



Code	Subject Title	Cr. Hrs	Semester
CHEM-313	Physical Chemistry	4	VI
Year	Discipline		
3	Chemistry-I, II		

**SYLLABUS OUTLINE:****1. Kinetics of bimolecular reactions:**

Mathematical treatment of collision and transition state theory of bimolecular reactions, effect of temperature on reaction rates, the interpretation of bimolecular reactions in solution, ionic reaction in solution, unimolecular gas phase reactions, fast reactions and their methods of study.

**2. Classical Thermodynamics:**

Maxwell's relations and thermodynamics formula, second law of thermodynamics, Clausius inequality, the entropy of non ideality of a gas, Nerst heat theorem, its applications to solid and gases, Nerst approximation formula, third law of thermodynamics and determination of entropy by third law, Experimental verification of third law. Adiabatic demagnetization.

**3. Statistical Thermodynamics:**

Sterling's approximation, statistical treatment of entropy, partition function and its physical significance, absolute entropy and partition functions, interpretation of thermodynamic functions in terms of translational, rotational vibrational and electronic partition functions, Free energy and equilibrium constant from partition function.

**4. Kinetic theory of Gases:**

Introduction, Maxwell distribution of molecular velocities and energies, Derivation of average velocity and most probable velocity, Barometric formula, effect of altitude, molar mass and temperature on vertical distribution of particles.

**Note Suggested out lines for Mathematics Course:****Basic Mathematics for Chemistry (1 Credit Course):**

Review of basic algebra and trigonometry, concept of function, Differentiation, concept of maxima and minima, integration, Differential Equations, equations of straight lines, partial fraction, Applications of Calculus in Chemistry and data handling.

**RECOMMENDED BOOKS:**

1. Physical Chemistry by Kundu, N and Jain, S.K., S. Chand and Company Ltd. 1984.
2. Fundamentals of Chemical kinetics by Logan, S.R., Longman Group Ltd. 1996.
3. Elementary reaction kinetics by Latham. J.L. and Burgess, A.E., 3rd Ed., Butterworths, London, 1997.
4. Physical Chemistry by Atkins, P.W., 5th Ed., W.H. Freeman and Company, New York, 1994.
5. Physical Chemistry by Alberty, R.A. and Silbey, R.J., John Wiley, New York, 1995.
6. Physical Chemistry by Engel, T. and Ried, P., 1st Ed., Pearson education, Inc. 2006.



7. Electrochemical Methods and applications by bard, A. and Faulkner, L.R., John Wiley, New York, 1980.
  8. Principles of Physical Chemistry by Maron and Prutton, Macmillan and Co. Ltd. 1965.
  9. Physical Chemistry by Glasstone, S. Macmillan and Co. Ltd., London, 195.
  10. Elements of classical and statistical thermodynamics by Nash, L.K. Addison Wesley Co. Ltd., 1979.
  11. Mathematics for Chemists.
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