BUILDING ENERGY DESIGN

2-YEAR MASTER OF SCIENCE IN TECHNOLOGY PROGRAMME
CAND.TECH.
BECOME AN EXPERT IN BUILDING ENERGY DESIGN

Today, there is great focus on energy use and renewable energy. Consequently, it is expected that the building industry will contribute to creating solutions to the challenges which society meets in connection with restructuring the energy system into 100% renewable energy.

The restructuring into renewable energy creates a number of new challenges - both in regard to reducing the energy demand in existing buildings, implementing renewable energy production, and developing interaction between buildings and the energy supply system. These tasks require graduates who possess a comprehensive understanding of and specialised knowledge about energy design in buildings.

As a Master of Science in Technology in Building Energy Design, you will work with reduction and optimisation of energy use in buildings through for example application of renewable energy in both design, construction, and operation.

Through the study programme, you will obtain a comprehensive understanding of and specialised knowledge about energy design in buildings. Furthermore, you will be able to create cost-effective solutions with minimal environmental impact in terms of design, construction, and HVAC systems.

The study programme is taught in English.
"The energy field is growing fast – especially within energy renovation and in general within the field of energy use in buildings. As higher demands are made for the energy use of buildings, there is a similar increase in focus on buildings’ energy design. Therefore, the study programme in Building Energy Design is up-to-date, and we expect a rising demand for qualified competences within the field; energy use in buildings."

Sidse Frich Thygesen, consultant in Dansk Byggeri (The Danish Construction Association)
1st semester is about reducing the energy demand and at the same time maintaining a good and healthy indoor environment. You learn to analyse the indoor environment and to set-up functional requirements for the building. The building layout and the building envelope are important for the energy demand, and you will have to calculate how the energy need is minimised in the best way. During this semester, the courses focus on heat and moisture transport, indoor environment and building energy modelling and simulation.

**Semester structure**
- Building Energy Use and Indoor Environmental Quality (15 ECTS project)
- Introduction to PBL, Heat and Moisture Transport in Buildings (5 ECTS course)
- Indoor Environmental Analysis and Measurements (5 ECTS course)
- Building Energy Modelling (5 ECTS course)

During the 2nd semester, you work with the technical systems for heating, ventilation, and cooling of buildings. You analyse and optimise the systems taking economy and the chosen comfort level into consideration. The courses support the projects and comprise heating, cooling, and ventilation systems, and how these installations are best controlled.

**Semester structure**
- Building Ventilation, Heating and Cooling (15 ECTS project)
- Building Ventilation (5 ECTS course)
- Building Heating and Cooling Systems (5 ECTS course)
- Control and Analysis of Building Energy Systems (5 ECTS course)
During this semester, you work with optimisation of building operation and with the minimisation of the total environmental impact of the building. It can for example concern daylight, solar heat, natural ventilation, and assessment of buildings and their HVAC systems in relation to their operation and environmental impact. You will follow courses in renewable energy systems, passive technologies, and methods for certification of sustainable buildings.

**Semester structure**
- Building Commissioning, Operation and Environmental Impact (15 ECTS project)
- Environmental Assessment Methods and LCC Analysis (5 ECTS)
- Two elective courses of 5 ECTS each

Alternatively, you can choose to study one semester at another university.

During the 4th semester, you work on your Master’s thesis. Here, it is possible to specialise within that particular area you find interesting and want to work with. The groups are small (1-3 persons), and the situation resembles the working situations you will meet in the industry.
“In COWI, we become more and more aware of the interaction between design of the energy supply and the building’s requirements concerning indoor environment and energy. Here at COWI, the ability to combine these interdisciplinary elements is a requested competence. Our international work increases the demand for people who have knowledge of foreign legislation, indoor and outdoor climate and energy supply systems. This knowledge also contributes to the competitiveness of COWI on the global market.”

Alice Andersen
MSc in Indoor Environment and Energy at COWI
With a Master of Science in Technology in Building Energy Design, you have plenty of opportunities to find work. As an example, you can work in consulting engineering companies where you can make calculations, choose materials, and supervise the construction. You can also work in large organisations as for instance hospitals and large real-estate companies and municipalities where you can work with the optimisation of the operation of the buildings in relation to both indoor environment and low energy use.

You will have great influence on the environmental development of our future society by working with actual subjects such as energy use, energy optimised buildings, renewable energy, computer simulation of energy flow in buildings, operation and control of building systems, indoor environment in offices and housing, heating systems, and mechanical and natural ventilation.

CAREER OPPORTUNITIES

“The interdisciplinary competence will be attractive for consulting engineering companies – especially in the initial phases of a project where you create and deliver design, but also in the further course of the process where the key competences of the engineers within the different fields must be integrated with the project and the team – here, the graduates could be the connecting link and bridge builder between the different parties.”

Johannes Overgaard
Department manager, Orbicon

“In Ekolab, we are increasingly aware of the necessity of having employees who see the big picture and have the ability to combine different energy-related initiatives. We expect a significant growth in demand for qualified competences within Building Energy Design.”

