SUMMER SCHOOLS 2012
Future Energy Technologies

Aarhus University School of Engineering
www.iha.dk/summerschool
Photos: Henrik Olsen, Istockphoto etc.
“Modern renewable energy is the future energy supply, and during these summer schools students will work with technologies shaping the future and making the world a more responsible and sustainable place. Denmark is the most important wind power hub.

Here, the participants will meet some of the world’s leading companies in this industry. Interacting with companies that possess world class technologies when it comes to modern energy will provide skills to apply theory to practice and give the possibility to experience the products up-close.

Within these two weeks the participants will be challenged and gain valuable insight into the world of modern energy and build on to their current competences within this field.

We are excited to meet young and talented students who are eager to learn, and we are excited to introduce them to these renewable energy technologies. I appreciate the direct dialogue with students at the summer school, and through workshops and discussions we get to know each other, and I get an opportunity to tell about our high-tech industry and what this industry offers.

It is also important to us that the students get a good impression both of our industry and of Denmark and become good ambassadors for the industry and for Denmark.”

Per Hessellund Lauritsen,
Siemens Wind Power A/S
In 2012, Aarhus University School of Engineering launches an extended summer school programme with a broad focus on energy technology. The programme consists of a portfolio of four intensive courses:

- Wind Turbine Technology
- Smart District Energy
- Biofuel Production Technology
- Power

Each course addresses future key energy challenges and gives insight into available technologies and how to use energy in a sustainable and cost effective way.

From across the world, students travel to Denmark to explore these four areas of expertise and to gain a deeper understanding of the state-of-the-art technical and scientific solutions behind renewable energy.

Denmark is an international hub for energy technology with a high concentration of green-tech companies and some of the world’s leading skill clusters and research environments. The country has a strong political focus on sustainability and a pioneer legacy, which provides a strong platform for global competition.

Denmark’s long term energy strategy is to become fully independent of fossil fuels by 2050. The country is therefore, in many ways a development laboratory for technologies that are able to satisfy the growing need for energy and reduce the CO2-emission at the same time.

By participating in the summer school programme, you will get a unique opportunity to use and develop your engineering qualifications in close collaboration with relevant companies. You will gain a course specific theoretical insight, but you will also be challenged to apply the theory when solving complex practical tasks in the industry.

In this brochure, you will find general information on admission and course descriptions.

For further academic and practical information as well as access to the application form, please visit our website www.iha.dk/summerschool

We are looking forward to welcoming you to Denmark in August 2012.
Wind power is a pivotal element in the necessary transition to a green growth economy!

Are you interested in getting insight into the latest development in wind turbine technology along with other international and Danish students and at the same time meet some of the leading companies in the wind industry? If yes, the international summer school in wind turbine technology is your chance to develop your competences and meet people from around the world.

Denmark is leading in the wind energy industry and the most ambitious country in Europe when it comes to wind power. In 2020, 50 % of the electricity consumption will be covered by wind power. This transition of the entire electrical power system will only add to the Danish capabilities and manifests that Denmark is an ideal place for studying wind energy.

The purpose of this summer school is to enable participants to apply their engineering competences to wind turbine technology problems and gain insight into the functioning of turbines and the interaction between the different sub-components and their demand profiles. Having completed the course with successful outcome, you will be able to apply your own engineering competences to analyse the specific elements in wind turbine technology. The summer school will primarily be focusing on mechanics and power engineering challenges.

A considerable part of the course will be carried out in cooperation with the Danish wind turbine industry. Also, part of the teaching will be conducted by the companies at their localities. Throughout the summer school, you will be working creatively in teams across the different engineering disciplines in an international environment.
The summer school led me to amazing opportunities

“The summer school on wind turbine technology is an excellent way to learn more about design of modern wind turbine generators and build a network with some of the most important industry representatives.

The summer school is held in a lovely setting, and the facilities are just wonderful. The multicultural environment enriches the learning and networking possibilities. With direct contributions from both wind turbine designers and researchers, the educational contents of the course reflect the state-of-art in the design of wind turbines.

On top of that, thanks to the summer school, I had the opportunity to make myself known to the representatives in the wind industry and a short while after the summer school, I found a job in one of the sponsoring companies”.

Giovanni Nappi, Universita degli Studi di Perugia, Italy

Creativity, technical knowledge and friends for life

“The summer school at IHA is a blend of classroom knowledge and field excursions to companies mixed with a cheerful Scandinavian way of getting things done, concluded with a creative final project and friends for life.

