



# KIC InnoEnergy Master School

## MSc SENSE – SMART ELECTRICAL NETWORKS AND SYSTEMS

**MSc SENSE develops your skills in electrical power engineering, innovation processes and entrepreneurship in the emerging field of Smart Grids. The inclusion of innovation, plus its connection to developing new business ventures together with industrial partners, makes the programme unique.**

### PROGRAMME DESCRIPTION

MSc SENSE focuses on understanding, modelling and analyzing the principles behind electric power generation, transmission, distribution and utilisation on a broad scale. Topics range from the design, operation, control and monitoring of individual components to national power systems in their entirety.

Existing technologies make up the bulk of the course content, but strong emphasis is also given to novel and innovative technologies that may stimulate the evolution of existing power grids into a 'Smart Grid'. The innovation process itself, plus the route towards new business development in the electric power area, is addressed. MSc SENSE displays strong interaction with its industrial and research partners, who can be found all over Europe and throughout the world. Examples of industrial partners include ABB, Vattenfall and IREQ (Hydro-Québec's Research Institute, Canada).

The programme gives you a highly relevant and advanced education within the smart grid concept. Smart power grids are the electrical power system of the future. They operate in accordance with many of the key requirements that a sustainable energy system must meet – capacity, decarbonisation, efficiency, flexibility, reliability and sustainability.

SENSE is a joint programme run by eight European universities involved in the framework of KIC InnoEnergy that is funded by the European Institute of Innovation Technology (EIT):

- AGH University of Science and Technology (AGH), Kraków, Poland
- Grenoble Institute of Technology (INP), France
- Karlsruhe Institute of Technology (KIT), Germany
- University of Leuven (KU Leuven), Belgium
- Royal Institute of Technology (KTH), Stockholm, Sweden
- Technical University of Catalonia (UPC), Barcelona, Spain
- Technical University of Eindhoven (TU/e), the Netherlands
- Uppsala University (UU), Sweden

### PROGRAMME CONTENT

MSc SENSE is a two-year master programme with a mandatory change of study country between the first and second year. Your first study year has a strong focus on fundamental courses like power system analysis, power electronics, electrical machines, high-voltage engineering, etc. The joint course 'smart electrical networks and systems' introduces you to the novel aspects and challenges of smart grids.

During your second study year, the following specialisations are available:

- Energy Management in Buildings and Power Grids (INP)
- Electrical Energy Systems and Electricity Market (KIT)
- Intelligent Transmission Networks (KTH)
- Power Distribution (KUL)
- Power Electronics as Enabling Technology for Renewable Integration (UPC)
- Storage (UU)
- Sustainable Electrical Energy Systems (TU/e)

MSc SENSE focuses strongly on entrepreneurship and creating businesses from innovations. As well as activities integrated in 'Smart electrical networks and systems', other events such as study tours and seminars are also provided. In addition, two

summer schools are arranged between your first and second year: one focused on smart grid innovations and one on entrepreneurship and business creation.

### THESIS PROJECT

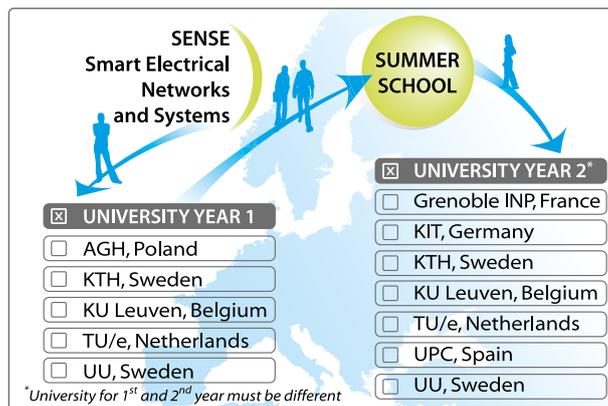
The final degree project is worth 30 higher education credits (ECTS) corresponding to five months of full-time study. You summarise your project in a written report and present it at a seminar. It should be relevant to smart grid concepts and have a clear orientation towards innovative solutions relevant to electric power. End-of-project results are presented at the SENSE summer school as, for example, seminar sessions or joint poster sessions.

### CAREER OPPORTUNITIES

The international environment of MSc SENSE prepares you for a global career in electrical power engineering, especially in the growing field of restructuring existing power grids into smart grids.

SENSE provides you with the in-depth knowledge and broad competence you need for a professional industrial career in electric power development, production, system design and grid operation. Industrial partners supporting SENSE have indicated a strong need to recruit new employees with the competences provided by the programme. Just as importantly, SENSE also prepares you

for continued research studies at higher academic institutions. What's more, the programme will prove invaluable to entrepreneurs wanting to turn good ideas into commercial products or services. The mandatory country mobility also strengthens your credentials on the international market and close interaction with industrial partners opens up many interesting job opportunities.



### APPLICATION PERIODS

Application Round 1  
January 2nd - February 28th, 2014  
Application Round 2  
March 1 - April 30, 2014

### REQUIREMENTS

MSc SENSE master programme is for outstanding students with an above-average Bachelor's degree in Mechanical Engineering, Electrical Engineering or Chemical Engineering. Admission of students with a different background in a related field may be possible after careful assessment. To qualify for SENSE, applicants need to fulfil the admission requirements related to previous studies.

### ENGLISH PROFICIENCY

All applicants must provide proof of their English language proficiency, which is most commonly established through an internationally recognised test such as TOEFL, IELTS or University of Cambridge/ University of Oxford Certificates

Detailed information on the application procedure and requirements can be found on our website:  
[www.kic-innoenergy.com/application](http://www.kic-innoenergy.com/application)

### CONDITIONAL ACCEPTANCE

Students in their final year of undergraduate education may also apply and if qualified, receive a conditional offer. If you have not completed your studies, please include a written statement from the degree administration office (or equivalent department), confirming that you are enrolled on the final year of your education and giving your expected completion date. If you receive a conditional offer, you should present your degree certificate to the KIC InnoEnergy Admissions Office before your admission in a specific programme can be formalized. The KIC InnoEnergy Admission Office will forward this to your programme, and appointed Year 1 university, such that your admission can be completed.

### PARTICIPATION FEES AND SCHOLARSHIPS

See info on website.

### ACCREDITATION

Having successfully completed the programme (120 ECTS), you will be awarded the Master of Science (M.Sc.) as a double-degree of the two universities you have attended.

### CONTACT

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