



Aalto University
School of Chemical
Engineering

Welcome to study at Aalto University!

Master's Programme in Chemical, Biochemical and Materials Engineering

Chemical and Process Engineering

8.9.2021 Marjatta Louhi-Kultanen and Anja Hänninen

Agenda

1. **Who are we? Getting to know each other**
2. **Personnel of the major**
3. **Degree and major structure**
4. **Special arrangements in Autumn 2021**
5. **Student guidance and coaching**
6. **Practical study matters**
7. **Meeting the academic advisors**

Who are we?

A short presentation of everyone present

Please tell briefly something about yourself to others:

- Your name
- The country you are from



Personnel of the major

Professors:

- Louhi-Kultanen Marjatta (*professor in charge of major*)
- Alopaeus Ville
- Corona Francesco (*academic advisor*)
- Li Yongdan
- Oinas Pekka
- Puurunen Riikka (*academic advisor*)
- Seppälä Jukka
- Harjunkoski Iiro

Other teaching staff:

- Karinen Reetta (*academic advisor*)
- Pokki Juha-Pekka (*academic advisor*)
- Jakobsson Kaj (*academic advisor*)
- Kortela Jukka (*academic advisor*)
- Lipponen Sami (*academic advisor*)
- Sarwar Golam (*academic advisor*)
- Viinikainen Tiia (*academic advisor*)

Personnel of the major - professors



**Marjatta
Louhi-Kultanen**
Chem. Eng. in
Aqueous Syst.
(in charge of major)



Ville Alopaeus
Chemical
Engineering



Francesco Corona
Process Control



Iiro Harjunkoski
Process Control



Yongdan Li
Industrial Chemistry



Pekka Oinas
Plant Design



Riikka Puurunen
Catalysis



Jukka Seppälä
Polymer Technology

Learning services



Photo: Unto Rautio

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

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

Planning officer: Anja Hänninen
Anja.hanninen@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)



Major structure

Common compulsory course 3-5 cr

Compulsory courses 35 cr

Specialization courses 25 cr

Elective studies 25-27 cr

Thesis 30 cr

1st year

Fall I

Spring I

Academic Learning Community (3-5 cr)

Engineering
Thermodynamics,
Separation Processes,
part I

Laboratory Project in
Chemical Engineering

Process Dynamics and
Control

Design Project in
Chemical Engineering,
part A

Reaction Engineering

Process Modeling

Specialization course

Specialization courses

Elective studies

2nd year

Fall II

Spring II

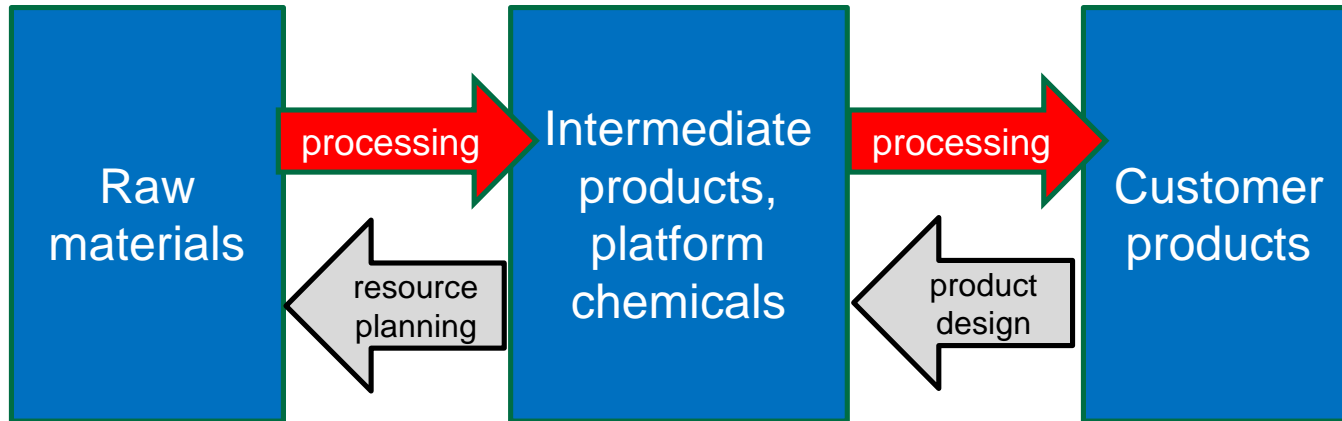
Design Project in
Chemical Engineering,
part B

