



UNIVERSITY OF CALGARY

DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
WINTER 2018

COURSE: CHEMISTRY 579 – Surface and Colloid Chemistry for Engineers

LEC	DAYS	TIME	ROOM	INSTRUCTOR	OFFICE	PHONE	EMAIL	OFFICE HOURS
L01	MWF	10:00-10:50	ENA 103	Venkataraman Thangadurai	ES 656E	403-210 8649	vthangad@ucalgary.ca	By appointment

Course website: Desire 2 Learn (D2L)

Departmental Office: Room SA 229, Tel: 403-220-5341, e-mail: chem.info@ucalgary.ca

TEXTBOOK: Not Required

PROPOSED TENTATIVE TOPICS INCLUDE:

- 1. Surface and Colloid Chemistry and Importance**
 - 1.1 What is a colloid?
 - 1.2 What is a phase?
 - 1.3 Distinction between true solutions and colloids
 - 1.4 Technological applications of surface forces
 - 1.5 Surface area
 - 1.6 Sedimentation & Diffusion
- 2. Experimental Techniques in Interface Science- Solid Surface**
 - 2.1 Surface and Bulk Characterization Methods
 - 2.2 X-ray Diffraction Methods
 - 2.3 Adsorption Isotherms
 - 2.4 BET Surface Area Analysis
- 3. Surface Tension/Surface Energy**
 - 3.1 Surface Tension
 - 3.2 Contact Angle
 - 3.3 Experimental Methods for Surface Tension & Contact Angle
 - 3.4 Laplace-Young Equation
 - 3.5 Capillary Rise Technique
 - 3.6 Kelvin Equation
- 4. Thermodynamics of Interfaces – Fundamentals**
 - 4.1 Definition of System Variables
 - 4.2 Thermodynamic Potentials
 - 4.3. Thermodynamic definition of Surface Tension
 - 4.4 Gibbs Adsorption Isotherm
- 5. Practical Applications of Interface Sciences – Electrochemistry and Non-electrochemical Aspects**
 - 5.1 The Electric Double Layer – Introduction
 - 5.2 Helmholtz and Gouy-Chapman Model
 - 5.3 Poisson – Boltzmann Theory (Debye Length)
 - 5.3 Experimental Methods to Determine Surface Charges
 - 5.4 The Electrostatic Double-Layer Force (DLVO equation)

This course does not have a laboratory component.

Department Approval: Approved by Department Head

Date: January 4th, 2018

