PHYSICAL CHEMISTRY (BS-ADP 6th Semester)

Module Code:	**Chem-320**
Module title:	**Thermodynamics**
Name of Scheme:	**BS-ADP 6th Semester**
Department:	**School of Chemistry**
Faculty:	**Science**
Module Type:	**Compulsory**
Module Rating:	**2 credits**

OBJECTIVES

Students will acquire knowledge to enable themselves to understand the fundamental principles and laws of thermodynamics. The course will be helpful for students for basic understanding of statistical thermodynamics. Students will also be able to explore the insights of reactions occurring in solution phase and perform related calculations.

SYLLABUS OUTLINES

Brief introduction of second law of thermodynamics, Clausius inequality, Nernst heat theorem and its applications, Nernst approximation, Maxwell's Relations, third law of thermodynamics, Experimental verification of third law of thermodynamics. Entropy change in solid/liquid and ideal gas, Adiabatic demagnetization.

Sterling's approximation, partition function (Q), its derivation and physical significance, Energy of system in terms of partition function, expression of thermodynamic functions (energy, enthalpy, entropy, heat capacity at constant pressure and volume and free energies) in terms of translational partition function (Q_t), rotational partition function (Q_r), vibrational partition function (Q_v) and electronic partition function (Q_e), Separation of partition functions, expression of free energy and equilibrium constant of reversible chemical reaction in terms of partition function. Entropy and probability.

RECOMMENDED BOOKS

1. Atkin, P. and Paula, J. D., Atkin's Physical Chemistry, 2nd ed., Oxford University Press, (2002).
2. Bhatti, H. N. and Farooqi, Z. H., Modern Physical Chemistry, Revised ed., Caravan Book House, (2014).
3. Physical Chemistry by Kundu, N and Jain, S.K.,S. Chand and Company Ltd. 1984.
4. Fundamentals of Chemical kinetics by Logan, S.R., Longman Group Ltd. 1996.
5. Elementry reaction kinetics by Latham. J.L. and burgess, A.E., 3rd Ed., Butterworths, London, 1997.
6. Physical Chemistry by Atkins, P.W., 5th Ed., W.H. Freeman and Company, New Yark, 1994.
7. Physical Chemistry by Alberty, R.A. and Silbey, R.J., John Wiley, New York, 1995.
8. Physical Chemistry by Engel, T. and Ried, P., 1st Ed,. Pearson education, Inc. 2006.
9. Principles of Physical Chemistry by Maron and Prutton, Macmillan and Co. Ltd. 1965.
10. Physical Chemistry by Glasstone, S. Macmillan and Co. Ltd., London, 195.
11. Elements of classical and statistical thermodynamics by Nash, L.K. Addison Wesley Co. Ltd., 1979