Specialization course

Elective studies

Thesis

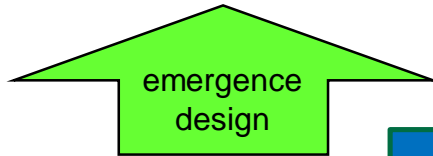
From raw materials to products (value chain perspective)



From phenomena to processes (multiscale perspective)

- Plant level
- Impact
- Large scale

Chemical industrial plants, production planning,
economics, societal effects, environment



- Process level
- Engineering
- Equipment scale

Separation
processes

Conversion
processes

Other processing
units (pumps, vessels...),
instrumentation



- Phenomena level
- Natural sciences
- Molecular scale

Transport
phenomena

Chemical
kinetics,
catalysis

Thermodynamics,
physical
properties

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

Specialisation studies (25 cr)

Chemical Engineering

Engineering Thermodynamics, Separation Processes, part II
II / 1st

Experimental Assignment in Chemical Engineering
I-II or III-V / 1st or 2nd

Fluid Flow in Process Units
IV-V / 1st

Reaction Engineering

Experimental Assignment in Chemical Engineering
I-II or III-V / 1st or 2nd

Reactor Design
III-IV / 1st or 2nd

Catalysis
III / 1st or 2nd

Polymer Engineering

Experimental Assignment in Chemical Engineering
I-II or III-V / 1st or 2nd

Polymer Properties
II / 1st

Polymer Reaction Engineering
III-V / 1st

Plant Design

Process Development
I-II / 1st or 2nd

Process Safety and Sustainability
I-II / 1st or 2nd

Plant/Process Design and Business Management
III-V / 1st or 2nd

Process Systems Engineering

Production Planning and Optimization
I / 1st

Advanced Process Control
III / 1st or 2nd

Special Course in Process Systems Engineering
IV / 1st or 2nd

Specialization track Chemical engineering

Equipment design of unit operations

- Solid-liquid, liquid-liquid, gas-liquid, multi-phase, kinetics

Process simulation software Aspen Plus

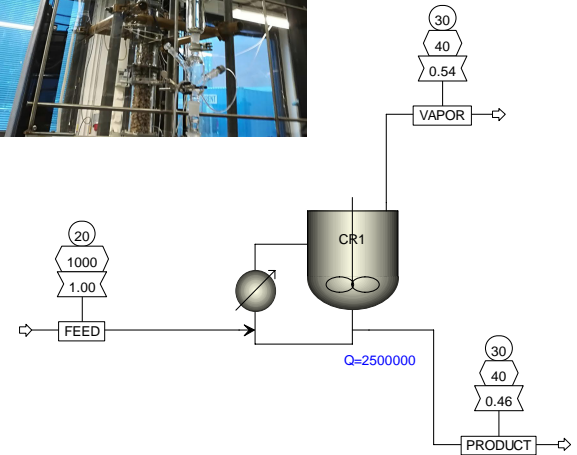
- Studies with laboratory and pilot scale equipment

