

## Performance Analysis of Telecommunication Systems (E011610)

**Course size** (nominal values; actual values may depend on programme)

**Credits** 4.0      **Study time** 120 h      **Contact hrs** 30.0 h

**Course offerings and teaching methods in academic year 2017-2018**

A (semester 1)	seminar	15.0 h
	lecture	15.0 h

**Lecturers in academic year 2017-2018**

Wittevrongel, Sabine	TW07	lecturer-in-charge
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**Offered in the following programmes in 2017-2018**

	crdts	offering
Bridging Programme Master of Science in Industrial Engineering and Operations Research	4	A
Bridging Programme Master of Science in Industrial Engineering and Operations Research	4	A
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	4	A
Master of Science in Industrial Engineering and Operations Research	4	A
Master of Science in Computer Science Engineering	4	A
Master of Science in Computer Science Engineering	4	A
Master of Science in Industrial Engineering and Operations Research	4	A

**Teaching languages**

Dutch, English

**Keywords**

discrete-time queueing theory, performance evaluation

**Position of the course**

Introduction to elementary and more advanced queueing theoretic techniques in discrete time for the modelling, the performance evaluation, the dimensioning and the design of subsystems in nowadays integrated communication networks.

**Contents**

- Multiplexers and switching systems: buffer models in discrete time
- Elementary buffer analysis: typical techniques
- Analysis of more complicated buffer models (with a more-dimensional state description): Correlated and bursty arrivals, Variable transmission times, Server interruptions, Priority systems

**Initial competences**

Elementary probability theory (see e.g. course 'Applied probability')

**Final competences**

- 1 To understand and to calculate performance measures of a buffer system.
- 2 To understand typical techniques for buffer analysis in discrete time and to apply them creatively.
- 3 To establish system equations for discrete-time buffer systems.
- 4 To have insight into the use of probability generating functions for the analysis of discrete-time buffer systems
- 5 To analyse simple discrete-time buffer systems.
- 6 To understand the meaning of and to analyse more complicated discrete-time buffer

- models with a more-dimensional state description.
- 7 To have insight into results of buffer analysis and to understand the influence of model parameters on the buffer behavior.

**Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

**Conditions for exam contract**

This course unit cannot be taken via an exam contract

**Teaching methods**

Lecture, seminar

**Learning materials and price**

Syllabus (about 5 euro); additional course material (available via Minerva)

**References**

- H. Bruneel, B.G. Kim, "Discrete-time models for communication systems including ATM" (Kluwer Academic Publishers, Boston, 1993)

**Course content-related study coaching**

By the lecturer and assistants: contacts are possible during or after the lectures and problem solving sessions, by means of email or after making an appointment

**Evaluation methods**

end-of-term evaluation

**Examination methods in case of periodic evaluation during the first examination period**

Open book examination

**Examination methods in case of periodic evaluation during the second examination period**

Open book examination

**Examination methods in case of permanent evaluation**

**Possibilities of retake in case of permanent evaluation**

not applicable

**Extra information on the examination methods**

Written open-book exam

**Calculation of the examination mark**