Troels Kildemoes
MSc, manager in Ekolab
As a student at Aalborg University, you will work closely together with your fellow students by way of problem-based project work. Aalborg University is host to a successful UNESCO Chair in Problem Based Learning in Engineering Education and a Centre for PBL and Sustainability approved by UNESCO. The Aalborg Centre for Problem Based Learning in Engineering Science and Sustainability under the auspices of UNESCO will build upon and develop the work of the UNESCO Chair and Centre for PBL and Sustainability, and is keenly supported by Aalborg University and the Danish Ministry of Science, Innovation and Higher Education.

Working be means of Problem Based Learning in practice, you will be part of a group typically consisting of 4-5 students. Once you have formed a project group, you need to define a problem together that you want to examine. The problem forms the basis of your project, and you are to a great extent responsible for defining it yourselves within an often very broad theme frame. The group work ensures a great variety of approaches and perspectives, which results in a sound and thoroughly prepared project. Together, you are able to discuss the details well. At the same time, you are able to solve larger and more complex problems than if you were studying on an individual basis.

Each of you has the opportunity to shape the project because group work requires a contribution from everyone. If you have any academic questions, you may also discuss these with your friends in the group.

The project work is completed with an exam. While working on your project, you will also need to do individual exams in your subjects. Together with lectures, literature and cooperation with the corporate sector, the project work will help you gain a deeper insight into the subject you are examining than if you had been working on your own.

With group work, you will quickly realise that you might have different opinions about how to solve a problem. Group work means that you have to compromise, and you will learn a lot about how to cooperate. Group work is very popular in the modern labour market so both you and your future workplace will benefit from the skills in cooperation you have acquired at Aalborg University.

**RATED FOR EXCELLENCE**

Aalborg University is rated for excellence in the QS-ranking system. Aalborg University has received five stars certifying the world-class position of the university based on cutting-edge facilities and internationally renowned research and teaching faculty.

Within Engineering and Technology, Aalborg University ranks as number 79 in the world.
STUDY IN AALBORG

Aalborg is Denmark’s fourth largest city and has approximately 125,000 inhabitants. 10% of these are students. As a student at Aalborg University, you can enjoy Aalborg’s many opportunities with regard to cultural experiences, sports and spare time activities. In recent years, Aalborg has undergone a transformation from an industrial city to a city of knowledge and culture. The city’s development is particularly apparent at the harbour promenade where a lively urban and cultural life with cafes, cultural event venues and sports facilities has replaced factories and smoking chimneys. As an international student at AAU, your chances of finding accommodation in Aalborg are also great.

ACCOMMODATION IN AALBORG

When you arrive in Aalborg and in order to begin your studies at AAU, Aalborg University’s International Accommodation Office (IAO) will assist you in finding a place to live. The types of accommodation offered to you by AAU’s International Accommodation Office include a single room in a private house, a room in a hall of residence rooms or a large flat shared with other students. The rent and location vary according to the type of housing.
APPLICATION AND REQUIREMENTS

Admission to the Master’s programme in Building Energy Design requires a:
• Bachelor of Architectural Technology and Construction Management
• Bachelor of Technology Management and Marine Engineering
• Bachelor of Science in Civil Engineering; Structural and Civil Engineering
• Bachelor of Science in Civil Engineering; Indoor Environmental and Energy Engineering
• Bachelor of Science in Civil Engineering; Water and Environment
• Bachelor of Science in Civil Engineering; Transportation

Applicants with an equivalent Danish or foreign education on the same level can be accepted after the study committee’s individual assessment.

The official English language requirements for international students applying to Aalborg University are:
IELTS (academic test): 6.5 - ielts.org or
TOEFL (paper-based): 560 - ets.org/toefl or
TOEFL (internet-based): 88 - ets.org/toefl or
Cambridge Certificate of Proficiency (CPE) - cambridgeenglish.org or
Certificate in Advanced English (CAE) - cambridgeenglish.org or
Cambridge First Certificate with the grade B - cambridgeenglish.org

The test must be less than two years older from the date of study start.

You do not have to submit an official English test if one of the following criteria applies to you:
• Have a complete bachelor degree done in English from either Australia, the UK, Ireland, Norway, Sweden, Finland, Iceland, USA, New Zealand, South Africa or Canada.
• Have a complete bachelor degree from a Danish University.
• Have a complete bachelor degree from a Danish academy of professional higher education.
• Have a complete bachelor degree from a Danish university college.
• Have a major/minor in English, ie the English language is the field of study and not only an elective course or medium of instruction.

For further information please refer to apply.aau.dk.
TUITION-FREE STUDIES

Students from EU/EEA countries do not pay tuition fee. However, all students must pay all other costs related to studying in Denmark: for example costs related to books, living expenses and accommodation. With the exception of students from partner universities outside the EU/EEA, a student from a non-EU/EEA country will need to pay tuition fee.

For more information, please see: apply.aau.dk

DEADLINES

Commencement of study: 1 February
Deadline for application: 15 October
If you have questions about how to apply or general questions about studying in Denmark and life at Aalborg University, please contact:

**ADMISSIONS & CONTINUING EDUCATION**

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If you have questions regarding the specific programme, please send an e-mail to civil.sg@ses.aau.dk