Thermodynamics

- Equilibria of multi-phase systems
- Ideal and non-ideal compound systems

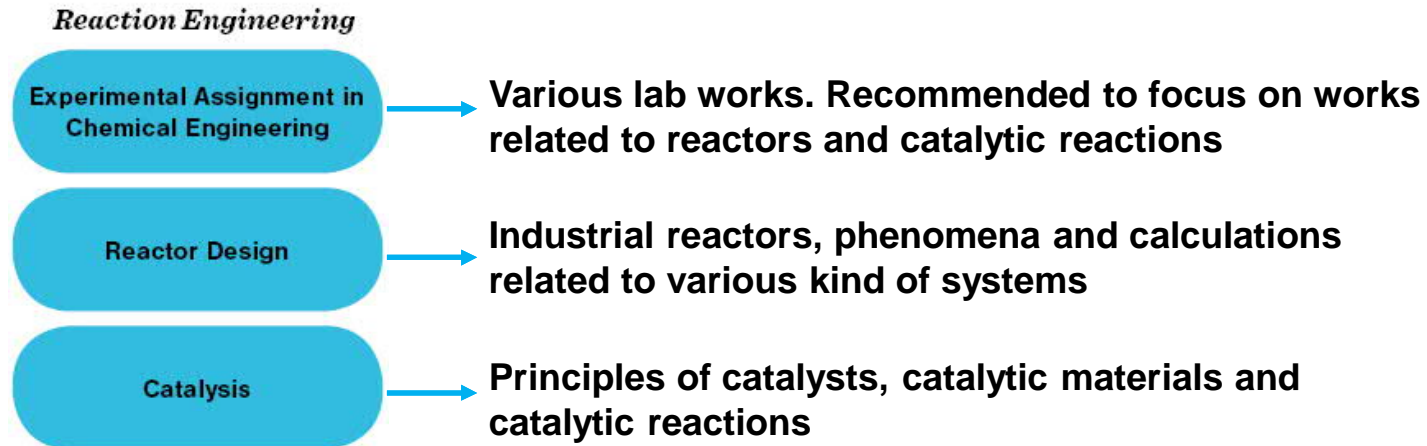
Fluid flows

- Computational Fluid Dynamics modeling by Comsol software



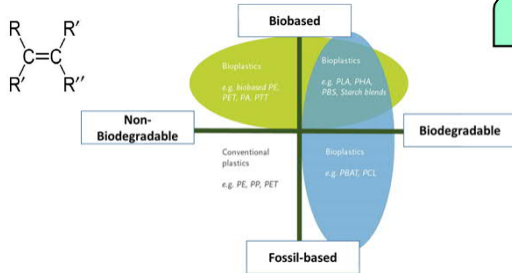
Specialization track Reaction engineering

The Reaction engineering track focuses on **chemical reactors** and **catalytic reactions**.

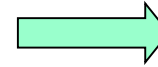
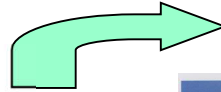


Specialization track Polymer Engineering

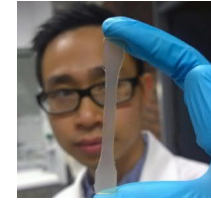
Monomers



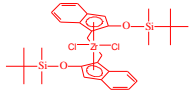
Polymer Engineering



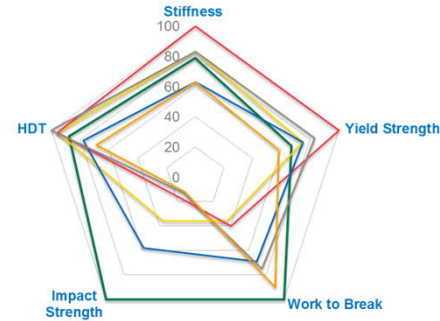
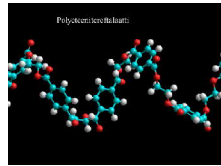
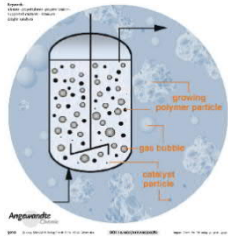
Products



Catalysts

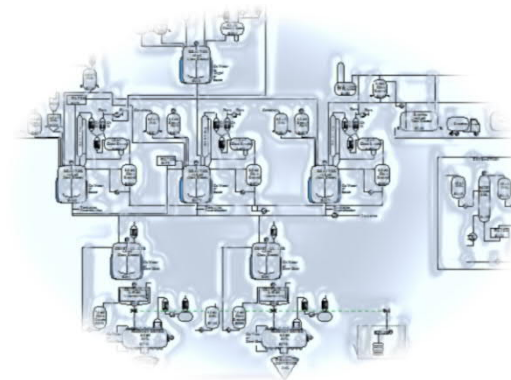


Polymerization and reactors



Specialization track Plant Design

- Innovative design of chemical plants
- Basic principles of large scale, real-life industrial equipment and operations
- Scale-up
- Dimensioning of equipment
- Process design chain from R&D to plant start-up
- Techno-economic-societal assessment
- Process simulation and cost calculation
- Safety & sustainability and EHSQ-issues
- Business, competition and markets
- 'Out-of-the- box' –mindset for design of industrial operations



Specialization track Process Systems Engineering

Learning and research at the interface of **Automatic Control, Applied Maths and Machine Learning**

