### BHARATHIAR UNIVERSITY, COIMBATORE-641 046

### B. Sc. CHEMISTRY DEGREE COURSE

### (AFFILIATED COLLEGES – CBCS PATTERN)

### (For Candidates Admitted During the Academic Year 2012-2013 Batch & Onwards)

**NOTE: THE FOLLOWING PAPER   CORE  V – CHEMISTRY  PAPER  IV  OF B.SC. CHEMISTRY FROM THE ACADEMIC YEAR 2012-13   IS REVISED AND FURNISHED BELOW.  THERE IS NO CHANGE IN THE REMAINING PAPERS.**

# CORE V – CHEMISTRY PAPER IV

Teaching hours: 45 hours per semester (3 hours per week)

**Subject description**

This paper presents the basic aspects of thermodynamics, adsorption, chromatography and computer programming.

**Goals**

To enable the students to understand the laws of thermodynamics, adsorption and  the Computer  C Programming.

**Objectives**

To study the applications of computer programming in chemistry and the importance of send  and thermodynamics, adsorption and chromatography**.**

**UNIT I:**

Introduction to second law of thermodynamics – Carnot cycle – entropy – Definition –  Entropy changes in isothermal transformation –Trouton's rule. Entropy as function of T and V – Entropy as a function of T and P – Changes of entropy with T, Entropy changes in ideal gas – entropy of mixing of ideal gases.

**UNIT II**

General conditions of equilibrium and spontaneity-  conditions of equilibrium and spontaneity under constants – definition of A and G – physical significance of – dA and dG.

Temperature and pressure dependence of G – Gibbs – Helmholtz equation.  Chemical equilibrium – The concept of chemical potential – chemical potential in a mixture of ideal gases – van't Hoff Isotherm and isochore – Third law of thermodynamics – statement and applications. Exception to third law.

**UNIT III ADSORPTION AND CATALYSIS**

Adsorption – types, differences between chemisorption and physisorption – Adsorption of Gases by solids – Adsorption isotherms – Freundlich, Langmuir isotherms derivations – BET EQUATION (Derivation not required) – Adsorption from solutions – ion exchange adsorption Types and applications – Techniques to determine the adsorped molecules on solid surfaces.

Catalysis – classification – differences between Homogeneous  and Heterogeneous catalysis – Acid Base catalysis – Kinetics and Mechanisms   – Autocatalysis – Enzyme catalysis Characteristics and mechanism - Michaelis – Menton equation.

## UNIT IV
## CHROMATOGRAPHY

Chromatographic methods – Partition Adsorption – Basic principles – Differential migration, adsorption phenomenon, nature of adsorbents, choise of solvents and Rf value – Techniques and applications of Paper, Column and TLC – Gas chromatography and HPLC (Basic principles only).

## UNIT V Some important  C programs for Chemistry

Programs: To calculate pH of solution and find that it is basic, acidic or neutral. Calculation of pH of a solution using Henderson equation.To compute the order of a reaction.To compute the half-life period of a reaction.  To compute the rate constant of a $1^{st}$ order Reaction.To compute the energy of activation of a reaction.

## REFERENCES:

1 .Principles of physical chemistry, B.P.Puri, L.R.Sharma and M.S.Phathania, Shobanlal Nagin Chand & Co.

2. Physical chemistry G,W.Castelan, Narosa publishers.

3. Physical chemistry(volll) – N.B.Singh, ShivasaranDas,A.K.Singh –New Age International
     Publishers – First edition(2009)

4. Introduction to Chromatography – V.K.Srivatsava and K.K.Srivatsava – S.Chand& Company
– Second edition(1981)

5. Computer for chemists – By PundirBansal – PragatiPrakasam Pubs