Change the world – study chemical engineering
Why study chemical engineering?

Chemical engineering is needed to solve all the major challenges facing our planet regarding clean, healthy and safe environment.

Do you want to learn about

- circular and bioeconomy?
- new energy solutions?
- green chemistry?
- environmentally friendly production processes?
- sustainable material solutions and production processes?
- replacing plastics with bio-based materials?
- the use of biomaterials, for example, in medicine or the textile industry?
- combine different natural sciences with engineering and thus create something completely new?
Welcome to Aalto University!

At the School of Chemical Engineering, we combine natural sciences and engineering in a unique way. Our teaching is of high quality and based on research. We have strong connections with the industry, and the student gets an early opportunity to take part in exercises with companies during the studies. Chemistry is present everywhere in our living environment and economy. Therefore, expertise in chemical engineering is needed in several fields, especially in Finland’s largest export sectors. With a Master of Science degree in Chemical Engineering, you can work in research or product development tasks, as a technology expert, design and sales tasks and as an entrepreneur, for example.

Come and study a field with excellent employment opportunities – not only now, but also in the future.

WANT TO LAUNCH YOUR CAREER WITH US?

JOIN OUR ROTATIONAL PROGRAM FOR ENGINEER & CHEMISTRY GRADUATES

Find out more at phillpsmedisize.com or contact bianca.vanhamburg@molex.com
New friends and lots of events

In addition to acquiring high-quality education, at Aalto University, you get an active community around you.

University life includes a wide range of get-togethers, sporting events and business visits, which are organised by, e.g., student associations. While an active member in such organisations, you can learn useful skills such as leadership, organisation and communication. In addition, you can make lifelong friendships!

What could be a better recommendation than a friend already studying at Aalto encouraging you to apply to the same school? Alexander Kupi and Mikaela Kumlin began their studies at the School of Chemical Engineering in 2019.

New friends and parties

"At Aalto, the bachelor’s programme’s majors and master’s studies seemed very diverse and that’s how they’ve been in practice. At first, my study curriculum was light, and I was able to participate in freshman events. The life of a first-year student, or freshman, includes a lot of fun parties and experiments with different sports. These are organised by The Association of Process Engineering Students, one of our student organisations. My own favourites have been sauna evenings in a relaxed atmosphere. New acquaintances can easily be obtained either from your own freshman group, events or from many different hobbies on campus – suitable activities can be found for everyone. I believe that with my master’s degree in engineering, I will be able to choose from a wide range of jobs in the future."

Aleksanteri Kupi
Studying in Finnish was not difficult

"My language of study changed from Swedish to Finnish when I continued from the upper secondary school to university. I could have taken certain courses in Swedish and I think all the exams could have been taken in Swedish as well. However, I decided to go through everything in one language. I've always been interested in science and mathematics. I also wanted to study a field where I could influence the climate. The choice of university was easy, as I had acquaintances at Aalto. They all said good things about the university and encouraged me to apply. I am very happy with my choice and feel I have found my own place! I quickly made friends from my own freshman group and events. The most challenging part has been writing a laboratory diary, as the writing style has had to be learned. However, this is the expertise that we came here to learn. It is good to have challenges!"

Mikaela Kumlin
Alumni stories

Aalto University graduates have created success stories both in the service of various companies and as entrepreneurs. The versatile studies of a Master of Science in Chemical Engineering gives you the knowledge and skills you need to build a successful career in areas such as bioeconomy and circular economy.

Let’s get things done’ attitude from Aalto University

”I manage a handful of R&D projects that have a vast range of different activities from designing and analyzing test trials to setting up new recycling processes. At the moment, my biggest projects are related to the recycling of lithium-ion batteries and waste electrical and electronic equipment.

I had been working as a process engineer in a totally different field for a couple of years and I had this urge to get back into the recycling field and do something meaningful. At Aalto University, I had studied recycling technology and my master’s thesis covered the same topic. I also had a summer job in metal recycling. Nevertheless, I feel that the biggest asset to get into that position was my enthusiasm and motivation.

Analytical and fact-based thinking is extremely important for fresh engineers as we get into the job field where many have been working for decades and hold strong opinions. I think Aalto has a lot of positive ”let’s get things done!” attitude which has also reflected in my way of thinking in the working life. Surprisingly, I learned a lot from volunteer student activities: responsibility, thriving in conflicting schedules, working with many organisational interfaces, allocating and prioritizing resources etc.”

Michael Saulny
Project Manager
R&D in Recycling and Waste Solutions
at Fortum Waste Solutions Oy
Finding new information inspires and motivates me

"I studied chemical engineering because I’ve always liked to develop something new; I like problem solving and research. Doctoral studies have brought me confidence in my own competence.

Hydrometallurgy is a young field of science and it offers a lot of challenges. I am also working on topics related to the treatment of the hydrometallurgy of gold and valuable metals at Metso Outotec. The topic of the dissertation was closely related to my work and I have received a lot of support from my employer for the doctoral thesis.

