Course Title: Colloid and Surface Chemistry

Semester: VIII
Course Code: CH-485
Credit Hours: 3-0
Pre-requisite: Nil

Course Objectives

1. Students will acquire knowledge about the important physical and chemical aspects ofnano and colloidal systems and the basics of thermodynamically and kinetically stabilized nanoparticles and colloidal solutions. They will also learn about the surfactant chemistry, characterization methods and applications of nanoparticles and colloidal solutions.

Contents

2. Colloid and Surface Chemistry: Colloidal solutions, catalyst preparation methods,industrial catalysts, emulsion, surfactant, nanoscale chemistry, nanomaterials and their applications, dimensional control in nanostructures, macromolecular surface films, charged films and Langmuir-Blodgett layers, characterization methods and applications. Solid surfaces, surface structures, clean surface structures, gas solid interface, thermodynamics of adsorption, heterogeneous catalysis, kinetic and mechanisms of catalyzed reactions, adsorption at liquid surfaces, chemisorption, physiosorption and dynamics, enzymatic catalysis, organized molecular assemblies, experimental probes for surface and adsorbent structures, scanning probe techniques, low energy electron diffraction (LEED), electron spectroscopy, and other surface analysis techniques.

3. TEXT Books:
   a. Adamson, A. W. and Gast, A. P., *Physical chemistry of Surfaces,* 6th ed., Wiley-Interscience, (1997).
   b. Hunter, R. J., *Introduction to Modern Colloid Science,* Oxford University Press,Oxford, (1994).
4. Recommended Books:
   a. Poole, C. P. and Owens, F. J., *Introduction to Nanotechnology,* 1st ed., Wiley-Interscience, (2003).
   b. Kolunsiki, K. W., *Surface Science: Foundations of Catalysis and Nanoscience*,3rd ed., John-Wiley & Sons, Ltd., (2012).
   c. Atkins, P. and Paula, J. D., *Atkin's Physical Chemistry,* 8th ed., Oxford UniversityPress, (2006).

Course Outcomes

5. Students will have knowledge about the important physical and chemical aspects ofnano and colloidal systems. They will have knowledge about surfactant chemistry, characterization methods and applications of nanoparticles and colloidal solutions.