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## **A broad and Interdisciplinary Programme**

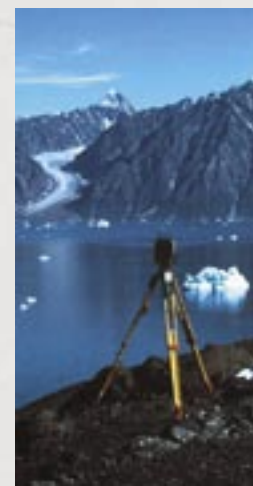
*The chartered surveying programme is a broad based comprehensive course where professional traditions from engineering, architectural and law education are synthesised.*

*The programme combines mathematics and technology with law and design. The programme also combines theory and practice and the students will be engaged both in indoor and outdoor activities.*

*During the programme students will learn about surveying and mapping, geographical information systems, property law and planning, as well as the management of land and natural resources.*

*Students have the opportunity to specialise within professional areas, however through the bachelor's programme they will also be provided with a broad interdisciplinary knowledge that combines the different professional areas.*

*Students will become both specialists and generalists at the same time!*



# Professional Profiles & Job Opportunities

*The chartered surveyor works with property, environmental issues and changes in our physical surroundings. Surveyors focus on surveying and mapping at various levels and also on the planning and management of development in urban and rural areas.*

*This programme is designed for those who wish to participate in the creation of our future society.*

The chartered surveying programme offers great future career prospects. Good job opportunities and a high rate of employment is available, all because of an education which provides students with many options to choose from.

**Chartered surveying in private practice** is a liberal profession (such as lawyers, veterinarians etc.). Licensed surveyors in private practice hold the monopoly to perform what is called cadastral work – meaning property development (subdivisions) or change of boundaries etc. The tasks also include surveying and mapping in connection with buildings and large construction works as well as consultancy on the development and use of property.

**Departmental manager in state agencies** such as the Ministry of the Environment (including the National Survey and Cadastre), where the work areas include mapping, property law, land and environmental management, and spatial planning.

**Planner/departmental manager in regional and local authorities**, working with planning of the urban environment, manage-

ment of nature and environmental interests in rural areas, property management, expropriation for new road facilities and the development and management of geographical information systems.

**GIS expert in private companies, utilities etc.**, where the expert may develop and maintain geographical information systems in a more IT-based environment.

**Project manager/consultant in mapping companies**, who develop and produce different mapping and digital solutions for the presentation of geo-referenced information.

**Project manager/consultant in engineering companies**, provides you with the opportunities to work with property development, surveying and mapping, virtual systems and projects regarding the urban environment, urban renewal and implementation of new infrastructures.

**International expert on development projects in developing countries**, having a great demand for the design and construction of systems to ensure land and property rights and to plan and manage the use of land.



# Study Programme



The duration of the programme is five years. It is organised with a 3-year Bachelor's programme followed by a 2-year Master's programme.

## Bachelor's Programme

During the bachelor's programme, the first year is meant as a basic year within the Faculty of Engineering and Science. More information about the first year can be found on page 6. The last two years are common for all students in the programme and are concerned with the basic tasks within the professional areas of surveying.