I work mainly on a computer, not in a lab. In practice, my work includes, for example, writing laboratory instructions, processing and reporting results, modelling, customer meetings and internal meetings. My work is very varied, broad-ranging and covers different areas of research.”

Riina Ahtiainen
Specialist
Gold Hydrometallurgy
Metso Outotec
Aalto University offers more than a degree

At Aalto University, you can create a sustainable future by developing solutions to the world’s major challenges. We provide you with the tools to build a better future – and more.

Aalto University is known for its interdisciplinary nature and self-assessed students. We offer a comprehensive selection of bachelor’s and master’s programmes, from which you can pick a practical combination.

Aalto University offers an internationally unique combination of natural sciences, technology, business and art. By combining chemical engineering with art or business studies, for example, we are able to create new and unique study entities. By doing so, we are able to acquire new kinds of expertise and create surprising scientific breakthroughs and innovations.

At Aalto University, we know that world-class education is only a part of the study experience. That’s why we offer our students an international operating environment,
various opportunities to participate in student activities, and numerous opportunities to collaborate and network.

Aalto University is a community of energetic change makers. You can join the entrepreneurship community, for example, by participating in entrepreneurship education, a hackathon, a multidisciplinary product development environment or startup activities.

**Lumi Maunuvaara’s** story is an example of the fact that studies in chemical engineering also prepare you to start your own business. Read the full story on Aalto’s website!

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Otaniemi Campus
– an active neighbourhood

The Aalto University campus is located in Otaniemi, Espoo, which is a vibrant and inspiring area close to nature.

Otaniemi is located about 10 kilometres from the centre of Helsinki, and the campus can easily be reached by metro, bus and, in the future, also by tram. There are also excellent public transport connections from other parts of Finland and the Helsinki-Vantaa Airport.

There are dozens of different restaurants and cafés in the area, including student-priced lunches.

The campus offers a versatile and high-quality setting for various events and leisure time. In addition, there are excellent opportunities for sport here. There are also student apartments on campus.

Otaniemi is a crown jewel of Finnish architecture. The area of culturally historical significance is developed sustainably and the goal is to have a carbon-neutral campus by 2030.
Explore the campus virtually at virtualtour.aalto.fi.

- a global player in fine chemicals and custom manufacturing
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Bachelor’s Programme in Chemical Engineering

Our Finnish language bachelors degree majors are chemistry and materials science, chemical engineering and processes, and bioproducts.

The studies and research of the School of Chemical Engineering focus on forest industry technology, chemical engineering, industrial biotechnology, materials science and nanotechnology, metal and mineral processing, and energy technology.

More information about studies:
www.aalto.fi

The key components of chemistry are the structure, composition, properties and reactions of substances. In chemical engineering, these are applied from nanometers to laboratory scale and from factory size to the national economy level.

"New metal recovery and recycling technologies need to be developed in order to guarantee the adequacy of metals for the needs of the battery industry, electronics and solar cells, for example. The field needs experts, and at Aalto University, the teaching is world-class."

Professor
Mari
Lundström

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Chemistry and materials science

Clean water and air and sufficiency of food and energy are global challenges for which chemistry and new materials offer solutions. Chemistry and materials science can be used to manufacture, e.g., powerful batteries, new drug molecules, biodegradable plastics, diamond-hard surfaces, cheap catalysts and dirt-repellent surfaces.

As a student of chemistry and materials science, you are involved in this development. You study phenomena and materials at the atomic and nano levels. You carry out experiments both in the laboratory and at the experimental plants and participate in the analysis of field trials. Modelling atomic-level phenomena and new materials on a computer is also part of your tasks. You will also learn about commercial and environmental matters, such as the basics of raw materials, energy and the circular economy.
Chemical engineering and processes

In this major, you will learn the principles of circular economy, bioeconomy, environmentally friendly products and production technologies, as well as how to recycle materials back into use. In your studies, you participate in the design of sustainable and responsible industrial production using modern process simulation software. You will also look at how digitalisation and process control are present in all production processes. This major prepares you to continue as an expert in the chemical industry, metallurgy, environmental engineering, biorefinery or energy engineering, for example.

Bioproducts

If you want to promote the sustainable use of natural resources and the utilisation of renewable raw materials, this is the right major for you. There is a wide range of possibilities for the development of bio-based products. You can dive into developing building materials, light but strong composites, various forest industry products such as packaging, textiles, biofuels and medical applications.

Harnessing chemical and biotechnology for the use of engineering expertise enables the design and manufacture of new innovative materials and products based on sustainable development. In this major, you will learn the essential knowledge and skills of how we can move from using non-renewable resources to implementing the technological solutions required for sustainable development.
Do you want to get a bachelor’s degree in English?

Aalto Bachelor’s Programme in Science and Technology - Chemical Engineering

In the Chemical Engineering major in Aalto Bachelor’s Programme in Science and Technology, students learn the basic skills and knowledge required for a transition from an oil-based to a sustainable society. The focus of the major is on biotechnology and biomaterials, complementing the strong basics in mathematics and programming obtained in the basic studies. This combination of skills is very powerful and allows you to specialise in many fields of chemistry and biotechnology as well as life science-related topics in your further master’s studies. The application time is in January.

