

# Queueing Theory

Programme course

6 credits

Köteori

TNK090

Valid from: 2017 Spring semester

**Determined by**

Board of Studies for Industrial Engineering  
and Logistics

**Date determined**

2017-01-25

## Main field of study

Mathematics, Applied Mathematics, Transportation Systems Engineering

## Course level

First cycle

## Advancement level

G2X

## Course offered for

- Communication and Transportation Engineering, M Sc in Engineering

## Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

## Prerequisites

Statistics

## Intended learning outcomes

The aim of the course is give a working knowledge of queuing models, a description of the underlying theory and examples of their applications in the area of communication and transport.

By the end of the course, the student is expected to:

- construct models in discrete and continuous time based on Markov Chains
- describe and explain the theory of Markov Chains
- describe and motivate Little's formula and its applications
- describe and analyze basic Markov queuing models and situations to which they may be applied
- apply Markov models for selected applications

- construct and analyze priority queuing systems
- describe networks of queuing systems

## Course content

The Poisson process, Discrete time and continuous time Markov Chains. Markov queuing systems: one server, several servers, finite and infinite carrying capacity, Markovian queuing systems, networks of queuing systems, M/M/, M/M/m, M/G/1 systems, Theory and methods applied to applications in communication, traffic and transport systems.

## Teaching and working methods

The teaching consists of seminars and tutorials.

## Examination

UPG1	Project	U, G	2 credits
TEN1	Written examination	U, 3, 4, 5	4 credits

## Grades

Four-grade scale, LiU, U, 3, 4, 5

## Department

Institutionen för teknik och naturvetenskap

## Director of Studies or equivalent

Erik Bergfeldt

## Examiner

Johan M Karlsson

## Education components

Preliminary scheduled hours: 38 h  
Recommended self-study hours: 122 h

## Course literature

### Additional literature

#### Books

Körner, Ulf, (2003) *Köteori*  
ISBN: 9144031033,9789144031033  
Lund : Studentlitteratur, 2003

# Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at [http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).