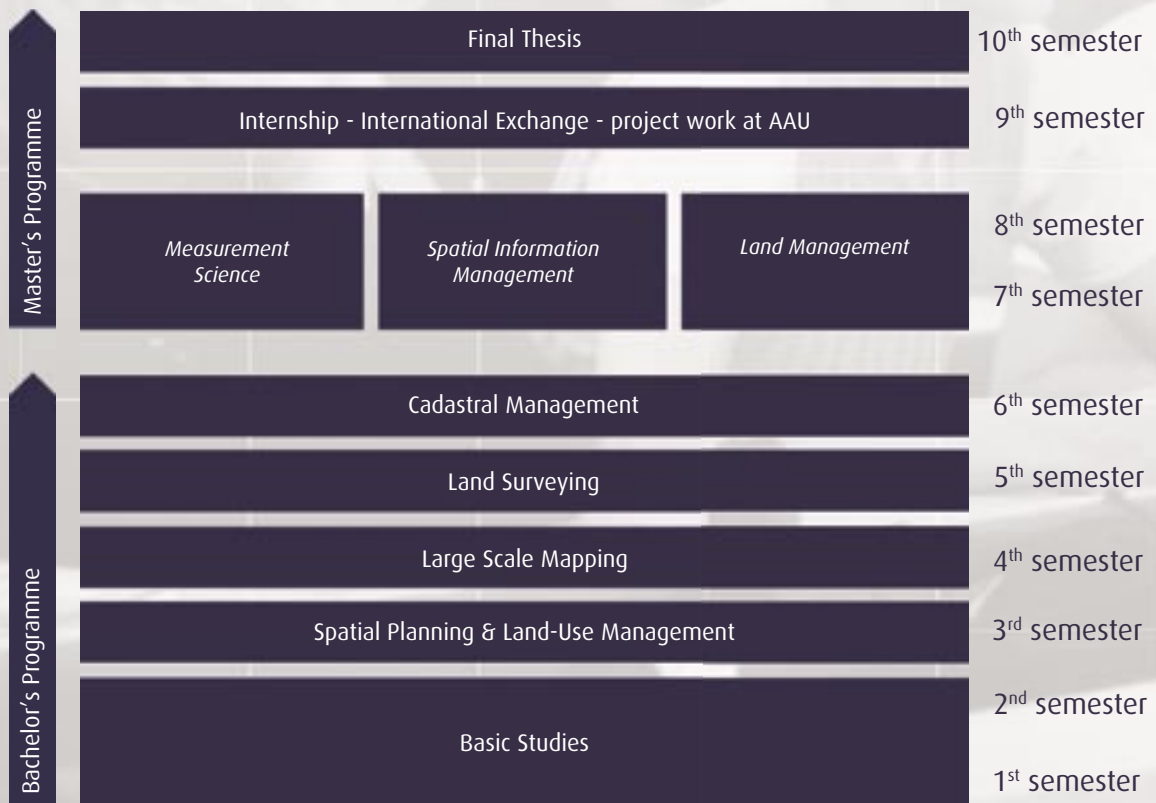
## Master's Programme

In the first year of the master's programme the students can choose from three different specialisations within:

- Measurement Science
- Spatial Information Systems
- Land Management,

In the 9<sup>th</sup> semester the focus is on professional development where a specific individual learning process is possible. For example, students can choose to have an internship in a company or a public institution; to study abroad at a foreign university, or to stay at Aalborg University to continue their studies.

During this semester all students are connected to a virtual network, which means that they stay in contact with their fellow students and the lecturers from Aalborg University. The final semester of the master's programme is dedicated to the production of the master's thesis, which may also encompass the entire final year of studies.



# Study Environment



Aalborg University is well known for its innovative way of studying. Throughout the entire programme, the focus is set on problem based learning and project work.

In the chartered surveying programme, approx. 40 students are enrolled each year, and of these almost one third are female.

During the bachelor's programme, project work covers approx. half of the study activities. The other half of the study time is divided between lecture courses and practical activities. A significant part of the exercises is fieldwork including outdoor activities.

In relation to the master's programme, the project work is predominant and the related lecture courses are oriented towards a theoretical and scientific content.

During the first year of the study programme students form project groups of around six to seven students, while the second and third years are characterised by project groups with between two to five students.

On the fourth and fifth years of the master's programme the students usually form groups of two or three together, all depending on the topics that they wish to focus on in their projects.

Throughout the entire study programme, teaching is research based. This means that researchers will participate as project supervisors. Furthermore, the master's thesis will be conducted by using actual research methods.

The coherence and interaction between research and teaching creates a very interesting and dynamic learning environment.



# Bachelor's Programme

The bachelor's programme includes the first three years of studies including 6<sup>th</sup> semester.

## **The Basic Study Year**

The first year of the study programme is the basic study year of the Faculty of Engineering and Science.

This first year of studies will provide the students with basic skills within project work and problem solving. The basic year is divided into an introductory mini project, two larger projects and a number of lecture courses to support the project work.

During the first year studies, the students will learn to work with the tools and methods relevant for the specific professional areas of the chartered surveyor.

The theme of the 1<sup>st</sup> semester project will usually be "mapping and spatial data" which will concern collection and presentation of spatial data by way of maps. On the 2<sup>nd</sup> semester the students will work with problems regarding the use of maps and spatial information in connection with land and natural resource management.