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As a Master of Science in Chemical Engineering, you can have a meaningful job

After a three-year bachelor’s programme, you can continue directly to your master’s programme and choose a major from seven options.

A Master’s degree in chemical engineering is a prestigious degree needed to maintain and develop important functions of our society. With a master’s degree in Chemical Engineering, you can develop technologies and processes to replace fossil materials and fuels with renewables, for example. You can solve significant problems in our society regarding global warming and the adequacy of materials. The possibilities are almost endless!

Master’s Programme in Chemical, Biochemical and Materials Engineering

Majors

- Biomass Refining
- Fibre and Polymer Engineering
- Biotechnology
- Chemistry
- Functional Materials
- Sustainable Metals Processing
- Chemical and Process Engineering

All master’s studies at the School of Chemical Engineering are in English. You can take an international double/triple degree with our European partner universities. Aalto also offers joint programmes which are run by multiple schools of Aalto University. More information about studies: www.aalto.fi
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International Aalto University

Forty per cent of the staff of the School of Chemical Engineering have an international background. We have degree students and exchange students from all over the world. Our study programmes provide the ability to operate in multicultural environments and solve global challenges.

At Aalto University, you have great opportunities to network on a global level, to create an international career and to participate in an exchange programme abroad, for example. We work with the world’s most prestigious universities and business schools.
When I was a researcher at the University of Sharjah in Dubai, I met a former Aalto University professor who suggested that I apply for master’s studies at Aalto University. Due to the worldwide reputation and the modern facilities Aalto became my first choice. The university and the people here are like a second home to me now.

The incredible student culture is definitely the best thing about the campus. I joined the guild and even became a member of the Aalto University Student Union’s annual ball committee. I participated in student parties, events and activities. I am sure I will miss those amazing student events that made Otaniemi so special.”

Alumni Adel Assad:
”Finland has become a second home for me”

Adel Assad graduated in 2019 from the Master’s Programme in Chemical, Biochemical and Materials Engineering.
Real-life success stories

The best way to innovate in the future is through cooperation. Here are a few stories of what we have achieved so far!

Crab-shell and seaweed compounds spin into yarns for sustainable and functional materials

Produce strong and flexible threads has been challenging. Researchers from Aalto University, the University of São Paulo and the University of British Columbia have found a way to make a new kind of fibre from a combination of chitin nanoparticles, extracted from residual blue crab shells and alginate, a compound found in seaweed. This new bio-based material is sturdy and has antimicrobial properties.

The researchers wanted to make a fibre that combined the properties of chitin – known for its antimicrobial properties – and seaweed alginate, which forms strong gels. The designed material took advantage of the strong interaction between the components. The research team sees great potential for the material to be used for such things as threads for surgical procedures and webs for internal tissue engineering. Other uses include pads and web-like meshes for applications on the skin, for wound healing, skin conditioning and burn treatments.
A combination of wood fibres and spider silk could rival plastic

Achieving strength and extensibility at the same time has so far been a great challenge in material engineering: increasing strength has meant losing extensibility and vice versa. Now Aalto University and VTT researchers have succeeded in overcoming this challenge, with inspiration from nature.

The researchers created a truly new bio-based material by gluing together wood cellulose fibres and the silk protein found in spider web threads. The result is a very firm and resilient material which could be used in the future as a possible replacement for plastic, as part of bio-based composites and in medical applications, surgical fibres, the textile industry and packaging.

Nature offers great ingredients for developing new materials, such as firm and easily available cellulose and tough and flexible silk. The advantage with both of these materials is that, unlike plastic, they are biodegradable and do not damage nature the same way micro-plastics do.
Smart materials respond to the environment

What if the blinds in the windows were so smart that they would close automatically when the temperature rises? Or a gauze on top of a vegetable garden would become tighter as temperatures drop towards the evening? What if a bear was empathetic and hugged you when you hugged it first?

Such applications are envisioned by Jaana Vapaavuori, Assistant Professor at Aalto University School of Chemical Engineering, who studies how fibres react to changing environmental conditions. The aim of Vapaavuori’s research is to develop smart materials that work interactively with the environment. They may react to changes in lighting or temperature.

The aim of the study is to develop fabrics that autonomously transform according to the ambient circumstances. Functional materials can therefore become less breathable, for example, or change colour as a result of an impulse in the environment.

"With my research, I aim to find answers to the challenges of the built environment. Functional materials can offer huge energy-saving opportunities if, for example, the cooling or heating needs of a building are reduced thanks to smart blinds.”
Are you one of our future experts?

Forest industry is now more topical than ever. Metsä Group plays a significant role in combatting climate change by introducing fossil-free production and renewable materials and products to replace the use of fossils.

Metsä Group invests in growth and the development of new bioproducts. We have versatile career opportunities for chemical engineering professionals in e.g. production, technology and research, development and innovations.

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Change runs on renewables