CENG 411/ENAS 611 : Separation Processes (FA14)

Professor
Chinedum Osuji
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Description
This course covers the theory and design of separation processes for multicomponent and/or multiphase mixtures via equilibrium and rate phenomena. Included are single-stage and cascaded absorption, adsorption, extraction, distillation, filtration, membrane, chromatography and crystallization processes.

TA
Francisco Antonio, francisco.antonio@yale.edu
Office Hours - TBA

Prerequisite
Undergraduate courses in Chemical Engineering Thermodynamics (CENG 300) and Transport Phenomena (CENG 315), or the permission of the instructor

Class
Mondays and Wednesdays, 11:35a-12:50p, ML 104

Office Hours
As required

Textbook(s)
"Separation Process Principles" 3rd ed. by Seader, Henley and Roper

Additional reading
"Introduction to Chemical Engineering Thermodynamics" 7th ed. by J. M. Smith, M. M. Abbott and H. C. Van Ness
"Fundamentals of Momentum Heat and Mass Transfer" 5th ed. by J. R. Welty, C. E. Wicks, R. E. Wilson and G. Rorrer

Exams
There will be two preliminary exams during the semester and a final exam at the end. Prelims will be in the lecture room at 104 Mason with dates as noted on the schedule.

Homework
There will be periodic homework assignments throughout the semester (≈ 8) which should be submitted at the start of class on their due date. Students are permitted to work cooperatively on assignments, but each person must submit his or her own individually prepared results.

Grading - a rough guide

In class discussion	5 points
Exam I	25 points
Exam II	30 points
Graded Homework & Lab	40 points
Total	100 points

Letter grades will be assigned according to the scale below

85 points	A- or better
70 points	B- or better
45 points	C- or better

Lecture #	Date	Lecture Topic	Chapter(s)
1	W Aug 27	Overview of separation processes; Examples	1
2	F Aug 29	Thermodynamcis and transport basics	2,3
3	W Sep 3	Equilibrium stage separations calculations	4
4	M Sep 8	Equilibrium stage separations calculations	4
5	W Sep 10	Absorption and stripping	6
6	M Sep 15	Absorption and stripping	6
7	W Sep 17	Absorption and stripping	6
8	M Sep 22	Binary mixture distillation	7
9	W Sep 24	Binary mixture distillation	7
10	M Sep 29	Binary mixture distillation	7
	W Oct 1	**Exam I**	
11	M Oct 6	Liquid extraction	8
	W Oct 8	*No class*	
12	M Oct 13	Liquid extraction	8
13	W Oct 15	Membrane separations	14
14	M Oct 20	Membrane separations	14
	W Oct 22	*Fall recess*	
15	M Oct 27	Membrane separations	14
	W Oct 29	*No class*	
16	M Nov 3	Chromatography, ion exchange	15
	W Nov 5	*No class*	
17	M Nov 10	Chromatography, ion exchange	15
18	W Nov 12	Crystallization and evaporation	17
19	M Nov 17	*Lab assignment*	
20	W Nov 19	*Lab assignment*	
	M Nov 24	*November Recess*	
	W Nov 26	*November Recess*	
21	M Dec 1	Centrifugation and particle separations	19
22	W Dec 3	Centrifugation and particle separations	19
	M Dec 8	**Exam II**	