During this period of studies, students will get an overview of the many different professional areas and functions that constitute the profile of the chartered surveying programme.

The basic study year also includes a number of lecture courses, which provide the students with preconditions in relation to their further studies. Examples are lecture courses in mathematics, cartography, Geographic Information Systems and social science. Both 1<sup>st</sup> and 2<sup>nd</sup> semester are concluded with exams.

## **Common course**

After the first year, all surveying students participate in the common courses through 3<sup>rd</sup> to 6<sup>th</sup> semester. During this period, the focus is both on the basic surveying professions and also on 'learning by doing' through the solving of problems, which are similar to the problems and tasks managed by chartered surveyors in practice.

The common course is important because it provides all surveyors with a common professionalism and methodical basis necessary to understand and handle the core activities within the surveying areas.

## **3<sup>rd</sup> semester**

The theme of the 3<sup>rd</sup> semester is "Spatial Planning and Land-Use Management". Each group conducts a project that includes the design of an overall planning strategy for a chosen area followed by a more detailed planning strategy focused on e.g. the living environment within a certain neighbourhood. Finally, a local plan is completed, providing the regulations for how to implement the project.

At the same time, lecture courses in law and planning are given in order to support the project work.

## **4<sup>th</sup> semester**

The theme "Spatial Planning and Land-Use Management" is scheduled until mid spring and is concluded with a project exam. During the last months of the 4<sup>th</sup> semester, the focus is on Large Scale Mapping. The students work together in pairs in order to survey a small urban area and the work is documented by way of a digital map. Shortly before the summer holiday, the project is evaluated through a project exam.





### **5<sup>th</sup> semester**

On this semester, courses within surveying and mapping take place, supported by exercises in the field. Different methods are focused on for solving several types of assignments and the students will become familiar with the use of modern tools, such as Global Positioning System (GPS).

The project work provides the students with a proper understanding of how tasks are handled within surveying practice. A project exam will conclude the semester shortly before Christmas.

### **6<sup>th</sup> semester**

The theme "Cadastral Management" concerns the processes and the problems of property rights, which are connected to the determination of property boundaries and the development of new properties.

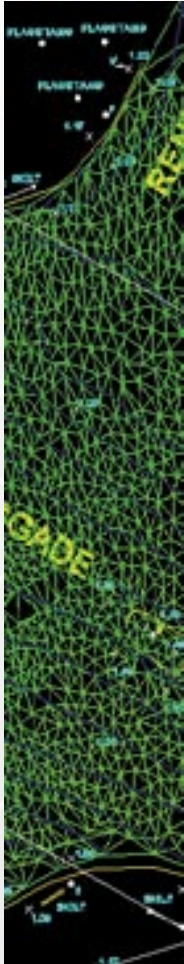
The project work has been planned in a way so students experience the same processes, as is the case at a private surveying firm. Also, the technology and methodical tools are the same.

Finally, a small project is completed based on an individually chosen topic within property law and cadastral management.

At the same time, lecture courses are given within property law and property economics, data systems, digital management and e-government.

The project work will be evaluated through a project exam shortly before the summer holiday.

The basis of the second and third years of the bachelor's programme is professional and methodical knowledge within the surveying subjects. When students continue on one of the three master's programmes, the focus on theories and complex problem solving is even more significant. The students hereby establish a professional and methodical toolbox, which will be useful when employed as a surveyor.





Master's Programme within

# Measurement Science

Specialisation in Surveying and Mapping



The Master's Programme in Measurement Science relates to those who would prefer to work professionally with advanced surveying and modern digital measurement methods.

This specialisation particularly enables students well for job opportunities within areas of advanced measurement and modern digital mapping methods.

**GPS, Global Positioning System** is related to surveying based on signals from satellites. This technology is considered revolutionary to large areas of traditional land surveying. The opportunities are many. GPS is used for exact surveying and marking, for instance in connection with construction works. GPS is also used for continuous local positioning, for example by installation in cars, including route-maps and navigation systems.

