Degree structure and coursework

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Structure of the degree

Doctoral studies at Aalto University consist of an approved thesis and study modules. In the field of technology, the study modules comprise research field studies as well as general research studies in total of 40 ECTS.

The Doctor of Science (Tech) degree consists of a doctoral thesis and 40 ECTS of theoretical studies which equals to four years of full-time studies.

The Licentiate of Science (Tech) degree consists of a licentiate thesis and 40 ECTS of theoretical studies which equals to two years of full-time studies.

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Doctoral thesis

The doctoral thesis is written on a topic related to the research field that the doctoral student has chosen and that has been approved by the doctoral programme committee of the School of Science and the supervising professor. The thesis shall contribute to new scientific knowledge. Approval of the thesis includes a public defence after a pre-examination process.

A doctoral thesis is a public document and is kept for public display at the university. Doctoral theses are evaluated on a scale of Pass/Fail.

Accepted forms of doctoral theses

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Licentiate thesis

The licentiate thesis is written on a topic related to the research field that the doctoral student has chosen and that has been approved by the doctoral programme committee of the School of Science and the supervising professor. The thesis shall demonstrate good conversance with the field of research and the capability of independently and critically applying scientific research methods. Approval of the thesis includes a public presentation at the department.

A licentiate thesis is a public document and is kept for public display at the university. Licentiate theses are evaluated on a scale of Pass/Fail.

Accepted forms of licentiate theses

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Theoretical studies 40 ECTS
The degree contains 40 ECTS of theoretical studies. If you have more credits, they need to be put in the extracurricular studies. The degree may be exceeded only if the courses do not add up to exactly 40 credits.

Sisu guidelines (only for doctoral students with a study right)

You can view your degree structure and information on courses and study modules in Sisu (sisu.aalto.fi) once you have prepared the Sisu part of your doctoral personal study plan in Sisu (Instructions: SISU Credit Plan for doctoral students - Sisu HELP - Aalto University Wiki). Please remember to choose the right curriculum period in Sisu.

Your study plan automatically shows the study modules that are compulsory, i.e. those you are required to complete in order to graduate. For your other studies, you can find courses by using the search function either in Sisu’s ‘selection assistant’ or on the Search page (click Search on the upper banner). You’ll find advice for suitable courses below. If the Sisu part of your doctoral personal study plan (i.e. the part including the content, scope and duration of studies with credits) follows the curriculum of your doctoral programme (please see below), you do not need it to have it approved until you start your pre-examination or wish to use your flexible study right and take JOOPAS or equivalent courses. It is of the utmost importance that you follow the guidelines given below.

Research field studies 20-35 ECTS

The aim of the research field studies is to support the writing of the doctoral thesis and prepare the doctoral students for research and other demanding work that requires expertise.

After completing the module, doctoral student:

- has specific research methodology knowledge appropriate to their doctoral thesis focus
- has knowledge of the background to their research field at an advanced level
- has experience of the practical implementation of appropriate research methodologies in a learning environment

The module may include the following:

- Postgraduate-level and advanced-level courses, which support the doctoral thesis (Letters E and L denote these courses in the course codes, e.g. PHYS-E1234 or PHYS-L1234)
- Custom course credits, to be agreed with the supervising professor

Compulsory courses

**Engineering Physics**

Full-time doctoral students in the research field of **engineering physics** must complete the following course:

- PHYS-L0666 Midterm review 10 ECTS

The course can be included either in the Research field -module or in the Scientific practices and principles -module.

**Industrial Engineering and Management**

Doctoral students in the research field of **industrial engineering and management** must complete **two** of the following three courses:

- TU-L0010 Advanced Organizational Theory (a joint course with Aalto BIZ and Hanken, 5 ECTS)
- TU-L1003 Doctoral Course in Strategy, Venturing, and Organizations (8 ECTS)
- TU-L2001 Doctoral Course in Operations Management (5 ECTS)

Courses are compulsory for those doctoral students in the research field of industrial engineering and management who have received their study right after 1 August 2018. Please see information about the corresponding courses.

Have you started your studies prior to August 2018? Please see information about the required courses.

Evaluation of the module

No grade is given for the module. Individual courses and study attainments are graded either as Pass/Fail or as grades 1-5.

