16:155:561:Applied Surface Chemistry
(Emulsion and Nanoemulsion Engineering)
Spring 2016
3 credits

Instructor: Dr. Badreddine Ahtchi
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Lecture: Thursdays 5:00-8:00pm in ARC-105

Text: Emulsion Formation and Stability, 1st Ed. (2012), T. F. Tadros, Wiley-VCH*, ISBN-978-3-527-31991-6; ePDF ISBN-978-3-527-64797-2*

Course Description:

An introduction to emulsion and nanoemulsion principles and their industrial applications. This course covers aspects of emulsion and nanoemulsion physical chemistry, process engineering, characterization techniques, principles of stability and stabilization, and rheology. Manufacturing processes currently used in the food, beverage, and personal care industries will be explored in detail and illustrated through hands-on laboratory experiments.

Course Timeline:

Topic	Reading Assignment	HW	Start Date	End Date	Class Unit
Emulsion and Nanoemulsion Overview	Ch. 1		01/19	01/22	Module 1
Physical Chemistry	Ch. 1	1	01/25	01/29	Module 2
Emulsion Ingredients	*A*	2	02/01	02/05	Module 3
Exam 1	Ch 1. + *A*		02/08	02/12	
Characterization Methods	Ch. 4	3	02/15	02/19	Module 4
Emulsion Processing (1)	Ch. 2	4	02/22	02/26	Module 5
Emulsion Processing (2)	Ch. 5	5	02/29	03/04	Module 5
Exam 2	Ch. 2, 4, 5		03/07	03/11	
Stability	Ch. 1 + *B*	6	03/21	03/25	Module 6
Stabilization	Ch. 6 + *C*	7	03/28	04/01	Module 7
Emulsion Rheology	Ch. 8	8	04/04	04/08	Module 8
Processing of oil in water emulsions - skin care	*(Hands-on Laboratory experiments)*	9	04/11	04/22	Module 9
Processing of oil in water nanoemulsions – beverages	*(Hands-on Laboratory experiments)*		04/25	04/29	Module 9
Final Exam			05/05		

A, B, C: reading assignments to be provided by the instructor

Course Grading: Course grading will be based on 9 HWs and 3 exams

Course Prerequisites: Math, Thermodynamics I & II and Transport Phenomena I & II