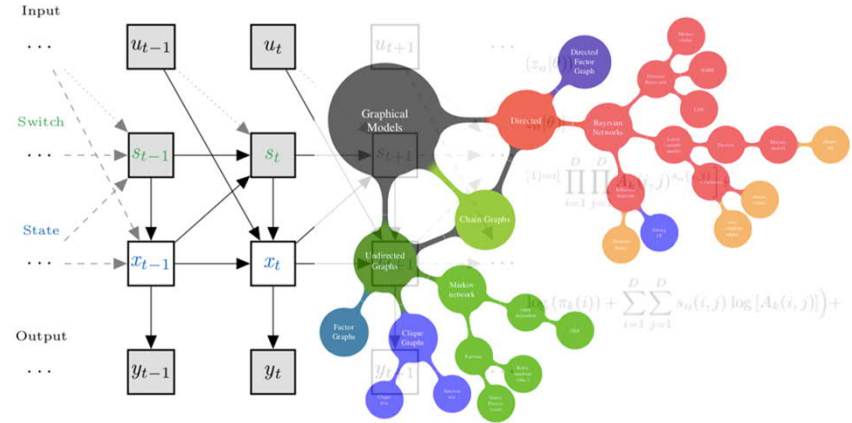
- Focus on full-scale (bio-) chemical and environmental process systems

Combine **phenomenological and statistical modelling**, with a touch of **data science**

- Dynamics and control of process systems
- Large-scale optimization and planning and scheduling of production processes

A computational approach to a sustainable and resource-efficient process engineering

World-class infrastructure (Factory of future automation, in the ABio Center)



Unique professional profile for process engineers

- They want you out there

Scientific career with opportunities for innovation

- We need you in here

Which 1-2 track(s) are you preliminarily interested in?

Answer the poll.

***Chemical Engineering
Reaction Engineering
Polymer Engineering
Plant Design
Process Systems Engineering***

Special arrangements in Autumn 2021

Compulsory courses

Code	Name	Credits	Period	Arrangements
<u>CHEM-E0105</u>	Academic Learning Community	3-5	I–V	Remote teaching
<u>CHEM-E7100</u>	Engineering Thermodynamics, Separation Processes, part I D	5	I	Remote teaching
<u>CHEM-E7130</u>	Process Modeling	5	I	Remote teaching
<u>CHEM-E7190</u>	Process Dynamics and Control D	5	II	Remote teaching
<u>CHEM-E7150</u>	Reaction Engineering	5	II	Remote teaching

Special arrangements in Autumn 2021

Specialisation courses

Code	Name	Credits	Period	Arrangements
<u>CHEM-E7110</u>	Engineering Thermodynamics, Separation Processes, part II D	5	II / 1st	Remote teaching
<u>CHEM-E7115</u>	Experimental Assignments in Chemical Engineering	5	I-II or III-V / 1st or 2nd	Labs on campus
<u>CHEM-E2130</u>	Polymer Properties	5	II / 1st	Remote teaching
<u>CHEM-E7105</u>	Process Development	5	I-II / 1st or 2nd	Remote teaching
<u>CHEM-E7175</u>	Process Safety and Sustainability D	5	I-II / 1st or 2nd	Remote teaching
<u>CHEM-E7151</u>	Production Planning and Optimization	5	I / 1st	Remote teaching

Elective studies / Minor

- Elective studies (25-27 cr)
- Students specialising in process systems engineering are encouraged to select one or more of these courses:
 - *MS-E2122 Nonlinear Optimization, 5 cr, I-II*
 - *CS-EJ3211 Machine Learning with Python, 2 cr, I-II*
 - *ENG-A1003 Numerical Methods in Engineering, 5 cr, III*
 - *MS-C2105 Introduction to Optimization, 5 cr, IV*
 - *MS-A0503 First course in probability and statistics, 5 cr, III OR MS-A0504 Todennäköisyyslaskennan ja tilastotieteen peruskurssi, 5 cr, IV*
 - *CS-E4710 Machine Learning: Supervised Methods, 5 cr, I-II*

Elective studies / Minor

- Possible to include a minor (15-25 cr) into the elective studies
- Minor not compulsory → degree without minor
- Recommended minors:
 - *Biomass Refining*
 - *Chemistry*
 - *Sustainable Metals Processing*
- <https://into.aalto.fi/display/enopinnot/Minors+2020-2022>

CHEM-E0140 Laboratory Safety Course

- Instructions to Digital Lab Safety Course, kirsi.yliniemi@aalto.fi
- There are two courses, you need to pass only one of them:
 - CHEM-A1010 Turvallinen työskentely laboratoriossa
(Finnish version for bachelor students)
OR
 - CHEM-E0140 Laboratory Safety Course
(English version, mainly for master level and exchange students)

PLEASE NOTE!

- Access to CHEM buildings is automatically linked to Lab Safety Courses
- You must have a Lab Pass before entering the labs of CHEM (more info can be found from course pages)

What to do?

