CBEMS 132 BIOSEPARATION PROCESSES
(Elective for ChE)

Catalog Data:	**CBEMS 132 Bioseparation Processes (Credit Units: 3).** Recovery and purification of biologically produced proteins and chemicals. Basic principles and engineering design of various separation processes including chromatography, electrophoresis, extraction, crystallization, and membrane separation. Prerequisites: CBEMS40A-B, CBEMS120A. (Design units: 1)
Textbook:	Harrison, Roger G. and Day, Trevor G. *Bioseparations Science and Engineering,* Oxford University Press, 2003.
References:	Belter, P.A., Cussler, E.L., and Hu, W. *Bioseparation, Downstream Processing for Biotechnology,* John Wiley & Sons, 1988.
Coordinator:	Juan Hong
Course Objectives:	To apply chemical engineering principles to processing biologically produced products such as amino acids, proteins.
Course Outcomes:	Students will: Apply chemical engineering fundamentals such as material and energy balance, thermodynamics to design separation processes specific to biologically produced products. Select and design separation processes to isolate, recover and purify valuable products produced from biological processes. Design and analyze filtration processes, centrifugation processes, cell disruption processes, extraction processes, adsorption processes, chromatographic separation processes, precipitation and crystallization processes, ultrafiltration processes, electrophoresis processes.
Prerequisites by Topics:	Material and energy balance, momentum transfer, thermodynamics
Lecture Topics:	Review of thermodynamics, Classification of separation processes Crystallization and Precipitation, Adsorption and Chromatography,Electrophoretic Separation, Membrane Separation , Sequencing Separations
Class Schedule:	Meets for 4 hours of lecture each week for 10 weeks.
Computer Usage:	Matlab or Polymath
Laboratory Projects:	
Professional Component:	This course is designed to contribute to the student's knowledge of biology and chemical engineering topics and separation process design.

Relationship to Program Outcomes: This course relates to Program Outcomes e, f, h, i, j, k, and l as stated at:
http://undergraduate.eng.uci.edu/degreeprograms/chemical/mission

Design Content Description:

Approach:	Lectures and homework on synthesis of separation sequence
Lectures:	100%
Laboratory Portion:	0%

Grading Criteria:

Homework	20 %
Exam I	40 %
Exam II	40 % (during the final exam period)
	100%

**only those who attempted to solve all the homework are qualified for the highest grade.
**Exams are closed note and books.

Estimated ABET Category Content:

Mathematics and Basic Science: 0 credit units or 0%
Engineering Science: 2 credit units or 67%
Engineering Design: 1 credit units or 33%

Prepared by: Juan Hong **Date:** July 2007

CEP Approved: Fall 2002