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Aalto University
School of Chemical
Engineering



Master's Programme in Chemical, Biochemical and Materials Engineering

Biomass Refining Major

8.9. 2020 Tapani Vuorinen and Minna Marin

Agenda

Who are we?
Getting to know
each other

Personnel of the
major

Degree and
major structure

Special
arrangements in
Autumn 2021

Study guidance
and coaching

Practical study
matters

Meeting the
academic
advisors

Who are we?

A short presentation of everyone present

Please tell briefly something about yourself to others, for example:

- Your name
- The country you are from
- Are you studying on campus or remotely?
- What do you expect from the forthcoming academic year 2021-2022?



Teachers of the major

Professors:

- Tapani Vuorinen, Olli Dahl, Herbert Sixta, Thaddeus Maloney, Eero Kontturi, Michael Hummel, Sandip Bankar, Silvan Scheller (CHEM/BIO2)
- Marjatta Louhi-Kultanen, Pekka Oinas, Riikka Puurunen (CHEM/CMET)
- Martti Larmi (ENG)

Lecturers:

- Kyösti Ruuttunen, Iina Solala, Eero Hiltunen (CHEM/BIO2)
- Juha-Pekka Pokki, Sarwar Golam (CHEM/CMET)

Learning services



Photo: Unto Rautio

Student advisor: Melissa Hendrén
msc-advisors-chem@aalto.fi

Study secretary: Kati Sumu
studies-chem@aalto.fi

Planning officer: Minna Marin,
minna.marin@aalto.fi

Additional information:

<https://into.aalto.fi/display/encbme/Contact>

Degree structure and planning your studies

Degree structure

120 ECTS credits:

- **Academic Learning Community (3-5 cr)**
 - *common to all students in Master's Programme in Chemical, Biochemical and Materials Engineering regardless of the major*
- **60 cr major studies**
 - *Compulsory studies*
 - *Specialization studies*
- **30 cr master's thesis** (approx. 5 months active work)
- **25 - 27 cr elective studies**
 - *Can include a minor*

→ Master of Science (Tech.)

Academic Learning Community (3 - 5)

Major studies (60 cr)

Master's thesis (30 cr)

Electives (25 - 27 cr)



Master of Science in Technology*

- **Major (63-65 cr)**
 - Academic Learning Community (3-5 cr)
 - Major-specific studies (60 cr)
- **Master's thesis (30 cr)**
 - The topic must be on the field of the major
- **Elective studies (25-27 cr)**
 - Student's own choices, academic advising available
 - Can include a minor

*In total 120 cr, description valid for your programme

Reasons to study Biomass Refining

- The Biomass Refining major provides competences that are essential in meeting some of the world's biggest challenges, especially the climate change and the plastic problem.
- For its part, circular bioeconomy, based on elaborate use of biomass, offers countless possibilities in replacing fossil carbon sources in production of healthy materials, chemicals and energy.
- In Finland, this industrial sector is very strong, including employers like Metsä Fibre, Stora Enso, UPM, Neste, Fortum, St1, Kemira, Andritz, Valmet, AFRY, Sweco and VTT.

Content description

The Biomass Refining major provides competences that are essential in meeting some of the world's biggest challenges, especially the climate change and the plastic problem. For its part, circular bioeconomy, based on elaborate use of biomass, offers countless possibilities in replacing fossil carbon sources in production of healthy materials, chemicals and energy.

The core of the Biomass Refining major is in deep understanding of biomass and its components on microscopic and molecular levels. This knowledge forms the scientific basis for mechanical, chemical, biochemical and thermochemical fractionation of biomass into its components and their conversion into fibre products, polymers, chemical compounds and fuels. The approach pays great attention on sustainability, resource efficiency and process integration, taking into account recycling and waste management.

The Biomass Refining major offers two specialization pathways, one in pulp and fibres and another in fuels and chemicals. The major applies knowledge of the fields of chemistry, chemical and process engineering and biotechnology, depending on the study track.

