

## **P.G. AND RESEARCH DEPARTMENT OF CHEMISTRY**

### **ST. STEPHEN'S COLLEGE PATHANAPURAM**

#### **Certificate course in "water quality analysis"**

##### **Course Details**

Minimum Duration: 6 Months

Maximum Duration: 1 Year

Course Fee: Nil

Minimum Age: 18

Maximum Age: No bar

##### **Who Should Apply?**

The certificate in **Water Quality Analysis (WQA)**, is open to all students or person with a MSc and B.Sc. [Chemistry(Allbranches)/ Zoology/ Botany/ / Physics/ Mathematics

- Common people and students or active personnel's from environmental organizations who want to increase their environmental expertise.
- Other professionals seeking to apply their skills to environmental work.
- Active personnel working with communities on environmental issues.

##### **About the Course**

The core problem faced by the world during last three decades and increasing with every passing year is the permanent and crucial damage to earth by environmental pollution due to rapid industrialization and urbanization. Water pollution caused by the introduction of any undesirable physical, chemical or microbiological material into water bodies like lakes, rivers has made marine life no longer hospitable and there are two types of contamination sources: point and non-point sources. Point sources are the source of contamination, that we can point directly which include humans who pollute water with large scale disposal of industrial waste products, garbage, landfills, leaking gasoline storage tanks, leaking septic tanks, accidental spills and other household waste. Non-point sources can be less apparent which include naturally occurring

contaminants, such as excess metal ions concentration like iron, arsenic, thorium, uranium, cobalt, zinc and radiological runoff from parking lots, organic pollutants like antibiotic, pesticides and fertilizers that infiltrate the soil and reached to aquifer, acid rain, thermal pollution and the depletion of dissolved oxygen exaggerate could also pollute the water bodies.

One by third of the universes constitute water, the scarcity of water for drinking and other necessity is a major concern in the present social system due to the water pollution. Hence the purification of water from pollutants is very necessary present situation. Though the ground water is mainly used for the drinking purpose, other water surface sources like rivers, canals, and lakes are also exploiting for the same purpose. Chemical, physical, biological and physiological contaminants are present in the polluted water, among these, the chemical pollutants in the water cause more adverse effect to the aquatic system than any other type of contaminants. The aim of the course is to *'make a Post graduate and graduate science student aware about analytical procedures and permissible limits of contaminants in soil and water'*.

The certificate course in **Water Quality Analysis (WQA)**, offered by the Research and post graduate department of Chemistry, St. Stephens College Pathanapuram provides professional training and awareness for careers Water quality analytical field with a chemistry background. This mission could be achieved through imparting practical knowledge about water contamination and doing analysis of real samples. The interdisciplinary curriculum is designed to clarify career goals for those who may be considering to do analytical lab works in ground water board, NCESS, Geology related departments where the ground water analysis are doing , as well as for common people suffering problems in drinking water. The department has collaboration with National Centre for Earth Science Studies (NCESS), Trivandrum for providing instrumental facilities.

**Water Quality Analysis (WQA)**, includes the following aspects of Water quality aspects

- Environmental and manmade reasons of increasing contamination in water
- Reasons for water mental pollution
- Classification of different type of water pollution
- Principles involved in different analytical techniques sufficient to analysis of water quality

- Create awareness about the environmental issues and maximum permissible limit of chemical constituents in water
- Impart knowledge about biological analysis of water and soil Clean water and air
- Scheduled water analysis

## CERTIFICATE COURSE

(Offered by Department of Chemistry, St. Stephen's College Pathanapuram)

Water Quality Analysis (Total credit: 30) CH 2023

Total Hours: 50

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### Paper-1

#### INSTRUMENTATION AND BASIC CONCEPTS

**MODULE I** (5 hours) Analytical instruments –Brief outline. Flame Emission Spectrophotometer (FES), UV-Vis spectrophotometer, Atomic absorption spectrophotometer (AAS), Biological analyzers; Autoclave, incubator, water analyzer for pH, salinity and electrical conductance; Units in which the quality parameters are reporting during each analyzing.

**MODULE II** (10 hours) Inorganic materials leading to toxicity of water – Its Hazardous value, safety measures and precautions. Maximum permissible limits of toxic contaminants, Possible Reasons for water and soil contamination, Control of water pollution – ISI/BSI standards of drinking water, Organic materials causing water pollution, Chemically Oxygen Demanded COD, Biologically Oxygen Demanded BOD analyses, Adverse effect in biological system– pesticides, detergents, antibiotics, fertilizers; Detailed study about detergent contamination in ground water.

**MODULE III** (5 hours) Sea water intrusion, Quality of groundwater – methods of collection and analysis of water samples as related to Ground water investigations; Determination of Soil texture- its significance.

## **PAPER-2**

### **Practical: Water quality analysis (30 hrs)**

#### **One seasonal collection of 50 ground water samples**

1. Determination of Hardness; total hardness, calcium hardness and magnesium hardness.
2. pH, salinity and total dissolved salt determination
3. Sulphate, chloride, nitrate, phosphate content of ground water determination
4. Water analysis procedures to determine the various toxic metals using AAS; Cu, Fe, Cr, Cd
5. Determination of soil texture and classification of silt, clay, sand percentage
6. Lab visit and analysis report

#### **References**

1. Environmental Chemistry, A.K. De.
2. Environmental Chemistry, P.S. Sindhu
3. Essentials of environmental studies, S.P. Misra & S.N. Pandey
4. Davis, Stanley N. and Deweist, Roger J. M. Hydrogeology. John Wiley & Sons, 1966
5. Krauskopf K. B. Introduction to Geochemistry.
6. Davis, Stanley N. and Deweist, Roger J. M. Hydrogeology. John Wiley & Sons, 1966
7. Chemical and biological methods for water pollution studies – P.K. Goel and R.K. Thrivedi
8. Analytical Chemistry: (J.W) G. D. Christian
9. Instrumental Methods of Inorganic Analysis(ELBS) : A.I. Vogel



**ST. STEPHEN'S COLLEGE, PATHANAPURAM**

*Re-accredited by NAAC at B++Grade with CGPA 2.91*

**Post Graduate & Research Dept. of Chemistry**

*invites application for*

***Certificate Course  
2023-2024***

*on*

**"Water Quality Analysis"**

***Duration: 6 months***

More details contact,  
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