Aalto Bachelor’s programme in Science and Technology

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Spring 2019
Jobs in science and technology – perception

civil engineer

chemical engineer

electrical engineer

mechanical engineer

computer scientist

physicist
Jobs in science and technology – reality

computer scientist
physicist
civil engineer
mechanical engineer
chemical engineer
electrical engineer
statistician
mathematician

political scientist
sociologist
historian
economist
business analyst
linguist
Aalto English-language BSc programme in science and technology

The nature of science and technology jobs is changing

Emphasis on mathematics and computational skills

Importance of multidisciplinarity

Example: An engineer wants to simulate the combustion process inside an engine. The task involves fluid dynamics, chemistry, heat transfer, mathematics, programming, and high performance computing.
Aalto English-language BSc programme in science and technology

Five majors:

- Chemical Engineering
- Computational Engineering
- Data Science
- Digital Systems and Design
- Quantum Technology

Common structure, common courses of mathematics and computation, different specialization paths
Aalto English-language BSc programme in science and technology

Common structure of the programme:

**Basic studies** 65cr
- Math 25cr
- Computation 25cr
- General studies 15cr

**Major** 65cr
Including BSc thesis

**Minor** 20-25cr

**Electives** 25-30cr
Programme in English

Meet other students from around the world
Interact with international professors
Prepare better for the global job market
The 5 majors
Why to choose this major?

• Strong basis from math and programming is combined with chemistry, biochemistry, life sciences and materials technology.

• IT is more and more present in all fields of technology and science.

• This major gives you a unique competitive edge over those being in the field for longer time. You can really combine cutting edge computational tools to applications that really matter!
Chemical Engineering

Why to choose this major?

Content of the studies

• Math, Computer science, Chemistry, Biochemistry, Material science, Design and much more!

Highlights
Why to choose this major?

• After having basic knowledge in chemistry, biochemistry and material sciences, both theoretically and in the laboratories, you will continue your studies with a strong connection to design and entrepreneurship.

Content of the studies

• After BSc, you can choose from a set of MSc majors, giving you opportunities both to work at high impact research or in industry that has a practical impact to well-being for all of us.

Highlights
Computational Engineering

Why to choose this major?

Content of the studies

Highlights

We use computers, mathematics and algorithms to simulate how new technologies will behave in reality.
Computational Engineering

Why to choose this major?

Content of the studies

Highlights

Physics and Engineering
mechanics of materials, fluid dynamics, thermodynamics, heat transfer

Applied mathematics
linear algebra, differential & integral calculus

Computation
programming principles and algorithms, learn to use the most popular engineering software
Computational Engineering

Why to choose this major?

Content of the studies

Highlights

Pursue a career in a wide range of fields: energy, construction, manufacturing, mechanical systems, bioengineering and more!

The majority of Aalto Engineers are employed as soon as they graduate!
Why to choose this major?

Content of the studies

Highlights

Combating Cancer With Data
Supercomputers will sift massive amounts of data in search of therapies that work.

For decades, scientists have worked toward the ‘holy grail’ of finding a cure for cancer. While significant progress has been made, their efforts have often been worked on as individual entities. Now, as organizations of all kinds seek to put the massive amounts of data they take in to good use, so, too, are the health care industry and the U.S. federal government.

The National Cancer Institute (NCI) and the U.S. Department of Energy (DOE) are collaborating on three pilot projects that involve using more intense high-performance computing at the exascale level, which is the push toward making a billion billion calculations per second (or 50 times faster than today’s supercomputers), also known as exaflops (a quintillion, 10^18, floating-point operations per second). The goal is to take years of data and crunch it to come up with better, more effective cancer treatments.

The DOE had been working on building computing infrastructure capable of handling big data and entered into discussions with the NCI, which houses massive amounts of patient data. The two organizations realized there were synergies between their efforts and that they should collaborate.

Researchers used scanning electron microscope images of nanometers-thin mouse brain slices to reconstruct cells into a neocortex structure (center), whose various cell types appear in different colors.

The time is right for this particular collaboration because of the application of advanced technologies like next-generation sequencing, says Warren Kibbe, director of the NCI Center for Biomedical Informatics and Information Technology. In addition, data is becoming more readily available from vast repositories, and analytics and machine learning tools are making it possible to analyze the data and make better sense of it.

Says Kibbe, “There is even better instrumentation and data acquisition...”
Data Science

Why to choose this major?

Content of the studies

Highlights

Computation
programming, algorithms, databases, AI, machine learning, data mining

Mathematics
matrix analysis, linear algebra, optimization

Statistics
probability and statistics, statistical inference
Data Science

Why to choose this major?

