SF2866 Applied Systems Engineering 7.5 credits

Tillämpad systemteknik

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

Establishment

Course syllabus for SF2866 valid from Autumn 2015

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

The course is intended mainly for students on the master programs TAEEM Aerospace and TTMAM Applied and Computational Mathematics.
Prequisites: SF1811/SF1861 Optimization and SF2863 Systems Engineering.

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

- reach a deeper understanding of the fundamentals of the subject (defined by the SF2863 course), practice the ability to apply the general theory, and generalize or specialize it to particular problems.
- collaborate in groups; discuss and apply mathematical principles and techniques to practical scientific problems.
- synthesize mathematical models for various processes and be able to analyze the models, explain and motivate the assumptions and approximations made and discuss their consequences, and finally use the model for optimization.
- be able to communicate professionally and present scientific results, by writing technical reports, and preparing and giving oral presentations.

Course contents

The course is based on different topics in systems engineering and operations research related to local industry and research projects. A theoretical framework will be presented in lectures and then a number of projects (1-3) will be used to illustrate the theory. The projects will be done in groups (designed by the examiner) to practice teamwork , generate peer learning and cooperative skills.
The topics may change from year to year and have different focus depending on which projects are selected. Numerical and statistical aspects of the projects will also be regarded when relevant.
The theoretical framework is based on, but not limited to, the following subjects:
Marginal allocation. Multiobjective optimization. Pareto optimality. Game theory. Sherbrooke's models for optimization of spareparts, including multi-echelon techniques. Inventory theory. Queueing theory. Dynamic programming. Markov decision processes. Reliability theory. Project management. Scheduling.

Course literature

Depending on the focused topics a selection of relevant sections in Hillier and Lieberman's "Introduction to operations research" , A. Ravi Ravindran's "Operations research and Management Science handbook", and handed out material from the department will be used.

Examination

- PRO1 - Project Assignments, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Written Examniation, 3.5 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

Written exam, TEN1, 3,5 hp.
Project assignment, written report and presentation, PRO1, 4 hp.

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.