Main changes in the curriculum 2020-22

- Two specialization tracks were created: **Pulp and Fibre** and **Fuels and Chemicals**
- This change gave room to increase the depth and breadth of teaching in the two areas
- Several new courses were formed and adopted from other majors to fulfil the expectations from the industry
- The feedback from the industry and from the students has been very positive

Common compulsory courses (25-30 cr)

Code	Name	Year	Period	Remarks
CHEM-E1100	Plant Biomass ^a	1	I	
CHEM-E1110	Lignocellulose Chemistry	1	II	
CHEM-E1150	Biomass Pretreatment and Fractionation – in Class	1	III-V	
CHEM-E1210	Bioproduct Mill Recovery Processes	2	I	New course
CHEM-E1220	Sustainability in Bioproduct Industry	2	II	New course
CHEM-E7100	Engineering Thermodynamics, Separation Processes, part I	1	I	

^aCompulsory course if not part of bachelor's degree

Pulp and Fibre track (30-35 cr)

Code	Name	Year	Period	Remarks
CHEM-E0115	Planning and Execution of a Biorefinery Investment Project	2	I-II	New course in this major
CHEM-E1160	Biomass Pretreatment and Fractionation – in Laboratory	1	III-V	
CHEM-E2120	Fibres and Fibre Products	1	I	New course in this major
CHEM-E1105	Advanced Fibreline Processes	1	IV	New course
CHEM-E1120	Thermochemical Processes ^a	1	III-IV	
CHEM-E2140	Cellulose-Based Fibres ^a ^a Select one of these if CHEM-E1100 Plant Biomass is part of your compulsory studies	1	I-II	New course in this major
CHEM-E2005	Thermochemical Energy Conversion	1	III-IV	New course

Fuels and Chemicals track (30-35 cr)

Code	Name	Year	Period	Remarks
CHEM-E1120	Thermochemical Processes	1	III-IV	
CHEM-E1130	Catalysis	1	III	
CHEM-E2155	Biopolymers	1	III-IV	New course in this major
CHEM-E2140	Cellulose-Based Fibres	1	I-II	New course in this major
CHEM-E3140	Bioprocess Technology II	1	II	
CHEM-E3190	Metabolism	2	I-II	New course
AAE-E3100	Energy Carriers	2	I	New course

^aSelect one of these if CHEM-E1100 Plant Biomass is part of your compulsory studies

Special arrangements in autumn 2021

Code	Name	Credits	Period	Arrangements
<u>CHEM-E0105</u>	Academic Learning Community	3-5	I–V / 1st	Teaching remotely
<u>CHEM-E1100</u>	Plant Biomass*	5	I / 1st	Partly on campus
<u>CHEM-E1110</u>	Lignocellulose Chemistry	5	II / 1st	Partly on campus
<u>CHEM-E7100</u>	Engineering Thermodynamics, Separation Processes, part I D	5	I / 1st	Teaching remotely

Special arrangements in autumn 2021

Code	Name	Credits	Period	Arrangements
<u>CHEM-E2120</u>	Fibres and Fibre Products	5	I / 1st	Teaching remotely
<u>CHEM-E2140</u>	Cellulose-Based Fibres D**	5	I-II / 1st	Teaching remotely
<u>CHEM-E2140</u>	Cellulose-Based Fibres D	5	I-II / 1st	Teaching remotely
<u>CHEM-E3140</u>	Bioprocess Technology II	5	II / 1st	Teaching remotely

A?

Engineering

CHEM-E0105 Academic Learning Community

Let's make this the best course ever!

Please note: MATLAB module (1 ECTS) starts on Monday, Sep 13th, 8-10 am

What?

- Course for *all* master's students in CHEM
- 3-5 cr, depending on completed tasks

When?

- Periods I-V
- Starting on September 20th, 8:30-10 am

Why?

- Learning *general skills and knowledge*
- Helping you *succeed in your studies*

For more information: [MyCourses](#)



Senior university lecturer
Kyösti Ruuttunen cannot wait
for the course to start!

Photo: Kitty Norros

Elective studies / Minor

- Elective studies (25-27 cr)
- Possible to include a minor (15-25 cr) into the elective studies
- Minor not compulsory → degree without minor



- <https://into.aalto.fi/display/enopinnot/Minors+2020-2022>

Laboratory Safety Course

- **If not part of your BSc degree, include the course in your plan**
- **This is required before starting any laboratory work**
- **CHEM-E0140 Laboratory Safety Course**

Language studies

- Mandatory in your degree if not part of your bachelor's degree (according to degree regulations)
- **3 ECTS** credits
- Only courses with letters O (for oral) and W (for written) fulfil the requirements
- English recommended, but other languages can be taken as well
- Finnish basic courses allowed
- Students with a Finnish bachelor's degree (including AMK students): usually no obligatory language studies required



Master's Thesis

Goal: master's thesis completed by the end of the 2nd study year

Before you start your master's thesis:

- complete all compulsory studies
- make sure your study plan is up-to-date

How to find a thesis position/topic:

- Be active!
- Start looking for a master's thesis position early, during the Spring of the 1st study year
- Be open to new ideas!
- Don't wait too long for the "perfect" master's thesis offer

WHAT PEOPLE THINK
THESIS WRITING IS
LIKE:



WHAT I THINK THESIS
WRITING IS LIKE:



WHAT THESIS WRITING
IS REALLY LIKE:



Planning your studies

All students are required to prepare a **personal study plan (HOPS)** as a part of their master's studies and always keep it up-to-date.

