

**Department of Chemistry**  
**School of Basic Sciences**  
**Vocational Course for UG Programmes**

**Paper Name- BASIC ANALYTICAL CHEMISTRY**

Paper Code- ~~CHM BAC 03~~ **VOC143**

- Course Objectives-**
1. Students learn about the quality of soil, water and cosmetics.
    1. Impart the theoretical and practical knowledge of basic principles of analysis of water, soil and cosmetics
    3. Impart the theoretical and practical knowledge of basic principles of separation techniques.

**Credit:3(1+2)**

**75 hours**

Unit	Topics	Hours
1	<b>Soil</b> : Composition of soil, <b>Cosmetics</b> : Major and minor constituents and their function	7
2	<b>Water quality and Separation Methods</b> : Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods. <b>Chromatography</b> : General introduction, principles of paper chromatography, TLC, Ion exchange and column chromatography etc.	8
3	<b>Analysis of Soil</b> <ol style="list-style-type: none"> <li>a. Determination of pH of soil samples.</li> <li>b. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.</li> </ol> <b>Analysis of water</b> : Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods. <ol style="list-style-type: none"> <li>a. Determination of pH, acidity and alkalinity of a water sample.</li> <li>b. Determination of dissolved oxygen (DO) of a water sample.</li> </ol>	30

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	<ul style="list-style-type: none"> <li>c. Determination of TDS, TSS, BOD, COD, of a water sample</li> <li>d. Determination of Chloride content in a water sample</li> <li>e. Determination of hardness of a water sample</li> <li>f. Detection of inorganic ions in water sample</li> </ul>	
4	<p><b>Analysis of cosmetics:</b> Major and minor constituents and their function</p> <ul style="list-style-type: none"> <li>a. Analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulphate.</li> <li>b. Determination of constituents of talcum powder: Magnesium oxide, Calcium oxide, Zinc oxide and Calcium carbonate by complexometric titration.</li> </ul> <p><b>Separation Techniques</b></p> <ul style="list-style-type: none"> <li>a. Paper chromatographic separation of mixture of amino acids</li> <li>b. To compare paint samples by TLC method.</li> </ul> <p><b>Ion-exchange:</b> Column, ion-exchange chromatography etc. Determination of ion exchange capacity of anion / cation exchange resin.</p>	30

**Reference Books:**

1. Willard, H. H. *Instrumental Methods of Analysis*, CBS Publishers.
2. Skoog & Lerry. *Instrumental Methods of Analysis*, Saunders College Publications, New York.
3. Skoog, D.A.; West, D.M. & Holler, F.J. *Fundamentals of Analytical Chemistry 6<sup>th</sup> Ed.*, Saunders College Publishing, Fort Worth (1992).
4. Harris, D. C. *Quantitative Chemical Analysis*, W. H. Freeman.
5. Dean, J. A. *Analytical Chemistry Notebook*, McGraw Hill.
6. Day, R. A. & Underwood, A. L. *Quantitative Analysis*, Prentice Hall of India.
7. Freifelder, D. *Physical Biochemistry 2<sup>nd</sup> Ed.*, W.H. Freeman and Co., N.Y. USA(1982).
8. Cooper, T.G. *The Tools of Biochemistry*, John Wiley and Sons, N.Y. USA. 16 (1977).
9. Vogel, A. I. *Vogel's Qualitative Inorganic Analysis 7<sup>th</sup> Ed.*, Prentice Hall.
10. Vogel, A. I. *Vogel's Quantitative Chemical Analysis 6<sup>th</sup> Ed.*, Prentice Hall.
11. Robinson, J.W. *Undergraduate Instrumental Analysis 5<sup>th</sup> Ed.*, Marcel Dekker, Inc., New York(1995).

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