



Biotechnology Process Engineering

This two course sequence offered in Fall 2007 and Spring 2008 was developed to provide Chemical Engineering and Biochemistry & Molecular Biology students a strong training in engineering of cellular processes to better prepare them for entering graduate school in biosciences and/or the pharmaceutical/biotechnology industry upon graduation.

Course 1: ChE 592B “Introduction to Biochemical Engineering”

Taught by Prof. Susan Roberts (ChE)

Offered in the Fall, Mondays and Wednesdays from 8:45 am – 10:00 am

An introductory lecture course in biochemical engineering, focusing on the application of chemical engineering and biochemistry/molecular biology principles to the design and optimization of processes in the food and pharmaceutical industries. Topics covered will include enzyme catalysis, metabolic engineering and regulation, cell and tissue engineering, drug delivery, fermentation, microbial growth, bioreactor design, and product recovery and purification. Open to highly motivated juniors, seniors and graduate students in chemical engineering, biochemistry & molecular biology, chemistry or other life sciences disciplines, or by consent of instructor. No prerequisites are necessary.

Note: for Chemical Engineering students, this course will count as a technical elective and is required of students to obtain the Letter of Specialization in Biochemical Engineering; for Biochemistry & Molecular Biology students, this course will count as an advanced technical elective.

Course 2: ChE 590A/Biochem 590A “Biotechnology Process Engineering Laboratory”

Co-Taught by Prof. Louis Roberts (BMB) and Prof. Susan Roberts (ChE)

Offered in the Spring, Tuesdays and Thursdays from 8:00 am-12:30 pm

A comprehensive laboratory course in biotechnology process engineering focusing on the laboratory skills necessary to bring a product to the marketplace. Students will work in interdisciplinary teams to design a process to supply a high-value product. Molecular biology tools will be used to engineer cells lines to express the protein of interest; cells will be cultivated in bioreactors with designed process strategies; the protein product will be recovered from the fermentation broth and purified using a wide range of techniques including filtration, chromatography and crystallization; the final protein product will be characterized in terms of protein quality and function. State-of-the-art techniques using high-throughput technologies will be integrated throughout the course. This course will involve interaction with industry and students will be exposed to good manufacturing practices and FDA guidelines. Previous experience in either biochemistry or biochemical engineering is required.

Note: for Chemical Engineering students, this course will count as the second senior laboratory course (substituting for ChE 402) and is recommended of students to obtain the Letter of Specialization in Biochemical Engineering; for Biochemistry & Molecular Biology students, this course will serve as a substitute for Biochem 526.