Master's thesis

- Study attainment of 30 ECTS credits
    - Compulsory part of studies – opportunity for specialization
    - The master's thesis is written on a topic related to the advanced studies of the degree programme
- General learning outcomes
    - Ability to apply the principles of science in solving research problems
    - Building on existing knowledge
    - Using scientifically relevant methodology
    - Logical argumentation based on facts
    - Improved skills for exact technical and scientific communication, in writing and orally
    - To get experience in conducting an independent technical or scientific research project

Main steps towards a Master's thesis

- Search for and agree on a topic in collaboration with Aalto professor (= Supervisor)
    - Start the searching several months before the planned starting time of the thesis work
    - aalto.fi -> CHEM school -> Departments -> Research
    - CHEM Master's Thesis Hub in MyCourses
- -Kick-off meeting with Supervisor and Advisor
- -Apply for topic approval from the Degree Programme Committee (DPC)
    - Check the application/meeting times beforehand
- -Carry out the work and write the thesis
- -Provide an oral presentation on the thesis
- -Apply for approval of the thesis from DPC
    - Check the application/meeting times beforehand

Check the Master's Thesis page in Student Guide! https://www.aalto.fi/en/programmes/masters-programme-in-chemical-biochemical-and-materials-engineering/thesis

General guidelines for thesis work

- Quality is always more important than quantity!
- Typical workload division
    - Studying literature and writing the review: 30%
    - Planning and executing the experiments and analyzing the results: 50%
    - Finalizing the writing: 20%
- Maximum length 70-80 pages with appendices
    - Appendices should be used for experimental details that are not necessary for understanding the main results/discussion
- Typical number of literature references is ≥ 50
- Discuss with your Supervisor for personal quidelines!

Structure of Master's thesis

- Introduction
  - Background for the research question: motivation, focus, objectives, hypotheses
- Literature review
  - Should support solving the research question: understanding the system, learning from others and their research methodologies
  - Should be critical and analytical
- Experimental
  - Exact description of the experimental methods applied (to be repeated by anyone else)
- Results and discussion
  - Exact and concise presentation
  - Focus on the main results (not individual observations)
  - Error analysis and reliability of the results
  - Connections to earlier literature
- Conclusions
  - Relative to the research question
  - Claims on novelty
  - Suggestions for further research

Finding Master's thesis project

- In a company or other non-academic organization
  - Direct connections or through professors
  - The most important (50%) way to become employed after the graduation
- In university
  - Projects funded by companies – often followed keenly by the companies (opportunity to get familiar with the company representatives)
  - Academically funded projects
  - Personal, non-funded project
- In Finland or abroad?
  - Professors have broad international research networks and most universities accept visiting master's thesis students

Support can be found in Aalto career design lab https://www.aalto.fi/en/aalto-university/career-design-lab

Funding of Master's thesis project

- Direct salary
  - In companies; agreement between the company and the student
  - Externally funded full-cost projects in university; fixed salary level
- Personal grants
  - Funding through Aalto University's and other research foundations
  - In some cases, directly from university or other organization

    - Additional grants available for students doing their master's theses abroad
- No compensation
    - Freedom in selection of the topic

Alternative funding may be found via the Foundation of Aalto University Science and Technology
https://www.aalto.fi/en/foundation-for-aalto-university-science-and-technology

Practical matters in the MSc Thesis process

Lots of information in the Student guide:

https://www.aalto.fi/en/programmes/masters-programme-in-chemical-biochemical-and-materials-engineering/thesis

Aproval of MSc Thesis topic

- Electronic application system eAge, *until spring 2024*
- Prerequisites
    - Completed Bachelor's degree or equivalent
    - Suitable stage of master's studies for starting the thesis
    - Personal study plan (HOPS) made
- Information required (must be agreed beforehand with the supervisor)
    - Supervisor[a] (name)
    - Advisor(s)[b] (name, title, contact information)
    - Topic with the thesis language (English, Finnish or Swedish)
    - Degree programme and major
- The Degree Programme Committee approves the topic and language of the thesis and nominates the supervisor and the advisor(s) under the following conditions:
    - The prerequisites are fulfilled, and the topic meets the criteria for a master's thesis
    - The thesis must have a Supervisor and one or two Advisors
    - The topic must be informative and should not contain abbreviations
    - The approval is valid for one year (12 months) – the thesis should be submitted for approval within this time

[a]The supervisor must be a professor in Aalto University, in special cases a lecturer may also act as a supervisor with Dean's permission.

[b]The advisor(s) must own master's or higher academic degree.

Approval of Master's thesis

- Apply for approval of the thesis from DPC at eAge system
    - Check the application deadlines and meetings from the Study administration schedule in Student Guide, under Graduation*: https://www.aalto.fi/en/programmes/masters-programme-in-chemical-biochemical-and-materials-engineering/graduation*
    - Always agree on the evaluation schedule in advance with your Supervisor
- Electronic application system
    - an electronic, final copy (pdf/A-format) of the thesis must be submitted

Evaluation process of Master's theses

- The thesis supervisor provides a numerical evaluation and a written statement to DPC and proposes a grade
  - If the supervisor proposes grade 1 or 5, an independent statement from another professor is required
- DPC decides on the grade based on the evaluation(s)
  - DPC can decide on a higher or lower grade in the case of an ambivalent statement and after an additional review of the thesis
- The student has a right to make an appeal on the grade
  - The appeals are handled by a university level body; an additional investigation by DPC is asked, usually including a more detailed statement from the supervisor

MSc Thesis evaluation guidelines and Characterization of thesis grades can be found in the Student Guide https://www.aalto.fi/en/programmes/masters-programme-in-chemical-biochemical-and-materials-engineering/thesis

The evaluated and graded Master's thesis is a public document

- Master's thesis will be available in the Learning Centre and also saved in the Aaltodoc database (https://aaltodoc.aalto.fi/)
- Latest instructions at https://www.aalto.fi/en/applications-instructions-and-guidelines/theses-as-public-documents