I found the exchange of ideas among participants and industry experts especially rewarding. The atmosphere was ideal for discussing new approaches, creativity was stimulated and technical knowledge is abundant. Thus, in the end, some very good insights and smart ideas were put into the final project - some of them might actually become reality in a near future.”

Luis Guerreiro, Nova University Lisbon, Portugal
Supreme system efficiency - A new way to cut costs!

Are you interested in reduction of energy use, reduction of carbon emissions and smart use of heat? If yes, you should apply for this summer school in smart district energy.

In 2060, more than 60 % of the global population will live in cities. Therefore, we need to think smart, be intelligent and act responsibly to ensure a sustainable development between growing populations, bigger cities and economic prosperity challenging our way of using energy. In Denmark, we have been successful in keeping the production of energy close to the consumers, allowing both energy efficient and environment friendly production of combined heat and power and district heating, and you will get a glimpse of this during the summer school in smart district energy.

The purpose of this summer school is to enable you to apply your engineering competences to district energy issues and gain an insight into the technology and the main components of district energy. Furthermore, the summer school focuses on relevant heat production sources, smart production and consumption and the great environmental advantage of using district energy.

A considerable part of the course will be carried out in cooperation with the industry, heat supply companies, consulting engineers and the Danish District Energy Development Centre. Several lessons will be conducted by the companies at their localities.
Learning from the best players in the industry

“The summer school is a perfect mix of theoretical classes, visits to leading companies and interesting sites and case work in teams. This mix gives you a fundamental insight into the principles of smart district energy. The Danish model of district energy is interesting and most of all inspiring. Coming home, I have been able to use this inspiration in practice as I together with a group of students and teachers, have started a small company with the aim of lowering the footprint of the student population in Leuven. We have already started our first projects where one of them is about district heating.”

Ruben Vos, University College Group T, Belgium

Feeling inspired and empowered

“You cannot even imagine how important the lessons, the visits, the case work and the presentations experienced in Aarhus have been for my work. Yesterday, I graduated in Energy Engineering with honors, and my thesis supervisor asked me to continue my studies in this direction, proposing collaborations with the local multi utility company for my future graduate degree thesis.”

Luca Bonfigliola, University of Bologna, Italy
Biofuel production and research are core competences in Denmark!

Are you eager to improve your skills within biofuel production technologies? Do you appreciate international contexts and multidisciplinary approaches? If yes, then you are the right candidate for the summer school in biofuel production technology.

In a world with limited mineral oil resources and an environment that is under pressure due to rising temperatures, a transition to alternative energy sources is necessary. The ideas are numerous, but the economy is limited. Danish competences within bioenergy technologies are much in demand and the country serves as a perfect industry hub and live testing ground for modern energy technologies in biofuels and biogas.

In this summer school course, we will look at the most advanced biofuel production processes and try to give a broad overview as well as an in-depth understanding of these. We will look at the processes and the economy and try to determine what limits the expansion of biofuel production. Furthermore we will also try to identify how processes can be optimised to large scale as well as to small scale processes.

The overall goal with this intensive programme is to give the students a substantial knowledge of biofuel production technologies. Having completed the course with successful outcome, you will have obtained an understanding of and insight into different biofuel production technologies, and you will be able to apply your own engineering competences to improve and innovate specific biofuel production technologies.
A Bright Future
As a Danish company and world leader in bioinnovation, Novozymes is delighted to support initiatives like the summer school within biofuel production technology at Aarhus University School of Engineering.
With the end of cheap oil and the urgent need to mitigate global warming by reducing CO2 emissions, it becomes clear that the world will have to switch from an oil-based economy to a bio-based economy.
I have the vision that within a few decades, a leader in biotechnology like Novozymes will become as big as the oil companies of today. Not only will our enzymes enable the production of biofuels, but also hundreds of other products made by oil refineries and chemistry today, will be substituted by similar products generated by “Biorefineries” in the future.
Lionel Picart, Regional Marketing Manager,
BioEnergy, Europe, Novozymes

Learn from the best in class
“Denmark is one of the leading countries in the utilisation of alternative energy sources. Especially in the bioenergy sector, Denmark is one of the most innovative countries. Research in second generation bioethanol, biodiesel and biogas are some of the examples. This summer school offers an excellent learning opportunity for students who are interested in the bioenergy field, and joining this summer school will give insight into these different technologies and will include several visits to leading companies in bioenergy production. In this intense learning environment, you will gain insight into the bioenergy field, be challenged by tasks you will be solving in groups, expand your network and have fun at the same time.”
John Nieland, Associate Professor, Bioprocess Technology,
Aarhus University School of Engineering
Power the future!

