



SF2863 Systems Engineering 7.5 credits

Systemteknik

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

Establishment

Course syllabus for SF2863 valid from Autumn 2014

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

In general:

150 university credits (hp) including 28 hp in Mathematics and 6 hp in Mathematical Statistics.

6 hp in Optimization is recommended.

Documented proficiency in English corresponding to English B.

More precisely for KTH students:

Passed courses in calculus, linear algebra, differential equations, mathematical statistics, numerical analysis.

Optimization is recommended.

Language of instruction

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

Intended learning outcomes

The overall purpose of the course is that you should be well acquainted with some operations research models (i.e. mathematical decision support models) which are relevant for analysis and optimization of technical systems. Moreover, you should be able to apply these models on various problems. In particular, you should be able to formulate, analyze, and apply

- reliability models based on Markov chains and Markov processes,
- queueing models based on Markov processes, including models for queueing networks,
- inventory models, deterministic as well as stochastic,
- models for spare parts optimization,
- dynamic programming, for recursive decision-making,
- optimal policy design for Markov decision processes.

Course contents

Basic theory for Markov chains and Markov processes. Some models for reliability and queues based on Markov theory, including queueing models with Erlang distributed service times. Jackson's models for queueing networks. Deterministic inventory models, including the Wilson formula. Stochastic inventory models, including the "newsvendor problem". Sherbrooke's models for optimization of spareparts. Marginal allocation. Dynamic programming. Markov decision processes.

Course literature

Hillier and Lieberman: Introduction to operations research, samt kompletterande kursmaterial från institutionen.

Hillier and Lieberman: Introduction to operations research, and some written course material from the department.

Examination

- TEN1 - Examination, 7.5 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.

Other requirements for final grade

A written examination (TEN1; 7,5 hp).

Homework assignments can give bonus points for 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.