



Aalto University

Curriculum for Aalto Doctoral Programme in Engineering 2024-2026

Content

According to the Aalto University General Regulations on Teaching and Studying, a curriculum is a confirmed overall description of the learning outcomes of the degree programme, the goals and contents of the study modules, course selection and the organisation of teaching in a given period of time. The course descriptions and organization of teaching is presented in SisU.

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1. Basic information on the programme

1.1. Name of the programme

Aalto Doctoral Programme in Engineering
Insinööritieteiden tohtorihjelma
Doktorandprogrammet i Ingenjörsvetenskaper

1.2. Title of the degree earned

Doctor of Science (Technology)

Licentiate of Science (Technology)

1.3. Languages of degree

Finnish, Swedish, English

1.4. Programme scope

40 ECTS + doctoral thesis / licentiate thesis

1.5. Target time

Doctoral degree: 4 years of full-time studies or 4-8 years of part-time studies

Licentiate degree: 2 years of full-time studies or 2-4 years of part-time studies

2. Education objectives and intended learning outcomes of the programme

After completing the degree the doctoral student is able to carry out independent and original academic research.

Doctoral education at Aalto University is conducted within a multidisciplinary international academic community that provides opportunities for field-specific and multidisciplinary research, as well as for various forms of education and learning. High quality education, transferable skills training, and network-building ensure the development of doctoral students as independent researchers and experts of their research fields.

The education prepares doctoral students for academic careers at top-level institutions. It provides competencies to pursue various career paths also outside of academia, for example working at demanding expert positions or as entrepreneurs.

The doctoral degree is a requirement to serve as a thesis advisor for doctoral students and as examiner for a doctoral degree.

3. Structure of the programme

Doctoral thesis / Licentiate thesis	General research studies (5-20 ECTS)
	Research field studies (20-35 ECTS)

The programme comprises three study modules:

- General research studies, 5-20 ECTS
- Research field studies, 20-35 ECTS
- Doctoral thesis / licentiate thesis

General research studies prepare students for research work, the application of research results and to learn the principles of responsible conduct of research. General research studies can include transferable skill studies.

Research field studies and doctoral thesis help students to gain comprehensive and in-depth knowledge of their research field and prepares them for the dissemination of research findings.

Based on the degree regulations on doctoral education, doctoral students must prepare a doctoral personal study plan (DPSP), which includes plans for the contents, scope and duration of their studies, research, supervision, funding and career. Students who wish to deviate from the approved curriculum of their programme must obtain approval for their doctoral personal study plan.

In addition to the courses taught at the School in Engineering, the degree can include other courses taught in Aalto University or other universities, as agreed in the doctoral personal study plan of the student (DPSP).

If the student does not want to finish the doctoral degree, the licentiate degree can be completed as an intermediate degree. The licentiate degree consists of an approved licentiate thesis and the same 40 ECTS of studies as for the doctoral degree.

3.1. General research studies

3.1.1. Intended learning outcomes

Depending on the studies chosen for this module, the doctoral student will be able to

- to comprehend and conscientiously address the fundamental ethical and sustainability considerations associated with their research.
- choose and apply appropriate research methods to the research question at hand
- adhere to the principles of responsible conduct of research (RCR) in both their research work and interactions within the research community
- work collaboratively within a multidisciplinary and international environment, engaging with diverse stakeholders.
- proficiently present their research in both scientific and professional settings.
- identify, utilize and communicate their transferable skills, such as communication, interpersonal, project management, leadership and pedagogical skills, to work successfully in academic and other professional positions.
- to communicate professionally in national language(s)

3.1.2. Degree requirements

Compulsory courses

LC-L1010 Research Ethics for Doctoral Students, 1-2 ECTS

Elective courses

Responsible conduct of research

LC-1333 Navigate your doctoral studies while learning about equity, diversity, and inclusion, 3 ECTS

LC-L1011 Open Science for Doctoral Students, 1 ECTS

LC-L1020 Theory of Science, 1 ECTS

General methodological and theoretical studies

ENG-L1000 Introduction to doctoral studies D, 3 ECTS

Science communication and presenting doctoral research

LC-LXXX Writing doctoral research for xxx, 3 ECTS

LC-1335 Preparing for the Doctoral Defense (o), 1 credits

LC-1336 Popularize your Research (o,w), 1-3 credits

LC-7110 Tieteellinen kirjoittaminen tohtoriopiskelijoille, 3 ECTS

LC-L1017 Asiantuntijaesittämisen valmennus jatko-opiskelijoille

LC-L1018 Tutkimusraportoinnin tekstireitit jatko-opiskelijoille

LC-L1019 Tutkimustiedon yleistajuistaminen

LC-1330 Presenting Doctoral Research (o), 3 credits

ENG-L2010 Presenting research at a conference I D, 1-3 ECTS

ENG-L2011 Presenting research at a conference II D, 1-3 ECTS
ENG-L2012 Presenting research at a conference III D, 1-3 ECTS
ENG-L2013 Presenting research at a conference IV D, 1-3 ECTS