1. Add “**CHEM-E0140 Laboratory Safety Course**” to your personal study plan (HOPS) in SISU (sisu.aalto.fi) - *CHEM.E Elective studies*.
2. Register to the course “**CHEM-E0140 Laboratory Safety Course**” in SISU (sisu.aalto.fi)
3. Go to MyCourses → “**CHEM-E0140 Laboratory Safety Course**” (mycourses.aalto.fi)
4. Follow the link to Virtual Lab Space
5. Take the Digital Exam in the MyCourses
 - You will be notified immediately whether you passed the exam (to pass: 65 % of the points).
 - You can take the exam as many times as you like...but the questions keep changing.
 - It is recommended that you have Virtual Lab open at the same time as you take the exam:

Do not just guess answers! This is for your own and others safety!

Pass the course **this week**

– you need a Lab Pass to enter the labs

- **After** passing Lab Safety Course, you will be printed

a Lab Pass:



- You have to have your Lab Pass visible on your lab coat when entering labs
- *(Note! The printing is done only after passing the course)*
- Pick up your Lab Pass from the study advisors' pop-up desk (CHEM main lobby, Kemistintie 1)

Study period when you take the Lab Safety	Passes ready in Study Advisors pop-up desk
Orientation Week September 2021 (< Sun 12 th Sep)	WED 15 th September onwards
PERIOD I (< Sun 19 th Sep)	WED 22 nd September onwards
PERIOD II (< 7 th Nov)	WED 10 th November onwards
Orientation Week January 2022 (< Sun 9 th Jan)	WED 12 th January onwards
PERIOD III (< 16 th Jan)	WED 19 th January onwards
PERIOD IV (< 6 th March)	WED 9 th March onwards
PERIOD V (< 24 th April)	WED 27 th April onwards

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



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>
-

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€
- It's a fast track to summer jobs at the departments



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!*



Academic advising

Most students felt that they benefit from the meetings (85,7%)

Many students wish for more than 2 meetings

Benefits for a student

- *help & advice & tips*
- *having a mentor, someone confidential supporting you*
- *getting feedback and ideas, other opinions*
- *a good possibility to talk, to share feelings*
- *building an academic network*

We could discuss anything related to studies and courses

I was able to reflect on my studies and see what went well and what I still need to improve upon.

I think it is just the fact that my advisor listened to everything and she didn't make it difficult to talk to her.

Very good concept! Good to have a person assigned to you so you know who to ask when you need help with something.

The advisor answered to every question and we had altogether quite a nice meeting.

All in all, I feel like academic advising is needed and welcome!

Academic advising groups

1. Francesco Corona

Atte Grönfors
Meri Oja
Pinja Heikkinen
Markus Luukkonen

2. Kaj Jacobsson

Piia Herttuainen
Ahmed Othman
Arvi Heinijoki
Juho Maukonen

3. Reetta Karinen

Dora Horto
Prakash Pandey
Antti Henriksson
Teemu Pulkkinen

4. Jukka Kortela

Heidi Koskela
Taru Jormakka
Emil Pärssinen
Tony Vuorio

5. Sami Lipponen

Toivo Kuisma
Kristian Chen
Jänis Järvilehto
Tella Taskinen
Aino Anttila

6. Marjatta Louhi-Kultanen

Joni Kurki
Joni Diep
Niilo Kostander
Roosa Similä

7. Juha-Pekka Pokki

Jutta Lahti
Eeli Haapala
Tatu Köli
Jaakko Säaskilahti

8. Riikka Puurunen

Riikka Lepistö
Erik Haikala
Sani Letchu
Laura Virtanen

Academic advising groups

9. Golam Sarwar

- Leevi Levo
- Oona Hanska
- Nea Levonmäki
- Eetu Salmijärvi

10. Tiia Viinikainen

Feng Ma

Songwen He

Laura Lukkarila

Julia Tofferi

Practical study matters

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. These sessions are a part of the CHEM-E0105 Academic Learning Community course.
- Answer the AllWell? questionnaire.

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**



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

Major page on MyCourses

Chemical and Process Engineering has its own forum for common issues of the major

<https://mycourses.aalto.fi/course/view.php?id=19603>

- Gallery introducing teaching staff
- Teachers' feedback on students' course feedback
- Recommended literature
- New topics for Master's theses, new positions, etc.

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

- Get to know each other
- Study plan
- Free discussion

➤ *Break-out rooms*

Welcome to begin your master's studies at Aalto University!

