treatment – Composting, Land filling and Heaping.

Unit – V

Post treatment analysis – Physicochemical analysis of treated water - BOD, COD and microbial assessment of recycled water. Reclamation of water for reuse – Agricultural, industries, Recreational and environmental uses.

Reference Books

1. Stuetz R and T Stephenson. 2009. Principles of Water and Waste Water Treatment Processes. IWA Publishing, Alliance House, UK. 214p.
2. Water Resources Systems - Subhas Chander and Rajesh Prasad, Jain Brothers.
3. Water Resources System Planning and Management- S.K.Jain and V.P.Singh,
4. Water Treatment - Principles and Design by J.M.Montgomery, Wiley, 1985.
5. L. F. Oeming, Stream Pollution Problems of the Electroplating Industry, SewageWorks Journal, Vol. 18, 4, 1946, pp. 678-685.
6. Manual on Water Supply and Treatment by Central Public Health and Environmental Engineering Organization, Ministry of Urban Development, New Delhi.

**PRACTICAL – PHYSICO CHEMICAL ANALYSIS OF WATER,
MICROBIAL ANALYSIS OF WATER, DIRECT AND INDIRECT
ASSAY OF WATER POLLUTION**

- Acquired Knowledge about units of chemical concentration and standards.
- Provide technical knowledge of physico- chemical analysis of water
- Learn the key techniques for microbial analysis of water.
- Afford the knowledge about direct and indirect analysis of water pollution.

Experiments:

- Preparation of Molarity, Normality and Molality solutions
- Standard Graph Preparation
- pH Determination
- Determination of Alkalinity
- Estimation of Anions
- Estimation of cations
- Estimation of Calcium and Magnesium (Hardness)
- Enumeration of Total coliform Bacteria in water by Most Probable Number technique
- Enumeration of Bacteria by Standard Plate Count
- Enumeration of Bacteria by Membrane Filtration Technique
- Estimation of Biological Oxygen Demand
- Estimation of Chemical Oxygen Demand
- Estimation of Total suspended solids and Total dissolved solids.
- Demonstration of instruments used for of water quality testing.