Scientific community and working life skills

LC-L1012 Business Skills for Doctoral Students (1 ECTS)
LC-L1013 Career Course for Doctoral Students, (1 ECTS)
LC-L1014 Interactive Leadership Skills for Doctoral Students, (1 ECTS)
LC-L1015 Project Management for Doctoral Students, (1 ECTS)
LC-L1016 Writing Research Grant Applications for Doctoral Students, (1 ECTS)
PED-9011 A! Peda Intro (5 op)
ENG-L2020 Academic advising I D, 1-3 ECTS
ENG-L2021 Academic advising II D, 1-3 ECTS
ENG-L2022 Academic advising III D, 1-3 ECTS
ENG-L2023 Academic advising IV D, 1-3 ECTS
ENG-L2030 Teaching at higher education I D, 1-3 ECTS
ENG-L2031 Teaching at higher education II D, 1-3 ECTS
ENG-L2032 Teaching at higher education III D, 1-3 ECTS
ENG-L2033 Teaching at higher education IV D, 1-3 ECTS
ENG-L2040 University practices I D, 1-3 ECTS
ENG-L2041 University practices II D, 1-3 ECTS
ENG-L2042 University practices III D, 1-3 ECTS
ENG-L2043 University practices IV D, 1-3 ECTS
ENG-L2050 Reviewing a scientific manuscript I D, 1 ECTS
ENG-L2051 Reviewing a scientific manuscript II D, 1 ECTS
ENG-L2052 Reviewing a scientific manuscript III D, 1 ECTS
ENG-L2053 Reviewing a scientific manuscript IV D, 1 ECTS

Finnish/Swedish language studies

Maximum of 6 ECTS of Finnish/Swedish courses (minimum level A1)

From Aalto University Language Centre

For example:

LC-7210 Finnish 1, 3 ECTS
LC-7220 Finnish 2, 3 ECTS

3.2. Research field studies

The Aalto Doctoral Programme in Engineering comprises of research fields/majors confirmed by the Academic Committee of the School. The research fields and their descriptions can be found here: <https://www.aalto.fi/en/doctoral-education/research-fields-and-supervising-professors-school-of-engineering>.

3.2.1 Intended learning outcomes

After completing this module, the doctoral student will be able to:

- demonstrate advanced discipline-specific knowledge
- identify essential research methods for their own research and apply them proficiently.
- disseminate research findings through relevant research forums and to the wider public.

3.2.2. Degree requirements

Together with his/her supervising professor, every doctoral candidate plans which studies should be included in this part of the personal study credit plan. These studies might include, for example, general and specific studies related to student's thesis topic. Further instructions and courses organized by Aalto ENG are available on the doctoral programme's [aalto.fi](https://www.aalto.fi) webpages. Courses are found in [MyCourses](#), [SISU](#) or courses.aalto.fi, findocnet.fi and doctoralcourses.fi.

Research field studies need to be post-graduate courses (advanced level) or other studies eligible for doctoral degree. No credits are given for doing research.

Post-graduate courses are marked letter D in the course name, with letter L in the course code or as "doctoral" in the course description. For example:

- EEN-E2004 Mass Transfer **D**
- MEC-L1001 Design Science

Suggested ways to complete the module:

- Attending suitable courses in Aalto University or another university
- Completing and reporting practical assignments related to the research field
- Writing a literature review
- Oral or written examinations based on textbooks
- Studies in scientific summer and winter schools and courses organised by graduate schools
- Conference presentations
- Learning of university practices

Doctoral seminar

Department's / Research fields / Major's seminars

Methodological, theoretical and content studies (related to the thesis)

ENG-L2060 Literature I D, 1-6 ECTS

ENG-L2061 Literature II D, 1-6 ECTS

ENG-L2062 Literature III D, 1-6 ECTS

ENG-L2063 Literature IV D, 1-6 ECTS

ENG-L2080 Summer or Winter Schools I D, 1-6 ECTS

ENG-L2081 Summer or Winter Schools II D, 1-6 ECTS

ENG-L2082 Summer or Winter Schools III D, 1-6 ECTS

ENG-L2083 Summer or Winter Schools IV D, 1-6 ECTS

Disseminating research results

ENG-L2070 Publishing research results I D, 1-3 ECTS

ENG-L2071 Publishing research results II D, 1-3 ECTS

ENG-L2072 Publishing research results III D, 1-3 ECTS

ENG-L2073 Publishing research results IV D, 1-3 ECTS

3.3. Doctoral thesis

3.3.1. Intended learning outcomes

After successfully defending their thesis, doctoral students will demonstrate the ability to:

- plan, execute, and report on their research and manage their data in accordance with established standards of academic research.
- proficiently search for, critically evaluate, apply, and synthesize existing knowledge; formulate research questions; and employ scientific research methods to create new knowledge.
- independently carry out research that generates novel insights and theoretical advancements in their own field of research.
- make syntheses and critical assessments required for addressing and resolving complex problems in the realms of research, innovation, and societal challenges.

4. Extracurricular studies

The degree structure of the programme in Sisu also includes a module called "Extracurricular studies". This module will not be included in the doctoral degree, but it can be used to register for courses which the doctoral student wishes to take in addition to their degree studies. These can be e.g.

Finnish as a foreign language: <https://www.aalto.fi/en/language-and-communication-studies/finnish-as-a-second-language-and-as-a-foreign-language>

Language and communication courses for doctoral students: <https://www.aalto.fi/en/language-and-communication-studies/courses-for-doctoral-students>

Other language and communication studies: <https://www.aalto.fi/en/language-and-communication-studies/teaching>

Researcher and working life skills: <https://www.aalto.fi/en/doctoral-education/doctoral-courses-and-curriculum#2-researcher-and-transferable-skills-courses>