

## **CHE-910    Advanced Chemical Engineering Thermodynamics**

**Credit Hours:** 3

**Prerequisites:** CHE-312, Chemical Engineering Thermodynamics II

Graduate standing in Chemical Engineering and successful completion of an undergraduate chemical engineering thermodynamics course

### **Course Objectives:**

To impart advanced knowledge of chemical engineering thermodynamics and illustrate their applications in the design of chemical processes

### **Course Contents:**

- Review of laws of thermodynamics
- Unsteady state processes
- Ideal and non-ideal solutions
- Prediction and correlation of phase equilibria for nonelectrolytes
- Electrolyte solutions
- Fundamentals of applied statistical mechanics
- Molecular theory of dense fluids
- Description of intermolecular forces
- Gas-liquid and liquid critical phenomena
- Theories of interfacial phenomena and adsorption
- Statistical mechanics of polymer systems
- Statistical mechanics of poly-dispersed systems

### **Course Outcomes:**

- Analysis of interfacial phenomena and adsorption
- Knowledge of phase equilibria in two-component and multi-component systems
- Understanding of essentials of statistical mechanics
- Ability to predict intermolecular potential and excess property behavior of multi-component systems

### **Recommended Books:**

- J.M. Smith, H.C. Van Ness and M.M. Abbott, Introduction to Chemical Engineering Thermodynamics, 7th ed., McGraw-Hill, NY (2005)
- S.I. Sandler, Chemical and Engineering Thermodynamics, 3rd ed., Wiley, NY (1999)