FEO3330 Network Calculus 10.0 credits

Nätverkskalkyl

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 FEO3330 valid from Autumn 2014

Grading scale

Education cycle

Third cycle

Specific prerequisites

The course is self-contained. A solid background in analysis and in stochastics is beneficial.

Language of instruction

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

Intended learning outcomes

Students passing the course will have acquired the following skills:

- Model queuing problems in the right framework

- Solve queuing problems with respect to the chosen framework

- Know and explain the current state-of-the-art in network calculus research

- Know and explain the strongest results from network calculus regarding the design of networks

- Address open research problems regarding stochastic queuing networks

Course contents

·   Traditional Queuing Theory

Basic analysis of M/M/1, M/M/1/N and M/G/1 Systems

Erlangs Blocking formula

Queuing networks

Erlangs fixed point equation

Applications

·   Deterministic Network Calculus

(Min,plus)- calculus

System-theoretic approach to deterministic network analysis

Arrival- and service curves

Delay & backlog bounds

Policing and shaping

Pay-burst-only-once

GPS-PGPS equivalence

·   Effective Bandwidth/Capacity Theory

Multiplexing

Effective bandwidth

EBB arrival curves

Effective capacity

Applications

·   Stochastic Network Calculus

Stochastic arrival and service curves

Performance bounds

Concatenation & scaling

MGF-calculus & applications

(Min,x)-calculus & applications

Disposition

See below regarding examination requirements.

Course literature

Reading assignments will be handed out before the course. Two books exist on the material (both online available):

-       LeBoudec: Network Calculus

 http://ica1www.epfl.ch/PS_files/NetCal.htm

-       Yuming Jiang: Stochastic Network Calculus

Online available under:

However, both books are not mandatory for the course, but serve for students as further reference material.

Examination

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

Three parts have to be fulfilled to pass the course:

-       Attend all but two lectures (without valid excuse)

-       Reach 75 % of points in each homework assignment. There will be one homework assignment per block, i.e. four homework assignments in total.

-       Pass the research project (turn in a written report, work out presentation and defend findings in a presentation to the group)

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.