Are you interested in gaining insight into how you can help design the future smart power grids? Or do you want to learn more about the Danish electricity network which is quite unique in an international perspective? If yes, the international summer school in power could be just the right choice for you.

The requirement of 30% renewable energy by 2020 puts Denmark on the list of countries needing the most renewable energy in the future. Thus Denmark is an ideal place for this area of study.

The courses focus on how we can use our technology in relation to the overall smart grid concept and during this summer school we will especially focus on the “micro” aspects of the smart grid. You will gain knowledge in many areas that can help develop the smart grid application, making us able to utilize the surplus of renewable energy from a storage point of view.

During the course, lectures will be given on the different subjects both by lecturers from the organising group but also by selected people from the industry. Furthermore the course includes excursions to relevant companies. Throughout the summer school, you will be working creatively in teams supporting the international environment.
A unique programme and an unforgettable experience

“When I was looking for a summer school course, Aarhus University School of Engineering attracted me with its unique programmes. The strong combination of theory and interesting company visits made the programme an unforgettable experience. It was one of the best choices of my life to pursue the summer school in Denmark as it is the world’s sustainable energy technology leader.

“The teaching academics with their cutting-edge knowledge practically helped me to extend my skills in power technology - the summer school equipped me with techniques to understand terms like smart grid and power quality. Furthermore the involved companies were very innovative and offered the possibility to start a career with them. An exceptional experience! I highly recommend this summer school course to everyone interested in new state-of-the-art technology.”

Christoph Knedel, University of Applied Sciences Flensburg, Germany

I met people from around the world

“This is a new way to use your vacation and knowledge. Integration of wind energy is what we work with, and we have found good ways. There are no courses like this elsewhere - it is unique.”

“It is a great way to meet new people with the same interests. These people care about the same things as me and the international network is really good. Furthermore, many friendships have arisen, and I will definitely keep in touch with some of them.”

Christian Jensen, Aalborg University, Denmark
Cooperation with companies
The summer schools are supported financially by industrial companies, the European Union and Aarhus University School of Engineering.

Representatives from the participating companies actively contribute both to the planning and the execution of the summer schools. For example, students will participate in lessons organised by the companies at their locations. Aarhus University School of Engineering has the overall professional responsibility for the academic content of the summer schools.

Wind Turbine Technology:
- Vestas Wind Systems
- Siemens Wind Power
- DTU Risø
- DTU
- Mita Teknik
- Aalborg University
- Vattenfall

Biofuel Production Technology:
- Novozymes
- Daka
- Faculty of Agricultural Sciences, Aarhus University
- Hveiti

Smart District Energy:
- AffaldVarme Århus
- Assens Fjernvarme
- COWI
- Danfoss
- Dansk Fjernvarme
- Grundfos
- Kamstrup
- LOGSTOR
- Rambøll

Power:
- Copenhagen University College of Engineering
- ABB
- AREVA
- DONG Energy
- Energinet.dk
- EnergyMinds
- Schneider Electric
- Vattenfall
- Technical University of Denmark
- Siemens Wind Power
- N-1
- Danish Wind Design
- Rockwell Automation
- Samsø Energy Agency
Your Participation
Students from across the world travel to Denmark to participate in the summer schools to explore a specific area of expertise and gain insight into the latest knowledge in this field – and we would like to welcome you on-board.

Application
You can apply online at www.iha.dk/summerschool
To apply, you have to upload your translated transcript of records, a photo of yourself and your CV (optional). Participation in the summer school programme requires a high level of technical and scientific competences.

Deadline
The application deadline is 15 May 2012.
In the weeks after the application deadline, the admission committee will evaluate all applications, and you will hear from us by the end of May 2012.

Participation fee
To participate in the summer school, you are required to pay a fee covering food and accommodation, social activities and possibly a tuition fee. The tuition fee varies and you will find more information about this on our website.

Duration
All four summer schools will take place from 5 - 17 August 2012.

Programme
You can find the programme for all the summer schools on our webpage. Please notice that the programme is subject to change, and all participants will receive a detailed programme on the first day of summer school. All courses are taught in English at Bachelor and Master level. Furthermore all four summer school courses credit the student 5 ECTS-points if passed.

More information
Read more about the summer schools, practical information, testimonials, courses and much more on: www.iha.dk/summerschool