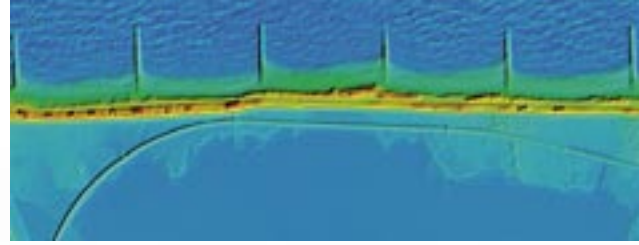
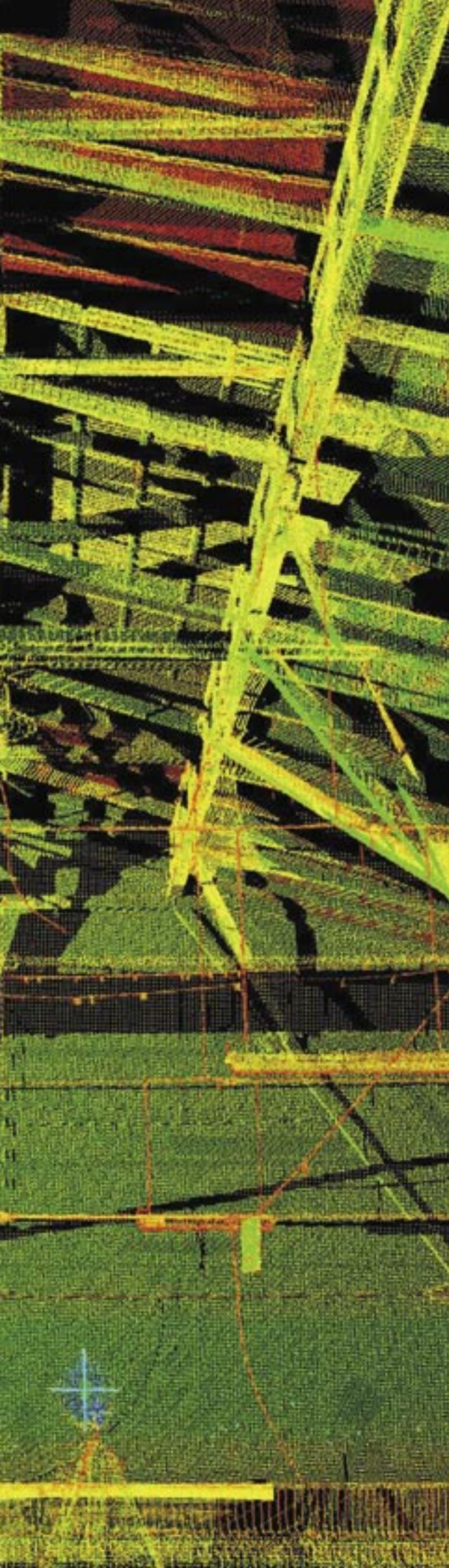
**The offshore industry** demands large production plants, such as offshore oilrigs, pipe systems and industrial infrastructures. This demands extremely precise surveying, in order to fulfil the quality requirements for all the units, which are included in construction works. The assignments may take place both on land and at sea. With regards to the placement of large offshore oilrigs there is a significant demand for high accuracy positioning and for surveillance to ensure that the oilrigs are stable.

**Infrastructure projects such as bridges and roads** have similar high demands in surveying. Related Danish projects are the surveying of the two bridge and tunnel projects of the Great Belt linking the eastern and western parts of Denmark and at the Öresund Bridge linking Denmark to Sweden. Prior to the detailed design of these projects, both sides were surveyed in order to determine the exact distances and heights of the construction project. The high accuracy of surveying results is closely connected to the modern computer systems for design, construction and placement of each unit within the bridge and tunnel projects. In the same way, exact surveying forms the basis of the planning and construction of road systems.

**Tunnel constructions** such as the railway tunnel underneath the Great Belt also demand a high level of accuracy. Obviously, the drilling machines from both sides are to reach each other very precisely underneath the Great Belt, when drilling for the tunnel pipes. In fact, the drilling machines did reach each other with only a few millimetres of deviation.

