EH2750 Computer Applications in Power Systems, Advanced Course 7.5 credits

IT tillämpningar i elkraftsystemet, fortsättningskurs

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for EH2750 valid from Autumn 2011

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Bachelors level in Electrical Engineering or Computer Science.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The purpose of the course is for the student to be able to independently analyse requirements for advanced functions for automation and control of power systems and translate these requirements into a distributed system solution. After the course the students shall be able to:

- Analyse requirements for advanced functions for power system control and automation and document these in the form of use cases - Use Cases
- Be able to formulate problems in control and automation of power systems as a **search** problem and create algorithms to solve these problems.
- Independently translate requirements on a system solution into a design of a distributed control system for control and automation of power systems .
- Independently plan and execute a project in a group of students including requirements analysis and documentation, as well as design and implementation.
- Implement functions for power system control using predefined components and standardized interfaces.
- Present results orally and in writing.

Course contents

The course includes theory and practice of autonomous systems in general, and specifically how such systems can be used to control and automate power systems. The course also consists of theory for distributed multi-agent systems, and how these can be developed in practice. A large part of the course consists of programming (Java) in a distributed platform (JACK) connected to a simple power system emulator where the theoretical concepts easily are applied in practical systems functions.

The platform means that the requirement of prior knowledge of programming is low in relation to the solutions that are implemented.

Disposition

The course has two main parts. During the first part of the course (period 1) theory and practice of autonomous systems for control of power systems is presented, this part consists of lectures, exercises and programming labs.

Part two (period 2) consists of the execution of the project assignment. In the assignment, students work in groups, planning the project, analysing requirements of the control function, designs the system solution and implements a distributed system to realise the advanced control function.

Course literature

Introduction to Multi-agent systems, Michael Wooldridge, ISBN 978-0470519462

In addition to the course book, shorter texts and articles will be used for specific topics. These will be provided during the course.

Equipment

Use of a personal laptop for the programming assignments is an advantage, but not a requirement.

Examination

- PRO1 - Project, 7.0 credits, grading scale: A, B, C, D, E, FX, F
- SEM1 - Seminar, 0.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

The project assignment (PRO1) is performed in groups. The student's individual performance is assessed by individual meetings and presentations during execution of the project. The seminar (SEM1) is individual and passing it is a strict requirement to start the project assignment.

Other requirements for final grade

All included examination parts (PRO1 and SEM1) must be passed. Grade is based solely on the student's performance in the project. The grade is based on how well the project was executed with respect to the theoretical and technical content, the degree of independent work in the implementation and quality of oral and written presentation.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.