



# **EH2741 Communication and Control in Electric Power Systems 6.0 credits**

**Kommunikation och styrning i elkraftsystem**

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

## **Establishment**

The official course syllabus is valid from the autumn semester 2022 in accordance with Head of School decision: J-2021-1823. Decision date: 14/10/2021

## **Grading scale**

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

## **Education cycle**

Second cycle

## **Main field of study**

Electrical Engineering

## **Specific prerequisites**

- Knowledge in analysis of electric power system, 6 higher education credits, equivalent to completed course EG2100.
- Knowledge in automatic control, 6 higher education credits, equivalent completed course EL1000/EL1110.

- Knowledge in numerical methods and basic programming, 9 higher education credits, equivalent completed course SF1519.

## Language of instruction

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

## Intended learning outcomes

After passing the course, the student should be able to

- describe the function of the primary equipment in the power system that is relevant for protection, automation and control
- analyse substations and simple power systems with regard to reliability and need of protection, automation and control with focus on power system with high penetration of renewable energy sources
- describe the function including necessary communication systems of information and control systems that are used for protection automation and control of power system with high penetration of renewable energy sources
- develop simple information and control systems for, e.g. SCADA systems with EMS applications including state estimator
- describe relevant interoperability standards in the area e.g. IEC 61850 and IEC 61970
- describe cybersecurity threats using information and control systems for control of electric power system

in order to

- obtain an introduction to the foundation of the architecture of information and control systems for protection, automation and control of electric power system both traditional power systems, and they with large sets renewable energy sources
- obtain a broad perspective in the area
- open for continued studies in specialised subjects.

## Course contents

Communication and control in electric power system is a large and broad subject with many different subareas including instrumentation, measurement, automatic control and computer and communication systems and power system analysis. The course gives a broad perspective in the area and opens for continued studies in specialised subjects. The contents are focused on design, implementation and use of information and control systems for protection, automation and operation of electric power system. The course is interdisciplinary and includes electrical power engineering as well as computer and communication system engineering.

## Examination

- PRO2 - Project Assignment 2, 2.0 credits, grading scale: P, F
- PRO1 - Project Assignment 1, 2.0 credits, grading scale: P, F
- PRO3 - Project Assignment 3, 2.0 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.

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

The examination consists of project work in groups, and individual oral presentations.

## 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.