**Photogrammetry and Remote Sensing** includes exact surveying and object identification by means of air photography and readings from satellites, and is becoming an increasing market for surveyors. Additionally, digital photogrammetry plays a signifi-



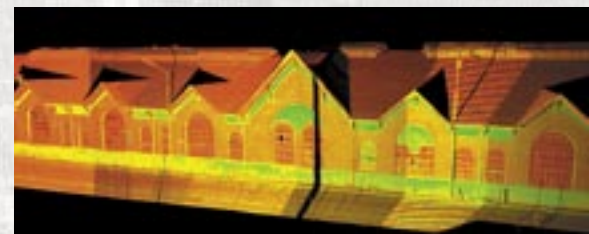


cant role in surveying. New techniques are implemented within remote sensing in order to improve collection of surveying information from satellites; another term for this is ground observations. In this relation, the surveying areas benefit from the research and development, which occur in connection with modern space travel. Techniques for ongoing data collecting and new equipment such as sensors are continuously developed and improved. Some of the brand new techniques include radar surveying and laser scanning.

#### **Lecture courses and project work**

The lecture courses at the 7<sup>th</sup> and 8<sup>th</sup> semester in Measurement Science put the emphasis on theories and methods in relation to the development and use of new technologies for positioning, high precision measurement, scanning, and the related IT-tools. The project work will be based on relevant and current problems or development assignments in cooperation with private companies. The 7<sup>th</sup> and 8<sup>th</sup> semesters will be completed with an examination in January and June, respectively.

The 9<sup>th</sup> semester offers an opportunity to follow a semester at a university abroad, or to undertake a so-called "project internship" in a relevant private company or a public authority. Another possibility is to undertake an ordinary project under the supervision of Aalborg University researchers. The 10<sup>th</sup> semester is devoted to the preparation of the master's thesis.





*Master's Programme within*

# Spatial Information Management

*Specialisation in Geographical Information Systems (GIS) and Media Technology*

During this specialisation, students will work professionally with spatial information, digital management and e-government, and geo communication and visualisation.

The area concerns the use of new technologies within spatial analysis and modelling, in order to solve projects of planning, environmental management and property. Focus is on spatial information infrastructures, organisation, implementation, modern digital communication and problem solving.

## **Digital management**

Digital management refers to problem solving, and in this connection, experts in Spatial Information Management are very important. In current years, planning and management are completed increasingly by means of digital tools. Digital mapping and spatial information are used with regards to topographical relations, people, companies and properties. Regardless of whether the project concerns surveillance of infectious outbreaks or the process of building permits, the projects are very similar, when it comes to methods for collecting, saving and presenting digital information. The development and implementation of these procedures demand great competency within spatial information management.

## **Virtual three-dimensional environments**

Most students are familiar with this dimension from computer games, but also the real

world has similarities. Three-dimensional spatial visualisation is used increasingly in planning of large building projects, design of environmentally sound solutions and planning of large traffic systems. Virtual and Artificial Reality and Argumented Reality are all examples of methods, which will become used for more and more projects. In the future, the development of new summer-house areas, alterations in urban environments or placement of new rural buildings will be prepared by means of three-dimensional tools.

## **Historic environments**

Historic environments can be rebuilt digitally and virtually through the content of historical maps and drawings. Such digital environments are easy to present and are often used to explain changes over time (4-D mapping) and to illustrate the connection with the physical environments of the past. Digitalisations are used in relation to both modern preservation planning and traditional historical presentations in media and museums. On the Internet, new virtual environments are being created in order for visitors to experience historical information in a totally new dimension.

## **Location Based Service**

This term represents the use and presentation of spatial information with regards to changing locations. The presentation may take place on a mobile phone or PDA's





(Personal Digital Assistants); the amount of information that is presented depends on the location, and it changes when the user moves along through urban or rural areas.

#### ***Lecture courses and project work***

The lecture courses on the 7<sup>th</sup> and 8<sup>th</sup> semesters in Spatial Information Management are concerned with theories and methods within development and use of new technologies for the handling, analysing and modelling of spatial information and its related IT-tools. The project work will be based on problems regarding technology development and IT implementation both within the private and the public sectors. In addition, the problems may be related to national or international policies and systems. The 7<sup>th</sup> and 8<sup>th</sup> semesters will be completed with an examination in January and June, respectively.

The 9<sup>th</sup> semester offers an opportunity to follow a semester at a university abroad, or to undertake a so-called "project internship" in a relevant private company or a public agency. Another possibility is to undertake an ordinary project work under the supervision of Aalborg University researchers. The 10<sup>th</sup> semester is devoted to the preparation of a master thesis.





