

ChE 265

Fall 1993

Interfacial Phenomena

Instructor: J. A. Shaeiwitz
Office: 417 ES
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Class: 5:00-6:15 pm TuTh

Course Goals: To present a survey of the problems that arise when the interface between two phases is involved. Fluid/fluid and fluid/solid interfaces will be examined, except that the gas/solid interface will not be treated.

Grading: Two Exams @ 22.5%	45%
Final Exam	25%
Problem Sets	10%
Project/Report due on or before 12/9/93	20%

Text: Hiemenz, Paul C., *Principles of Colloid and Surface Chemistry*, (2nd ed.), Marcel Dekker, 1986.

Other Reading: See attached annotated bibliography.

Semester Project: Since we are only able to survey a field with an extensive literature, each student is to do a report on an area of Interfacial Phenomena which we have either omitted or only discussed superficially. You may choose your own topic. References (see attached Bibliography) 34, 39, and 40 and newer volumes of 25 are recommended starting places for finding topics. You are, of course, expected to go beyond these review articles and cover your topic in depth. Although quality is far more important than quantity, 10 typed pages, double spaced, not counting figures and/or tables, should be considered the maximum length of this paper.

Approximate Syllabus

<u>Class</u>	<u>Date</u>	<u>Topic</u>	<u>Reading</u>	<u>Assignment Due</u>
1	8/24	Introduction, Intermolecular Forces	1, 11.3-11.4	
2	8/26	Interparticle Forces	11.7-11.9	
3	8/31	Interfacial Tension	6	
4	9/2	Interfacial Tension		
5	9/7	Interfacial Tension Measurement		
6	9/9	Wetting, Contact Angles		PS 1
7	9/14	Wetting, Contact Angles		
8	9/16	Adsorption	7	PS 2
9	9/21	Adsorption		
10	9/23	Colloids, Sedimentation	1, 2	PS 3
11	9/28	Exam 1		
12	9/30	Sedimentation vs. Diffusion	2	
13	10/5	Colloid Thermodynamics	3	
14	10/7	Viscosity of Suspensions	4	PS 4
15	10/12	Charged Interfaces Single Double Layers	12.1-12.7	
16	10/14	Double Layer Interactions		PS 5
17	10/19	DLVO Theory, Coagulation Kinetics	11.1-11.2, 11.5-11.6	
18	10/21	Coagulation Kinetics, Stability	12.8-12.11	
19	10/26	Stabilization and Flocculation by Polymers		
20	10/28	Thin Films		PS 6

21	11/2	Electrokinetic Phenomena	13	
22	11/4	Other Particle Migration Phenomena		
23	11/9	Exam 2		
24	11/11	Application to Particle Pollution Control		
25	11/16	Surfactants	8	
26	11/18	Micellization		PS 7
27	11/30	Emulsions, Microemulsions		
28	12/2	Detergency		
29	12/7	Surfactant Adsorption and Applications		
30	12/9	Surfactant-based Separations		PS 8
	12/18	Final Exam 11am - 1pm		