

BIOE 4010: Bioprocess Separation Engineering

Course Information:

Credit Hours: 3 Lecture: 2 Lab: 2

Catalog Description:

Unit operations used in biological processing useful in product isolation and purification. Solid-liquid separation, filtration, centrifugation, cell disruption, isolation, purification, chromatography and drying.

Prerequisite: BIOE 3000

Required Texts:

Bioseparations Science and Engineering, Harrison, Todd, Rudge, Petrides, 2003, Oxford University Press, ISBN 0-19-512340-9

Course Outcomes

Upon completion of this course, students shall be able to:

- Describe methods to purify biologically processed materials.
- Specify equipment and steps required in bio separation systems
- Analyze and compare alternative separation approaches.
- Design a bio separation system
- Select appropriate instrumentation and quality systems for bio separation applications

Lecture Topics

Topics covered in this course include:

- Engineering Analysis of Activity and Purity
- Lysis and Flocculation
- Filtration
- Sedimentation
- Extraction
- Chromatography
- Precipitation
- Crystallization
- Drying
- Bioprocess system integration and design

Relevant Program Outcomes:

Graduates of the BS in Engineering Program will demonstrate:

- a) an ability to apply knowledge of mathematics, science, and engineering.
- b) an ability to design and conduct experiments, as well as to analyze and interpret data.
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- e) an ability to identify, formulate, and solve engineering problems.
- g) an ability to communicate effectively.
- h) an understanding of the impact of engineering solutions in a global, economic, environmental, and societal context.

- i) a recognition of the need for, and an ability to engage in life-long learning.
- j) a knowledge of contemporary issues.

Professional Component Content:

Math/Science: 0; Engineering: 4 cr; General Education: 0

Assessment Requirements:

Student Work Samples:

- Homework report (Outcomes b and g)
- Assignment on contemporary issues (Outcome j)
- Course project and presentation (Outcomes a, b, c, e, g, i, and j)

Targeted Exam Questions

- Application of statistics (Outcome a)
- Solution of engineering problems (Outcome e)

Student Course Survey

Last Review:

February 14, 2008 by Stephanie T. Sullivan