SF2937 Reliability Theory 7.5 credits

Tillförlitlighetsteori

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

Establishment

Course syllabus for SF2937 valid from Autumn 2007

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

SF1901 (5B 1501) Probability theory and statistics I or equivalent.

Language of instruction

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

Intended learning outcomes

To pass the course, the student should be able to do the following:

- construct and analyse reliability models for simple technical systems in terms of concepts like component wise and system wise redundancy, and series and parallel structures
- describe standard models and explain the applicability of the models in given examples, in particular renewal processes
- construct simple Markov models for technical systems and explain their properties and behaviour
- with standard methods like Kaplan-Meier and Nelson estimate the hazard rate for survival data, possibly censored
- med Weibull analysis analyse survival data and determine optimal strategies for maintenance
- construct structure functions and fault trees as models for technical systems and calculate different measures of reliability for the components in the systems
- for systems with dependent components approximate the system availability using standard methods and inequalities

To receive the highest grade, the student should in addition be able to do the following:

- Combine all the concepts and methods mentioned above in order to solve more complex problems.

Course contents

Hazard rates and life length distributions. Analysis of survival data. Estimation of hazard rates and survival functions for survival data. Optimal maintenance strategies.

Markov models for reliability systems. Markov processes with discrete state spaces. Poisson processes. Semi-Markov processes. Renewal theory.

Structure functions and fault trees. Combination of systems. Measures of structural and reliability importance of components. Associated random variables.

Course literature

Holen, Höyland & Rausand: Pålitelighetsanalyse, Tapir

Enger, Grandell: Markovprocesser och köteori, Compendium

Complementary material from the department.

Examination

- INL1 - Assignments, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, 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.

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.