



IK2219 Performance Evaluation for Network Engineering 7.5 credits

Prestandautvärdering för Nätverkskonstruktion

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

Establishment

Course syllabus for IK2219 valid from Autumn 2013

Grading scale

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

Education cycle

Second cycle

Main field of study

Information and Communication Technology

Specific prerequisites

Language of instruction

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

Intended learning outcomes

This course covers a practical collection of theories and techniques which have been widely applied in the field of communication networking over the past decades. It is no surprise that the subject matter stretches over multiple theories. Upon completion of the course, students are expected to learn how to:

Useful Modern Statistics (Chapters 1-4)

- Compute confidence interval and prediction interval
- Fit a suitable model or curve to your measurement data
- Make assertions on your model in a mathematical manner

Basic Theory for Simulation (Chapter 6)

- Internalize theoretical framework in order to run simulations correctly

Palm Calculus: the Importance of Viewpoints (Chapter 7)

- Explain why other queues are always faster when you are shopping

Queuing Theory: Through the Lens of Palm Calculus (Chapter 8)

- Comprehend useful topics in queuing theory from a fresh angle

Throughout the course, students will learn how to utilize various software packages in conducting simulations and validating analyses.

Course contents

This course focuses on broadly applicable methodologies in the field of communication networks, putting special emphasis upon the evaluation of performance therein. A distinctive feature of this course lies in its combination of questions in everyday life and practical problems in communication networks with selected topics in methodologies. In order to help students to gain a better understanding of the methodologies and its applications, the course also contains a set of homework assignments and a project. The textbook can be referred to throughout the academic and industrial careers of students for tackling out various problems in both fields.

§ Content of Lectures

In order to achieve the abovementioned learning outcomes, there are about 11-12 lectures (2 hours) primarily based on the main textbook. The lectures will cover various topics in performance evaluation of communication networks: Summarizing Data (Topic 1), Model Fitting (Topic 2), Tests (Topic 3), Discrete Event Simulation (Topic 4), Palm Calculus (Topic 5), Queuing Theory for Dummies (Topic 6).

§ Review Question Session

Each group of students will present how to solve a few (1-3) selected review questions within a short time (no more than 5 minutes). All review questions and their complete solutions for each topic will be provided by the examiner.

§ Homework Assignments

Introductory Performance Data Summarizations, Random Waypoint Simulation, Queuing Theory from Palm Viewpoint, Web Server Simulation (Queuing Network)

§ Project Assignment (Group work)

Each group will define a performance evaluation problem in their thesis projects or ongoing research projects and apply methodologies in the course to analyse the problem. If it is impossible for a group to find an appropriate problem, the group will give a talk about a topic or a research paper closely related to performance evaluation in networking.

Disposition

Teaching language: English

Course literature

Jean-Yves Le Boudec, “Performance Evaluation of Computer and Communication Systems”, 2010, 1st Edition, EPFL Press. ISBN: 978-2-940222-40-7.

The textbook was published in 2010 by EPFL Press. A free pdf version is available online at <http://perfeval.epfl.ch/> by courtesy of EPFL Press.

Examination

- PRO1 - Project Assignment, 2.5 credits, grading scale: A, B, C, D, E, FX, F
- UPG1 - Home Assignment, 2.5 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Exam, 2.5 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.

Homework Assignments: 2.5 hp, Project Assignment: 2.5 hp, Written Final Exam: 2.5 hp, Grade scale: A-F

Other requirements for final grade

The final grade is based on the weighted average of the four examination parts when each part has received a passing grade: review question session (7%), homework assignment (35%), project assignment (28%), and final written exam (30%).

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.