CB2010 Downstream processing of biological products 7.5 credits

Industriell rening av biologiska produkter

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for CB2010 valid from Autumn 2024

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

Completed 15 credit degree project in technology or natural sciences, 20 credits in biotechnology, 10 credits courses in mathematics, and 20 credits courses in chemistry. English B/6.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

- Describe, compare and understand a set of general methods used for downstream processing in large scale processing.
- Describe and explain the tasks a given unit operation can solve in a downstream process.
- Describe and motivate a set of general analytical tools used to track the downstream process.

Course contents

An important task for bioengineers is to design and execute efficient and sustainable downstream processes to achieve a pure bioproduct. The desired purity and the biophysical characteristics of the product will have large effects on the design of the process. The course aims to give an understanding of the fundamentals of recovery/purification operations for biopharmaceutical production and how these operations are developed for use at production scale. Methods that are relevant for the down-stream process (DSP) will be described and discussed: different means for characterization of biological mixtures, methods used for separation of solid and soluble phases, technologies used to separate dissolved molecules from each other as well as methods utilized to concentrate the product. How the biophysical properties of the target molecule as well as the contaminating molecules can be exploited in the design of an effective DSP will be presented. The theoretical backgrounds of the methods will be described as well as their practical use, advantages and drawbacks. How demands on purity and yield of bio-products affect the design of the (DSP) will be reviewed. Furthermore, the different possible choices of unit operations for downstream purification methods and how the used upstream methods will affect those, will be discussed.

Examples of methods that will be discussed are: filtration, sedimentation, precipitation, centrifugation, extraction, crystallization and chromatography.

Examination

- PRO1 - Project, 2.0 credits, grading scale: P, F
- TEN1 - Written exam, 5.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Project (PROJ1; 2,0 credits, grading scale P/F)
Examination (TEN 1; 5,5 credits, grading scale A - F)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.