



FEI3232 Högspänningsteknik - avancerad nivå, doktorandkurs 8,0 hp

High Voltage Engineering - Advanced Level, PhD Course

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för FEI3232 gäller från och med VT19

Betygsskala

P, F

Utbildningsnivå

Forskarnivå

Särskild behörighet

MSc in electrical engineering, physical engineering or similar

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

- describe the principles behind generating high DC-, AC- and impulse voltages
- develop equivalent circuit models of the different high voltage generators
- perform a dynamic response analysis of high voltage measurement systems
- compute the breakdown strength of gas-filled insulation systems with simple geometries
- approximately judge the breakdown strength of contaminated liquids and solids.
- describe the principles for measurement of capacitance and dielectric loss
- discuss ageing of electrical insulation from measurements of complex permittivity
- compute the complex permittivity from the dielectric response function and vice versa.
- discuss the measurement principles behind partial discharges
- compute phase resolved partial discharge patterns from simple models

Kursinnehåll

The course contains the basic theories and the most important experimental methods of high voltage engineering.

Generation of high voltages. Cockroft-Walton cascade rectifier. Transformer cascade. Marx generator for impulse voltages. High voltage dividers. High voltage test technique. Electrical breakdown strength of gaseous, liquid and solid insulation. Dielectric properties of electrical insulation. Complex permittivity and dielectric response functions. Kramers-Kronig relations. Insulation diagnostics. Dielectric spectroscopy. Partial discharges.

Two projects are included that treats measurements of high voltages and diagnostics of electrical insulation. Three laboratory exercises are included plus experimental tasks in the projects. Three non-compulsory assignments treat the theoretical aspects. Two study tours are usually offered. In the end of the course there is a written exam.

Kursupplägg

Two projects, 3 home assignments, 3 laboratory exercises, 1 written examination and 2 study tours

Examination

- EXA1 - Examination, 8,0 hp, betygsskala: P, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

Övriga krav för slutbetyg

This course is run at the same time as EI2430 - High Voltage Engineering, special project tasks are given to PhD students. Minimum grade B on examination. Minimum 3 out of 6 credits on homework assignments, approved projects with minimum 4 out of 6 bonus credits.

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.