

Time and Place

8:30-9:20AM Monday-Wednesday-Friday

3315 Seamans Center for the Engineering Arts & Sciences

Course Description

Chemicals manufactured via biological processes are typically produced at low concentration within a stew of other materials. Often they are also too fragile to survive the most common industrial separation processes. This course discusses the unit operations used to isolate and purify biologically-derived chemicals, including filtration, centrifugation, chromatography, extraction, electrophoresis, crystallization, and cell disruption for intracellular product recovery.

Instructor

Eric Nuxoll

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4140 SC

Office Hours:

T 4:30-5:30, F 4:30-5:30,

or by appointment

Teaching Assistant

Khalid Al-Gharrawi

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G138 SC

Office Hours:

T 6:30-7:30

Th 6:00-7:00

Discussion: M 6:30-7:20 in SC 2133

Required Text

Bioseparations Science & Engineering, 2nd edn.

by Roger G. Harrison et al, 2015

ISBN: 978-0-19-539181-7

Course Format

Lectures with weekly homework, one group

project, three mid-term exams and a final exam.

Each lecture should conclude with a minor quiz.

Grading

Grades for the course will be weighted as follows:

Homework: 11%

Final Exam: 30%

Mid-term Exams: 18% each

Minor Quizzes: 5% collectively

Scheduling conflicts

Students anticipating a scheduling conflict should contact the instructor as soon as possible.

Exams will be offered at alternative times as consistent with the University's exam policies.

These policies can be viewed at www.registrar.uiowa.edu/exams/exampolicy.aspx

Accommodations for Disabilities

If you feel that you may need an accommodation based on the impact of a disability please contact Prof. Nuxoll privately to discuss your specific needs. You may also contact the Office of Student Disability Services (319/335-1462) to discuss the accommodations that are available for students with documented disabilities.

This course is housed in the College of Engineering, therefore class policies on matters such as requirements, grading, and sanctions for academic dishonesty are governed by the College of Engineering. Students wishing to add or drop this course after the official deadline must receive the approval of the Dean of the College of Engineering. Details of the University policy of cross enrollments may be found at: <http://www.uiowa.edu/~provost/deos/crossenroll.doc>

Schedule

Below is a TENTATIVE outline of the course, with accompanying section of the text

<u>Date</u>	<u>Topic</u>	<u>Text</u>
January 20 (W)	Introduction, small molecule products	1.1-1.3
January 22 (F)	Macromolecules	1.4-1.7
January 25 (M)	Process overview	1.8, 11.1-11.3
January 27 (W)	Cell lysis	3.1-3.3
January 29 (F)	Flocculation	3.4, 3.5
February 1 (M)	Sedimentation	5.1-5.3
February 3 (W)	Centrifugation	5.4, 5.5
February 5 (F)	Field flow fractionation	5.6-5.9
February 8 (M)	Filtration theory	4.1, 4.2
February 10 (W)	Filtration equipment	4.3, 4.5, 4.6
February 12 (F)	Membranes	4.4
February 15 (M)	Membranes	4.4
February 17 (W)	Review	
February 18 (Th)	MID-TERM EXAM #1 6:30pm -8:30pm SC3321	
February 19 (F)	Evaluation of midterm exam	
February 22 (M)	Extraction theory	6.1, 6.2
February 24 (W)	Extraction equipment	6.3, 6.4
February 26 (F)	Chromatography	7.1, 7.2
February 29 (M)	Adsorption column dynamics	7.3
March 2 (W)	Adsorption column dynamics	7.3
March 4 (F)	Adsorption column dynamics	7.3
March 7 (M)	Chromatography column dynamics	7.4
March 9 (W)	Chromatography column dynamics	7.4
March 11 (F)	Adsorbents	7.5, 7.6
March 14 (M)	NO LECTURE	
March 16 (W)	NO LECTURE	
March 18 (F)	NO LECTURE	
March 21 (M)	Chromatography Equipment	7.7
March 23 (W)	Chromatography Scale-up	7.8, 7.9
March 25 (F)		
March 28 (M)		
March 30 (W)	Review	
March 31 (Th)	MID-TERM EXAM #2 6:30 pm – 8:30 pm SC3321	
April 1 (F)	Evaluation of midterm exam	
April 4 (M)	Precipitation	8.1, 8.2
April 6 (W)	Precipitation	8.3, 8.4
April 8 (F)	Precipitation	8.5-8.7
April 11 (M)	Crystallization	9.1, 9.2
April 13 (W)	Crystallization	9.3, 9.4
April 15 (F)	Crystallization	9.5, 9.6
April 18 (M)	Drying	11.1, 11.2
April 20 (W)	Drying	11.3, 11.4
April 22 (F)		
April 25 (M)	Analytical methods	2.1-2.4
April 27 (W)	Analytical methods	2.5-2.7
April 29 (F)		
May 2 (M)	Review	
May 3 (T)	MID-TERM EXAM #3 6:30 pm – 8:30 pm SC3321	
May 4 (W)	Evaluation of midterm exam	
May 6 (F)	Review	
TBD	FINAL EXAM	