



# KIC InnoEnergy MasterSchool 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, and 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. Topics range from the design, operation, control and monitoring of individual components to the power system in its 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.

SENSE displays strong interaction between its innovation projects and 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. The programme gives engineering students

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
- KU Leuven (KUL), 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

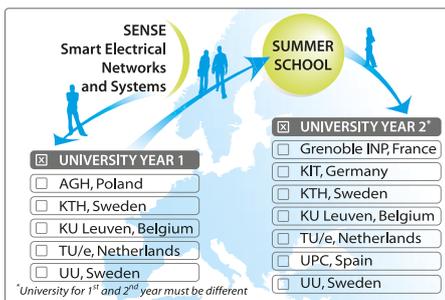
MSc SENSE is a two-year master programme with a mandatory change of study country between the first and second year.

The 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' is also included in your studies. This introduces you to the novel aspects and challenges of smart grids.

During the 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 (Uppsala University)
- Sustainable Electrical Energy Systems (TU/e)

KIC InnoEnergy and SENSE both focus strongly on entrepreneurship and creating businesses from innovations. In MSc SENSE, a number of activities are integrated in the joint course 'Smart electrical networks and systems'. Other events like study tours and seminars are provided on several occasions within the course. In addition, two summer schools are arranged between the first and second year: one focused on smart grid innovations and one on entrepreneurship and business creation.



## DEGREE PROJECT

The final degree project is worth 30 higher education credits, corresponding to five months of full-time study. The project is summarized in a written report and presented at a seminar. It should be relevant to smart grid concepts and have a clear orientation towards innovative solutions relevant to electric power.

You present your end-of-project results at the SENSE summer school as, for example, a seminar session or a joint poster session.

## CAREER OPPORTUNITIES

The international environment of 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, 2013

Application Round 2  
March 1 - April 30, 2013

## PARTICIPATION FEES AND SCHOLARSHIPS

See info on website

## REQUIREMENTS

Applicants must have completed a Bachelor's degree in Electrical Engineering or a closely-related field encompassing a minimum of 180 ECTS credits, or have equivalent academic qualifications from an internationally-recognized university.

Applicants must also have at least 60 ECTS credits in electrical engineering and mathematics (including calculus, numerical methods, algebra, probability theory and basic control theory) equivalent to at least 30 ECTS credits. The average grade must be at least 75% of the scale maximum.

## 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 InnoEnergy Admissions Office before your admission in a specific programme can be formalized. The InnoEnergy Admission Office will forward this to your programme, and appointed Year 1 university, such that your admission can be completed.

## ADMISSION DETAILS

Students in their final year of undergraduate study may also apply to SENSE and, if qualified, receive a conditional acceptance. If you have not completed your studies, please include a written statement from the Degree Administrations Office (or equivalent department) giving your expected completion date.

## ENGLISH PROFICIENCY

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

## ACCREDITATION

On fulfilling all programme requirements, a Master of Science degree will be awarded from the universities where studies were performed during year 1 and year 2, i.e. a double-degree. Students will also receive a certification of having studied an EIT-accredited programme.

## CONTACT

MSc SENSE Programme Director:  
Hans Edin, KTH School of  
Electrical Engineering  
Teknikringen 33  
SE-100 44 Stockholm, Sweden  
Tel: +46 8 790 7639  
sense@kic-innoenergy.com

For more information:  
[kic-innoenergy.com/senseprogramme](http://kic-innoenergy.com/senseprogramme)