Master's Programme within

# Land Management

Specialisation in Real Property, Land Management and Planning



Students who complete the M.Sc. in Land Management will gain professional knowledge about property development, property law, planning, and the management of land-use and natural resources in both urban and rural areas.

A key professional area is about consultancy for landowners, who want to change the use of their property or to implement new developments. Another and opposite focus is on the public planning and land-use regulations that aim to influence future land-use through comprehensive considerations and concerns about the natural and built environment.

### **Licensed Surveyors in private business**

are responsible for cadastral works such as subdivisions, boundary determinations, and for any change of the boundary between existing properties. In other words, the tasks are related to the development of properties based on the requests of private and public clients. Such professional work also includes consultancy and investigation of alternative possibilities within a legal framework.

In relation to the cadastral work, the necessary documents must be completed. These documents form the basis of approval and registration of the prepared property changes in the Cadastre and the Land Book, and the related digital mapping.

When working as a licensed surveyor, it is important that you are able to communicate well with people and it is also significant

that you hold the necessary professional and social skills in order to manage such procedures.

### **Public planning and land management**

first of all includes insight into planning, nature and environmental legislation, and property law. Here, the chartered surveyor participates as specialists and problem solvers in order to engender compromises between different parties and interests when negotiating. Some of the questions to solve include where to locate industrial plants or summer housing and also, what is an environmentally sound solution in relation to a specific area? Legislation may seem rather complex and it requires a broad insight in various areas to offer consultancy for both politicians and private persons, to enable them to make the right decision in a certain case. Some of the cases could be: the urban environment and the rebuilding of declined harbour and industrial areas or the conflict of nature protection in relation to agricultural needs.

**Expropriation** of entire or parts of properties are sometimes necessary in order to implement public works such as roads and other infrastructure projects. In this situation, the consideration for the interests of the landowner is extremely important. When calculating compensation it is necessary to determine which areas are included in the expropriation and also whether any other inconvenience has been caused.





**International assignments** for chartered surveyors are increasing. International organisations and companies are getting involved in many developing projects in Eastern Europe and in third world countries. In these areas professional consultancy and knowledge are required to develop sustainable mapping and land registration systems with the purpose of securing land rights and managing the use of land and connected environmental issues. On top of that, it is also a question of developing the necessary knowledge and competences in each country for them to independently manage and maintain such functions in the future.

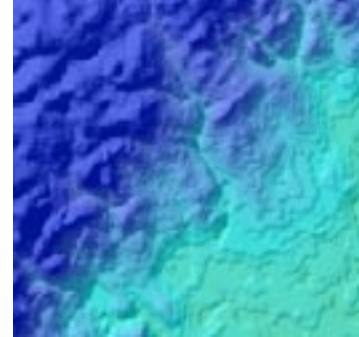
#### **Lecture courses and project work**

The lecture courses on the 7<sup>th</sup> and 8<sup>th</sup> semesters in Land Management emphasise theories and methods within property law, planning and management of land-use and development, urban management, and nature and environmental protection. The project work is often based on relevant and current problems within land laws and land management procedures. The 7<sup>th</sup> and 8<sup>th</sup> semesters are completed with an examination in January and June, respectively.

The 9<sup>th</sup> semester offers an opportunity to follow a semester at a university abroad, or the student may choose to have a so-called "project internship" in a relevant private company or public authority. Another possibility is to undertake an ordinary project work under the supervision of Aalborg University researchers. The 10<sup>th</sup> semester is devoted to the preparation of a master thesis.



# Practical Information



## **Study environment**

The chartered surveying programme is only available at Aalborg University and therefore students come from all over Denmark. Approximately 40 students are enrolled each year.

Due to the way of studying and the comprehensive study environment that includes many social activities, students easily get to know each other. By way of other activities organised by the surveying students' organisation, students also get acquainted with students from other semesters. The programme also contains many professional and social traditions.

In total Aalborg University has more than 13,000 students. Therefore, many opportunities exist for students wishing to get involved in activities on campus or at the student house, or in the city of Aalborg.

The Municipality of Aalborg guarantees that all Danish students are allocated a place to stay during the first couple of months of study until they find their own accommodation. International students are assisted by the International Office in all kinds of practicalities including finding accommodation.

