FEI3390 Reliability Evaluation of Sustainable Electric Power Systems (RSEPS) 7.5 credits

Tillförlitlighetsanalys av uthålliga elkraftsystem

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

Establishment

Course syllabus for FEI3390 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Entry requirements for this course is equivalent to master exam in Electrical Engineering, or corresponding and with basic knowledge in statistics methods.

Language of instruction

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

Intended learning outcomes

After the course the student will be able to:

- Know basic terminology and concepts for reliability analysis.
- Analyse a system including the following methods and techniques for reliability analysis: • Network method for analysis of systems of independent components, • Methods for identifying critical components • Marcov modelling • Life time modelling
- Perform power system analysis including aspects of: • Need and access to data from fault and disturbance • Availability of test systems for power system reliability analysis • Adequacy and security assessment • Protection system reliability • N-1 criterion analysis • Load point and system indices
- Perform analysis of the power system as part of the energy system with aspects of: • Reliability evaluation for the Smart Grid developments. • Reliability worth analysis and an overall knowledge on laws and regulations to give incentives for reliability levels. • Life cycle cost analysis (LCC) and basic investments and risk analyses based on results from reliability and LCC evaluations. • Formulate a reliability based maintenance plan for maintenance management outgoing from reliability centred maintenance and have knowledge of quantitative developments like the RCAM (Reliability Centered Asset Management) method.

Course contents

This course will give a thoroughly introduction of fundamental reliability theory and basic models for analysis. The theories are generic and applicable for any technical system. This course is focused on application for electric power systems and its equipment. Examples will be given from real case studies and own research studies. The application examples include: generation (hydro, nuclear and wind), transmission and distribution and main components (cables, lines, circuit breakers, transformers) and usage and storage (smart meters and electrical vehicles). The overall objective of the course is that the participant after completed course shall be able to use reliability theory as a tool for decision support for design, operation and planning of electric power systems.

Examination

- EXA1 - Examination, 7.5 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.

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

During 2013 there will be a written exam following an intensive course of lectures. The same written exam will be given in Norway, Finland and Sweden.

Other requirements for final grade

The requirement for final grade is to participate at the course lectures and to pass the written exam.

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.