

COLLOID AND INTERFACIAL ENGINEERING (Minor)

Module I:

General introduction of colloids, interfaces, surfactants, and micellization. Intermolecular forces, van der Waals' forces (Keesom, Debye, and London interactions). Colloidal systems and colloidal stability (van der Waals' attraction and potential energy curves). Brownian motion and Brownian flocculation.

Module II:

Surface and interfacial tension and surface free energy. Surface tension for curved interfaces. Surface excess and Gibbs equation. Theory of surface tension, contact angle, and wetting.

Module III:

Thermodynamics of interfaces, thermodynamics of micelle and mixed micellar formation. Electrical phenomena at interfaces (Electrokinetic phenomena, Electrical double layer). Emulsion and microemulsion. General applications. Enhanced petroleum recovery, super hydrophobic and self-cleaning surfaces. Novel fabrication of nanostructured particles. Measurement techniques of surface tension, Contact angle, Zeta potential, Particle size.

Reference Books:

1. *Principles of Colloid and Surface Chemistry, 3rd ed. by P Chiemenz and R Rajagopalan, Merce Dekker.*
2. *Introduction to Colloid & Surface Chemistry, 4th ed. by D J Shaw, Butterworth Heinemann.*
3. *Colloid and Surface Chemistry by P Somasundaran, CreateSpace Independent Publishing Platform.*
4. *Introduction to Applied Colloid and Surface Chemistry by G M Kontogeorgis and S Kiil, John Wiley & Sons.*