

# Biomass Refining

**Code:** CHEM3029

**Extent:** 20–25 cr

**Language:** English

**Professor in charge:** Tapani Vuorinen

**Target group:** Master's students

**Application procedure:** Open for all students of Aalto University.

**Quotas and restrictions:** Please note, that in some courses the number of participants can be limited. Then major students (Biomass Refining) have the priority.

**Prerequisites:** While making your study plan, you should verify that you have the prerequisites needed for the courses.

## Objectives

Biomass refining is the technology for sustainable processing of biomass into a spectrum of marketable products and energy. The minor in Biomass Refining provides an introduction to the most important principles of Biorefinery. This includes a descriptive overview on the sustainable raw material sources as well as the chemical and biocatalytic fractionation and separation principles used in biomass refining processes. Further, business cases of renewable resource applications, renewable energy and biobased material production will be presented and discussed.

## Learning outcomes

After successful completion of this minor students are expected to be able to:

1. describe the composition and availability of biomass.
2. understand and apply the principles and practices in (bio)catalysis.
3. describe technologies required for different applications of renewable resources.
4. explain the term "sustainability" and the basic principles of Biorefinery.
5. explain strategies to replace petrochemical application by biobased technology.
6. evaluate the sustainability of biobased processes.

## Content and structure of the minor

Minor (20–25 cr) can be any combination of courses belonging to [the Biomass Refining major](#). Please check the list below.

### Structure of the minor

Code	Name	Credits	Period
Elective courses		20–25	
Choose so many courses below that the Minor will be at least 20 cr			
<a href="#">CHEM-E1110</a>	Lignocellulose Chemistry	5	II
<a href="#">CHEM-E1100</a>	Plant Biomass	5	I
<a href="#">CHEM-E7100</a>	Engineering Thermodynamics, Separation Processes, part I	5	I
<a href="#">CHEM-E7110</a>	Engineering Thermodynamics, Separation Processes, part II	5	II
<a href="#">CHEM-E1120</a>	Thermochemical Processes	5	III – V
<a href="#">CHEM-E1130</a>	Catalysis	5	III – IV
<a href="#">CHEM-E1140</a>	Catalysis for Biomass Refining	5	I – V

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CHEM-E3140	Bioprocess Technology II	5	II
CHEM-E1150	Biomass Pretreatment and Fractionation – in Class	5	III – V
CHEM-E1160	Biomass Pretreatment and Fractionation – in Laboratory	5	III – V
CHEM-E1200	Integration and Products	10	I– II

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