Content of the studies

Highlights

**strong tradition** in Aalto in
- data science
- machine learning
- artificial intelligence

**world-class research**
Why to choose this major?

Content of the studies

Highlights

Tech Giants Are Paying Huge Salaries for Scarce A.I. Talent

Nearly all big tech companies have an artificial intelligence project, and they are willing to pay experts millions of dollars to help get it done.

By CADE METZ OCT 22, 2017
Digital Systems and Design

Why to choose this major?

Content of the studies

Highlights

Embedded systems

Project management and design

Estimation, Detection, learning

Automation & control

Electronic circuits

Networking

Optical communication
Digital Systems and Design

Why to choose this major?

Content of the studies

Highlights
Digital Systems and Design

Why to choose this major?

Content of the studies

Highlights

• Design in Engineering Competences
  • Unique among comparable programs

• Industry-relevant programming skills
  • Python, C++, C, Matlab

• Hands-on experiences
  • MyDaQ/Arduino

• Industry internship periods
  • ELEC-C7430 Industrial training
Quantum Technology

Why to choose this major?
• Are you fascinated by quantum physics?
• Do you want to create real-world applications?
• Come study Quantum Technology at Aalto University!

Content of the studies

Future quantum technologies:
  o Quantum computers
  o Quantum communication
  o Quantum sensing
  o Quantum simulation

Highlights
• Become a quantum engineer!
Quantum Technology

Why to choose this major?

Content of the studies

Highlights

During the BSc degree, you will:

- learn the **fundamentals of quantum physics** and understand its applications in real-world technologies
- acquire mathematical & physical skills to understand the **quantum world** from a technological perspective
- perform experiments on **quantum systems** and generate roadmaps to future applications
- develop computer algorithms exploiting quantum mechanical principles
Quantum Technology

Why to choose this major?

Content of the studies

Highlights

Broad career prospects in industry and academia

Research and development engineer
Quantum computing scientist
Technology consultant

Quantum technology specialist
Quantum software programmer
Banking and finance

World-class research on Quantum Technology in Aalto
Questions?
Admissions
Admissions

• The application period for the programme is on the first application period for spring joint application to higher education (yliopistojen yhteisvalinta), this year on 9–23 January 2019

• Admission Group I
  • Admission based on the grades of the Finnish matriculation examination, IB- or EB-degree completed in or outside Finland or RP/DIA-degree completed in Finland
  • points are calculated in accordance with the principles used in the DIA joint admissions for engineering and architecture (Diplomi-insinööri- ja arkkitehtikoulutuksen yhteisvalinta)
  • Minimum requirements: either L (laudatur) or E (eximia) in advanced mathematics depending on the study option

• Admission Group II
  • Admission based on SAT test results
    o SAT test (Evidence Based Reading and Writing- and Mathematics-sections)
      Minimum score 1200
    o SAT subject test in Mathematics
      Minimum score 600 (level 1) OR 600 (level 2)
  • Applicants are ranked based on the total score of the SAT test (Evidence Based Reading and Writing- and Mathematics-sections)
1. Can I apply for both the Finnish and the English study options in the field of technology/engineering even though the application period is different?

- Yes you can, the application for the English programmes is on the first application period for spring joint application (January) and the application for the Finnish programmes on the second application period (March-April).
- You can apply up to six (6) study programmes and choose study programmes from both application periods in the spring joint application.
- You will need to fill in only one application form.
FAQ

2. What if my Math grade is not high enough to be admitted in the admission based on the matriculation examination?
   - Finnish applicants can also apply in the admission based on the SAT test results.
   - The minimum requirements are decided annually and since the English study options are new the minimum requirements are subject to change.

3. Can I be admitted to the English study options through an entrance exam?
   - Currently, admission based on the entrance exam is not offered.
   - This might be possible in the future if the entrance exam will be offered in English.
   - For now the admission is based on either the grades obtained in the matriculation examination or the SAT test results.
Further questions?

https://www.aalto.fi/study-at-aalto

- Find a study option or check the full list
- Application information
  - Bachelor's Admissions (English) 9.-23.1.2019
- admissions@aalto.fi
Links

Chemical Engineering:

Computational Engineering:
https://www.aalto.fi/study-options/computational-engineering-bachelor-of-science-technology-master-of-science-technology

Data Science:
Links

Digital Systems and Design:

Quantum Technology:
Students from around the world joined the Aalto Bachelor’s Programme in Science and Technology – meet Dylan, Anna and Ishaan