# Lecture Plan

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| **Name of the College: Government College of Arts, Science and Commerce Sanquelim - Goa** | | |
| **Name of Faculty: Mr. Sujay S. Sawant** | **Subject: Chemistry (Water and Soil Analysis (SEC ))** | |
| **Paper code: CHC 141** | **Program: F.Y.BSc** | **Division: -** |
| **Academic year: 2024 - 2025** | **Semester: II** | **Total Lectures: 15** |

**COURSE OBJECTIVES**

- To define the various terms encountered in sampling and study the techniques involved.
- To study methods that can be employed for the determination of the various physico-chemical parameters of water and soil.

**Course Outcome:**

At the end of the course students will be able to

CO1 : Understand the fundamentals and techniques of water and soil sampling.

CO2 : To describe the methods for the determination of various physico chemical parameters of soil and water

**Student Learning Outcome :**

At the end of the course students will be able to

- Explain different terms involved in Sampling technique
- Differentiate between random, systematic, multistage and sequential sampling
- Apply fundamental sampling techniques for liquids and solids
- Explain composition of soil, including concepts like pH, chelation, and the role of indicators in soil analysis
- Describe water quality parameters like dissolved oxygen, BOD, COD, and their environmental implications.

| Month | Lecture From | Lecture To | No. of lectures allotted | Topic, Subtopic to be covered | Exercise/ Assignment | ICT Tools | Reference books |
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| **December** | 09/12/24 | 13/12/24 | 1 | Sampling Techniques:<br>Terms encountered in sampling: - the population /universe, Sample, Sampling unit, increment, the gross sample, the sub sample, Analysis sample | Define terms | Chalk and Board | [1-5] |
| | 15/12/24 | 20/12/24 | 1 | Bulk ratio, Size to weight ratio, Multistage sampling, Sequential sampling | | Chalk and Board | [1-5] |
| | 23/12/24 | 31/12/24 | **CHRISTMAS BREAK** | | | | |
| **January** | 02/01/25 | 10/01/25 | 1 | Random sampling, Systematic sampling, Preservation, storage and preparation of sample solution. | Differentiate Random and Systematic sampling | Chalk and Board | [1-5] |
| | 13/01/25 | 17/01/25 | 1 | Sampling of Liquids | Identification of suitable equipments for the sampling of homogenous, heterogenous (or static) and non static liquids | Chalk and Board | [1-5] |
| | 20/01/25 | 24/01/25 | 1 | **ISA 1** | -- | -- | -- |
| | 27/01/25 | 31/01/25 | 1 | Sampling of Solids | Identification of equipments required for sampling od Compact and Particulate solids | Chalk and Board | [1-5] |
| **February** | 01/02/25 | 07/02/25 | 1 | Analysis of soil:<br>Composition of soil, Concept of pH and pH measurement | Discuss composition of soil | Chalk and Board | [1,2] |
| | 10/02/25 | 15/02/25 | 1 | chelation, chelating agents, use of indicators , Bulk density | | Chalk and Board | [1,2] |

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| | 17/02/25 | 22/02/25 | 1 | Specific gravity, moisture content, water holding capacity, pH, electrical conductivity | | Chalk and Board | [1,2] |
| | 24/02/25 | 28/02/25 | 1 | **ISA 2** | -- | -- | -- |
| **March** | 03/03/25 | 07/03/25 | 1 | Alkalinity , calcium, magnesium and organic matter. | | Chalk and Board | [1,2] |
| | 10/03/25 | 15/03/25 | 1 | Analysis of water:<br>Definition of pure water, sources responsible for contaminating water;<br>water purification methods (For domestic water) | Discuss sources responsible for contaminating water | Chalk and Board | [1,2,4] |
| | 17/03/25 | 21/03/25 | 1 | water purification methods (For domestic water and industrial waters). | | Chalk and Board | [1,2,4] |
| | 24/03/25 | 31/03/25 | 2 | Water analysis: Dissolved oxygen, free carbon dioxide, B.O.D., C.O.D. | Differentiate between B.O.D and C.O.D | Chalk and Board | [1,2,4] |
| **April** | 07/04/25 | 11/04/25 | 1 | Water analysis : total carbohydrates + Revision | | Chalk and Board | [1,2,4] |

**References :**


1. K. De, Environmental Chemistry. New age international Publishers, 4th Edition. 2007
2. B. K. Sharma, Environmental Chemistry. Krishna Prakashan Media (P) Ltd. 2014.
3. Svehla, G. Vogel's Qualitative Inorganic Analysis, Pearson Education, 2012.
4. Mendham, J. Vogel's Quantitative Chemical Analysis, Pearson, 2009.
5. Dr Sunita Rattan Experiments in Applied chemistry, 3rd Edition, -S. K. Kataria and Sons. 2011
6. Pandey, O.P., Bajpai D. N. & Giri S. Practical Chemistry, Revised Edition, (For BSc. I, II, III Year Students of All Indian Universities) S. Chand Company Pvt Limited, 2014

| * Assessment Rubrics | |
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| **Component** | **Max marks** |
| ISA (Theory) | 5 |
| ISA (Practical) | 10 |
| Semester End Exam | 20 |
| Practical | 40 |
| **Total** | **75** |