## **Study tours**

On the 6<sup>th</sup> semester, the students have a study trip to Copenhagen, for instance to visit the National Survey and Cadastre to get to know about the functions and tasks

of the agency. Furthermore, a one-week trip abroad will usually be organised in either the 7<sup>th</sup> or 8<sup>th</sup> semester with the purpose of gaining professional knowledge and inspiration from studying the professional areas in an international context.

## **Internationalisation**

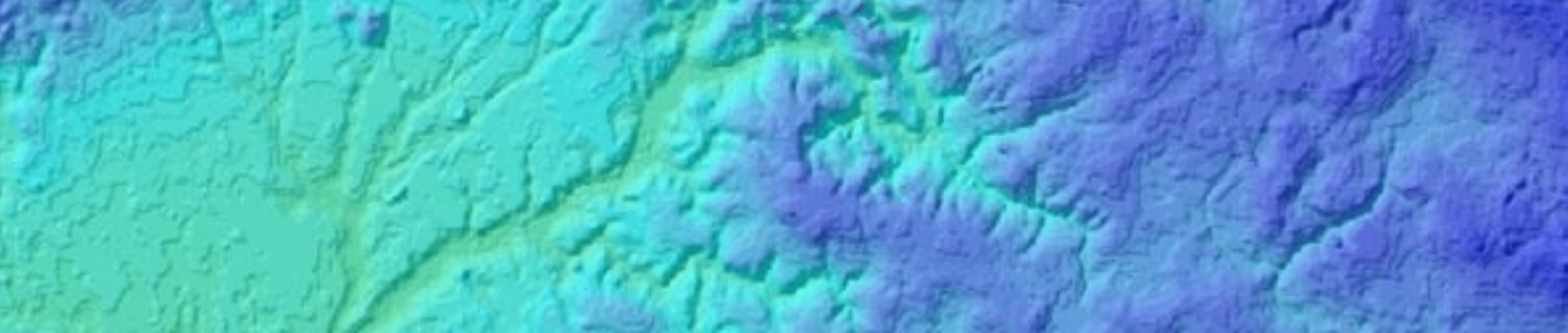
Aalborg University cooperates with many similar educational institutions throughout the world. Therefore it provides an opportunity for students to complete a semester (normally 9<sup>th</sup> semester) at a foreign university. The international agreements also mean that foreign students coming to Aalborg University may get enrolled onto the master's programme (7<sup>th</sup> to 10<sup>th</sup> semester); hence, part of the lecture courses will be presented in English.

## **Admission**

Special entry requirements apply for Danish students. They must hold an upper secondary school certificate with an A level equivalent in mathematics. All students that comply with these requirements are enrolled.

It is considered, within a few years, to provide the master's programme in English. Foreign students may then apply to the surveying study board for admission onto the master's programme. Students must hold a relevant bachelor's degree from their home university.





**Contact address for foreign students**

International Office  
Aalborg University  
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9100 Aalborg Oest  
Denmark  
Phone: +45 9635 8080  
Fax: +45 9815 4522

Direct contact:  
The L-Study Bord  
Phone: +45 9635 8341  
E-mail: [joj@land.aau.dk](mailto:joj@land.aau.dk)

Or visit the homepage for international students:

**[www.aau.dk/international](http://www.aau.dk/international)**

This site includes the relevant information for international students considering applying for the programmes at Aalborg University.

**Links**

A number of relevant links explain about the surveying programme as well as the professional areas related to the surveying profession.

The following links are recommended:

**[www.lsn.aau.dk](http://www.lsn.aau.dk)**

This home site of the surveying study board presents the key information on the contents of the programme. The function of the site is as a working tool for running the individual semesters.

**[www.ddl.org/thedanishway](http://www.ddl.org/thedanishway)**

The home site of the Danish Association of Chartered Surveyors presents a general overview of the professional areas related to the surveying profession in Denmark. This includes topics such as cadastre, land management, spatial planning, land valuation, topographic mapping and spatial information management. Furthermore there is information about the surveying profession and how surveying practice is regulated.

**[www.fig.net](http://www.fig.net)**

This is the well-known web site for the International Federation of Surveyors (FIG), where the administrative office is located at the Surveyors House in Copenhagen. The web site includes information on the international surveying network as well as documentation and proceedings from conferences and the work of the ten professional commissions.



