SF2863 Systems Engineering 7.5 credits

Systemteknik

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

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

Establishment

Course syllabus for SF2863 valid from Autumn 2011

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, 6 hp in Mathematical Statistics and 6 hp in Optimization. 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.

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 spareparts optimization, including multi-echelon techniques,
- dynamic programming, for reqursive decision-making,
- Markov decision processes.

Course contents

Basic optimization theory. 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, including multi-echelon techniques. Dynamic programming. Markov decision processes.

Course literature

Hillier and Lieberman: Introduction to operations research, eighth edition, together with some additional 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.

Other requirements for final grade

A written examination (TEN1; 7,5 hp). Homework assignments (based on Matlab) give credits on the final 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.