# KF2480 Chemistry of a Biorefinery 7.5 credits

**Bioraffinaderiets kemi**

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

## Establishment

Course syllabus for KF2480 valid from Spring 2014

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Chemical Science and Engineering, Chemistry and Chemical Engineering

## Specific prerequisites

**Admission requirements for independent students:**
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding. Documented proficiency in English corresponding to English B.

**Admission requirements for programme students at KTH:
**At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2, and bachelor's work must be completed, within a programme that includes:
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.

## Language of instruction

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

## Intended learning outcomes

After completing the course, the student should be able to:

• collect and summarize scientific information in a written report and do an oral presentation of this;

• describe different methods for biorefinery of biomass including chemical reactions and advantages and drawbacks with different concepts

• draw and describe reaction mechanisms for plant polymers and extractives under soda, kraft and sulphite pulping, as well as for steam explosion and organosolv techniques;

• draw and describe reaction mechanisms for ageing of chemical and mechanical pulps

• develop an understanding to predict how the hierarchic structure of plant fibres are affected during biorefinery processes and ageing

• critically evaluate effects of changes in processes and raw materials on product properties and environment

• describe processes, structures and properties for cellulose and lignin derivatives, and other chemicals produced from plant biomass

• predict structure and properties of plant cell wall polymers and fibers at process modifications

## Course contents

The course consists of lectures, a literature seminar and eventually laboratory work. The examination is done in combination with a written examination and a written and an oral presentations of the seminar task.

Lectures:
Chemical reactions during, chemical reactions during mechanical fiber release, chemical reactions during chemical fiber release, chemical reactions during steam explosion, chemical reaction during acid hydrolysis, chemistry of bleaching, generation and storage of process chemicals, anaytical methods in biorefinery, the biorefinery and the environment, and its chemical cycle.

## Course literature

The Ljungberg textbook Chemistry of a Biorefinery

## Examination

- SEM1 - Seminar, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 6.0 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.

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

## Other requirements for final grade

Examination (TEN1; 6 credits)
Seminar (SEM1; 1.5 credits)

The final grade is based on the performance of the written examination and the ability to orally and in writing, present the seminar task.

## 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.