- The study plan is a **binding agreement** on both parties: the student and the university.
- Students can, at any time of their studies, **update** their study plan. The study plan should at all times correspond to the student's current plan for his/her studies. Changes to the study plan should always be done before participating in courses.

Planning your studies

- The study plan includes:
 1. Major courses, based on curriculum
 - *Compulsory courses and specialisation courses*
 2. Elective courses
 - *Possible to include a minor in the elective studies, not compulsory*
 3. Timing of all chosen courses and the master's thesis
 - Study plans are created in SISU
 - Some parts require approval
 - *Approved by the planning officer, deviations from the curriculum need to be separately approved by the professor in charge of the major*
 - Deadline: **10 September 2021**
 - More instructions: <https://into.aalto.fi/display/encbme/Planning+your+studies>
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Why should you earn your degree within two academic years?

Requires an average of 60 credits per year

WHY?

- It shows your potential future employers that you are able to commit to your studies and that you can acquire a wide spectrum of new knowledge while keeping to an agreed schedule
- CHEM rewards students who have completed their degree within the target time -> 500€



More information: <https://into.aalto.fi/display/encbme/Planning+your+studies>

Student guidance and coaching in Aalto CHEM

Academic advising

The academic advising at Aalto CHEM is organised in connection with the course CHEM-E0105 Academic Learning Community.

- *Two compulsory individual meetings with your academic advisor (academic advisor organizes)*
- *Support!*



Practical study matters

Student feedback



Be active in providing your feedback regarding courses and also the major as a whole



Course feedback is collected after every course and is valuable for course development



Feedback sessions with students and teachers will be organized

Twice in an academic year.

These sessions are a part of CHEM-E0105 Academic Learning Community course.

Be an active student

- Take the responsibility of your studies
- Use the curriculum and other resources → Into, MyCourses, SISU

- Read your **aalto.fi e-mails**
 - *Change the password every 6 months*



- Can't find information or unsure -> please, ask!
- Participate actively in your courses and challenge your teacher!

What's next?

- Orientation to Services and Wellbeing, “Service fair”: **Thu September 9, 13:00-15:00** [LINK](#) (*for students from outside Aalto, optional for Aalto bachelors*)
- IT services and enrolment to courses: Thu **9.9. at 10.00-12:00** (*for students from outside Aalto, recommended for Aalto bachelors*)
- Student union (AYY) introduction **Fri 10.9. 9:30-10:00** (*Optional for all*) [LINK](#)
- Q&A Session with Learning Services Fri 10:00-12:00 (*Optional for all*) [LINK](#)
- **TeekkariLife lecture** ~30 min (*Optional for all, you can watch at any time*)

Meeting the academic advisors

Ouyang, Kun	Kyösti Ruuttunen
Pereira Torres, Carolina	Kyösti Ruuttunen
Porvali, Ville Petteri	Kyösti Ruuttunen
Kasper	Kyösti Ruuttunen
Jersnström	Kyösti Ruuttunen
Henrik Lindberg	Kyösti Ruuttunen
Essi Räisänen	Kyösti Ruuttunen
Oskari Virolainen	Kyösti Ruuttunen

Tzanakaki, Angeliki	Tapani Vuorinen
Vlasova, Mariia	Tapani Vuorinen
Voipio, Ainu Maria Aleksandra	Tapani Vuorinen
Aarni Aspi	Tapani Vuorinen
Ilmari Hieta	Tapani Vuorinen
Viivi Huotari	Tapani Vuorinen
Jenni Ikonen	Tapani Vuorinen

Hakim, Md Azizul	Olli Dahl
Heikkilä, Henri	Olli Dahl
Nyqvist, Camilla	Olli Dahl

Hanna Seppäläinen	Olli Dahl
Robert Snårbacka	Olli Dahl
lines Toivanen	Olli Dahl

Welcome to begin your Master Studies at Aalto University!



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