

School of Chemistry

Aims and Objectives: Session 2023-2024, Semester 1

Module CH1401: Introductory Inorganic and Physical Chemistry

Course Title: Thermodynamics

Duration: 8 hours

Lecturer: Dr D. G. Pinto

Aims: Discuss Units and temperature. Cover Ideal Gas Law. Introduce the basic concepts of thermodynamics and three of the most important terms enthalpy, entropy and Gibbs energy. These will be used to predict whether a chemical reaction will occur or not under given conditions and to determine the position of chemical equilibrium for reactions which do not proceed to completion.

Objectives:

1. Discuss units, temperature and the Ideal Gas Law, $PV = nRT$.
2. To introduce the basic terms and concepts used in thermodynamics – e.g., energy, heat and work.
3. To introduce the first law of thermodynamics, the internal energy (U) and the enthalpy (H).
4. Define the standard state.
5. Use Hess's Law to calculate changes in enthalpy (ΔH) for phase transition and chemical reactions. To define and use the standard enthalpy of formation ($\Delta_f H$).
6. To introduce the second law of thermodynamics. To define the concepts of disorder, entropy (S) and spontaneous changes and explain their relevance to chemical systems.
7. Define Gibbs energy (G) and its relationship to enthalpy and entropy.
8. Define ΔG and its relationship to ΔG^\ominus and K (equilibrium constant).