General research studies 5-20 ECTS

The aim of the module is to provide doctoral students with knowledge of the basic concepts of science, the key characteristics of scientific research and scientific knowledge, familiarisation with the most important research methods of their research field, and to develop their transferable skills.

After completing the module, doctoral students:

- are able to apply the principles of good scientific practice to their own research
- are able to apply the basic structure of scientific publications to their research reports
- know the key publication series of their fields
- have gained the ability to draft an appropriate and suitable structure for their doctoral thesis
The module may include the following:

Postgraduate-level and advanced-level courses in (Letters E and L denote these courses in the course codes, e.g. PHYS-E1234 or PHYS-L1234), for example:

- Research methodology
- History or philosophy of science
- Transferable skills and competences:
  - Aalto University Communication courses
  - Pedagogical studies (requires Aalto login)
  - Self-study courses
- Custom course credits, to be agreed with the supervising professor

Compulsory courses

**Industrial Engineering and Management**

Doctoral students in the research field of **industrial engineering and management** must complete the following three methodology courses:

- TU-L0000 Research Methods in Industrial Engineering and Management (5 ECTS)
- TU-L0022 Statistical Research Methods (5-8 ECTS)
- TU-L0031 Qualitative Research Methods (3-6 ECTS)

Courses are compulsory for those doctoral students in the research field of industrial engineering and management who have received their study right after 1 August 2017. Please see information about the corresponding courses.

Have you started your studies prior to August 2017? Please see more information about the required courses.

Evaluation of the module

No grade is given for the module. Individual courses and study attainments are graded either as Pass/Fail or as grades 1-5.

Research fields and professors

The Doctoral Programme in Science comprises six research fields, which are based on the strong research traditions of the departments. The programme is a joint effort of the Department of Neuroscience and Biomedical Engineering, Department of Mathematics and Systems Analysis, Department of Applied Physics, Department of Computer Science, and Department of Industrial Engineering and Management.

The doctoral student chooses a research field when applying to the programme. The professor supervising the doctoral studies is agreed upon at the same time.

<table>
<thead>
<tr>
<th>Code</th>
<th>Name of the research field</th>
<th>Supervising professors (in alphabetical order)</th>
<th>Research groups/areas of the field</th>
</tr>
</thead>
</table>
SCIO1

Teknillinen fysiikka
Engineering Physics
Teknisk fysik

Alava, Mikko
Ala-Nissilä, Tapio
van Dijken, Sebastiaan
Flindt, Christian
Foster, Adam
Groth, Mathias
Hakonen, Pertti
Ikkala, Olli
Kaivola, Matti
Kauppinnen, Esko
Lado,Jose
Lillroth, Peter
Lund, Peter
Mercier de Lépinay, Laure
Pekola, Juha
Paz, Robin
Rinke, Patrick
Ruokokainen, Janne
Sand, Andrea
Sillanpää, Mikko
Timonen, Jaakko
Törnä, Päivi

Research groups: http://physics.aalto.fi/en/groups/

SCIO2

Tietotekniikka
Computer Science
Datateknik

Aura, Tuomas
Babbar, Rohit
Brzuska, Chris
Chalamsook, Parinya
Deny, Stéphane
Di Francesco, Mario
Garg, Vikas
Guckelberger, Christian
Holme, Petter
Hyvönen, Eero
Hämäläinen, Perttu
Jiang, Shao-feng
Jung, Alexander
Kannala, Juho
Kaski, Petri
Kaski, Samuel
Kisfaludi-Bak, Sandor
Kivelä, Mikko
Köylä, Maarit
Lampinen, Jouko
Lassenius, Casper
Lehtinen, Jaakko
Lindqvist, Janne
Lähdesmäki, Harri
Malmi, Lauri
Mannila, Heikki
Marttinen, Pekka
Meik kit, Elisa
Niemelä, Ilkka
Nieminen, Marko
Orponen, Pekka
Paler, Alexandru
Rintanen, Jussi
Rousu, Juho
Saramäki, Jari
Savelja, Lauri
Solin, Arno
Suomela, Jukka
Takala, Tapio
Truong, Hong-Linh
Uitto, Jara
Vehtari, Aki
Vuorimaa, Petri
Ylä-Jääski, Antti

Research areas: https://www.aalto.fi/en/department-of-computer-science/research-areas