



Dempo Charities Trust's
DHEMPE COLLEGE OF ARTS & SCIENCE
Miramar, Panaji-Goa

Limnological Assessment of Potable Water using Physico-chemical and Microbiological parameters

[2 Credits 30 hours]

Course Objectives:

- 1) To enable students to acquire knowledge of various techniques used in water analysis.
- 2) To estimate the different physico-chemical and biological parameters in drinking water and to determine whether water is hygienically safe and fit for consumption.

Course Contents:

I) Introduction to microbiological parameters of water. [2 contact hours]

1. Water quality of drinking water and WHO standards of drinking water.
2. Study of *E. coli*, *Pseudomonas aeruginosa*, and *Salmonella Typhimurium*
3. Effect of micro-organisms on human health.
4. Introduction to microbiology.

II) Microbiological techniques

1. Sterilization Techniques- Autoclaving, drying of apparatus, making cotton plugs, Laminar air flow, traditional way b/w burner [3 contact hours]
2. Preparation of different media- Nutrient broth, Nutrient agars, MacConkey Agar, -control And test samples [3 contact hours]
3. Serial dilution technique for plate count. [3 contact hours]

4. Inoculation of sample and detection of presence. [3contact hours]
5. Isolation of Pure cultures of bacteria by streak plate method. [3contact hours]
6. IMViC test [3contact hours]

III) Introduction to chemical parameters of water: [2 contact hours]

1. Sources of water supply
2. Water standards (WHO) for potable use-physical characteristics such as turbidity, colour, and odour.
3. Chemical characteristics such as pH, chlorides, hardness, phosphates, nitrates, total dissolved solids, DO, total Fe content, Acidity, Alkalinity, sulphates, free CO₂, electrical conductivity.
4. Aspects of water pollution.
5. Treatment of water for domestic use.

IV) Chemical Analysis of Water:

1. Colour, odour, taste, pH, turbidity and total dissolved solids: [2 contact hours]
2. Total Acidity, total Alkalinity, chlorides and free CO₂: [2contact hours]
3. Total hardness, calcium content, sulphates and nitrates: [2contact hours]
4. Total Fe content, total phosphorous : [2 contact hours]

Learning outcomes:

- 1) Students after completing this course will gain adequate knowledge of the various methods used to conduct analysis of water samples.
- 2) They can utilise this knowledge to test the potability of water in their locality and thus serve the community in the larger interests.
- 3) They can also be gainfully employed in water testing laboratories.

References: -

- 1) N. Manivasakam, Physico-Chemical Examination of water, sewage and Industrial Effluents-Pragati Prakashan (Meerut) sixth Edition 2010.
- 2) Mendham, J. Vogel's Quantitative Chemical Analysis, Pearson, 2009.
- 3) Jain, P.C. & Jain, M. Engineering Chemistry, 16th edition, August 2010-Dhanpat Rai Publishing company (P) Ltd -New Delhi
- 4) Dean, J. A. Analytical Chemistry Notebook, McGraw Hill.

- 5) Day, R. A. & Underwood, A. L. Quantitative Analysis, Prentice Hall of India.
- 6) Harris, D. C. Quantitative Chemical Analysis, W. H. Freeman.
- 7) Cappucino J and Sherman N. Microbiology: A Laboratory Manual. 9th edition, 2010 Pearson Education limited.
- 8) Green L. H and Goldman E. Practical Handbook of Microbiology, 3rd Edition, 2015- CRC Press
- 9) Tortora G. J. , Funke B. R. , and Case C. L. Microbiology: An Introduction. 9th edition 2008 Pearson Education.
- 10) Dubey R.C. and Maheshwari D.K Practical Microbiology – Revised edition. S. Chand Publication.
- 11) Basic Practical Microbiology: A Manual by Microbiology Society- 2016 Publication.

Determination of PhysicoChemical Parameters of Water Sample.

Academic Year 2019-20

D. C. T.'s Dhempe College
Panjim - Goa.

Class TYBSc
Month Nov

27/11 (1hr)
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Course Coordinator



**Dempo Charities Trust's
Dhempe College of Arts and Science
Panaji, Goa**

Department Of Chemistry

Report of the long term non-conventional course entitled “**Determination of physicochemical and microbiological parameters in drinking waters**” for the academic year 2019-20.

The department of chemistry conducted a long term integrated (faculty of Chemistry and Zoology) value added non-conventional course entitled “Determination of physicochemical and microbiological parameters in drinking waters” for SY BSC students.

Duration of the course is of 33 hours which comprises of 4 sessions of lectures of one hour each and 29 hours of practical sessions. The intake capacity for the course is 25 students with a fee of Rs 1000/- per student. This year 16 students were enrolled for the course.

The course syllabus includes introduction to microbiological and physico-chemical parameters of drinking water, in addition there are practical sessions of determination of microbiological as well as physical and chemical parameters of drinking waters. Course objective is to equip students with practical knowledge of determination of water quality to qualify whether water is hygienically safe and fit for consumption.