CHALMERS UNIVERSITY OF TECHNOLOGY - rev. A
Department of Computer Science and Engineering
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DAT300 (DIT668 for GU) ICT Support for Adaptiveness and Security in the Smart Grid for the International Masters Program in Computer Systems and Networks (MPCSN), 7.5 credits - Course period I, 2016/2017

Aim

The course gives an introduction of the smart grid and its increased dependence on information and communication technologies (ICT). In Europe and elsewhere, the electrical grid is being transitioned into the "smart grid" in order to increase flexibility and accommodate large scale energy production from renewable sources. This transition involves, among other steps, the installation of new, advanced equipment - for example, the replacement of traditional domestic electrical meters with smart meters - and remote communication with devices - for example, allowing remote access to an unsupervised energy production site.

The course is built around seminars where you learn about the design or development of systems, infrastructure, and applications that are related to the electric power smart grid, with a focus on distributed algorithms and security. You are expected to give some presentations, as well as to participate actively in discussions. As part of the course, you are also expected to complete lab work, i.e. a significant project with relevance to the smart grid. In this way you will also gain experience at the front connecting research and education in the main domain overlapping two of the Areas of Advance, namely ICT and Energy.

Prerequisites

General requirements from a Bachelor's degree are required. You should have taken at least one course in computer programming. We also expect 7.5hp or equivalent in one of the four areas: computer communication, operating systems, computer security, or distributed systems. English is required.

Examiners

Assistant Professor Magnus Almgren, ph. 031 772 1702, email: magnus.almgren[1]
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Other responsibles

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Contents

Part 1: Lectures from faculty and industry
Part 2: Paper presentations from students, and a final project
All lectures are obligatory.

Reading

The course is built around seminars, lecture notes and research papers. These are chosen in the first two weeks of the course.

Course homepage
The course homepage is http://www.cse.chalmers.se/edu/course/DAT300/ .

Learning outcomes

Knowledge: Demonstrate knowledge in the smart grid domain, in particular on ICT methods for supporting distributed resource management, adaptiveness and cybersecurity, including protocol or algorithms design, programming and evaluation, with proven experience as well as insights of current research and development in the area.

Technical Skills: Demonstrate the ability to understand, design and analyse methods, algorithms, protocols for distributed, adaptive and cybersecure smart power grid networks; these methods should aim at helping to adapt to the needs and capacities of consumers, industry and society and meet the requirements of sustainable development in economic and ecological terms. Distributed computing and systems, information and systems security, networking and computer communication are important in this context.

Skills: Ameliorate the ability to present complex material to a small audience and explain complex algorithms and concepts. Improve skills in running a small team project, practice technical writing.

Examination
The examination is based on the activity in the course: project quality & project report (50% of the grade), team presentation (20%), individual summary (20%), leading paper discussions and overall active participation of the student in the discussions (10%).

Marks 3, 4 and 5 are given for successful completion of the course activities (GU: Pass and Pass with distinction).

Lecture plan
This project course setup includes a short sequence of introductory lectures given by lecturers and invited talks from the industry, that will prepare the students and allow their project groups to share a wider common background. Moreover, the course setup includes a seminar series on advanced topics related to the projects, followed by a discussion in the classroom led by an expert in the area. The projects will be presented towards the end of the course, as a presentation (to peers) and as a written report.