T. K. M. COLLEGE OF ARTS AND SCIENCE

Kollam-691005, Kerala

DEPARTMENT OF BIOCHEMISTRY

CERTIFICATE COURSE ON

WATER QUALITY ASSESSMENT AND MANAGEMENT

For the academic year 2023-24

Course Co-ordinator: Dr. HARISANKAR. H. S,
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Certificate Course on Water Quality Assessment and Management

Curriculum

Course Overview: The curriculum aims to better understanding about water quality, pollution and its management.

TOTAL TEACHING HOURS: 35

THEORY: 20

TRAINING ON WATER QUALITY ASSESSMENT: 15

Objectives

Obtain knowledge and better understanding of water quality, water pollution and its management.

Create awareness about water quality management

Generate experience in water quality analysis experiments

Course Outcomes

To impart knowledge of water quality and its importance

To understand water quality management strategies

To develop skill in skill in experiments, practical work, water sampling, equipments and handling chemicals

To develop experience in collection and interpretation of data from water analysis

To provide practical experience to students as a part of course to develop scientific ability for water quality analysis and to work in laboratories

Assessment Procedure:

Assessment is done through continuous evaluation through class tests, attendance, assignments and final evaluation (MCQ test)

A Grade: 80% and above

B Grade: 60-79%

C Grade: 40-59%

D Grade: Below 40%

COURSE CONTENT

Theory

Unit I Physiochemical properties of water (5 hours)

Introduction to water quality. Aqueous nature of life. Importance of physiochemical properties of water temperature, colour, turbidity, odour, taste, pH, conductivity, dissolved oxygen, alkalinity and hardness. Microbial contamination and water born pathogens. Sampling techniques and preservation of water samples for analysis.

Unit II Water Quality Assessment (5 hours)

Sources and causes of water pollution. Point source and non-point source pollution. Impact of water pollution on human health and the environment. Water quality standards and regulations. Water quality indices and parameters.

Unit III Water Quality Management (5 hours)

Water quality monitoring and data collection methods. Physiochemical parameters- Temperature, Colour and turbidity, pH measurement, Conductivity measurement, Dissolved oxygen measurement, Alkalinity and hardness measurement, Microbial analysis techniques (Coliform, E. coli), Testing for other specific contaminants (heavy metals, pesticides), Interpreting water quality data and reporting.

Unit IV Methods of Purification of Water for Drinking (5 hours)

Overview of water treatment processes, Coagulation and flocculation, Sedimentation and filtration, Disinfection techniques (chlorination, ozonation, UV treatment), Adsorption methods (activated carbon), Reverse osmosis and other membrane-based processes, Advanced treatment techniques (aeration, ion exchange).

Practical Water Analysis (15 hours)

Hands-on experience with selected water sampling techniques and following parameters

1. Laboratory analysis of physiochemical parameters

Temperature, colour, turbidity, and odour measurements

pH measurement using a pH meter

Conductivity measurement using a conductivity meter

Dissolved oxygen measurement

Alkalinity and hardness titrations

Microbial analysis techniques (Coliform, *E. coli*)

Testing for specific contaminants (heavy metals, pesticides)

2. Interpretation of water quality data and preparation of reports
3. Field visits to water treatment plants and testing laboratories

Note: The syllabus may be subject to minor adjustments based on the availability of resources and the specific needs of the participants.