

# Course Specifications

From the academic year 2019-2020 up to and including the

## Performance Analysis of Telecommunication Systems (E011610)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size (nominal values; actual values may depend on programme)  
Credits 4.0 Study time 120 h Contact hrs 30.0 h

Course offerings in academic year 2020-2021

A (semester 1) English Gent

Lecturers in academic year 2020-2021

Wittevrongel, Sabine TW07 lecturer-in-charge

Offered in the following programmes in 2020-2021

	crdts	offering
<a href="#">Bridging Programme Master of Science in Industrial Engineering and Operations Research</a>	4	A
<a href="#">Bridging Programme Master of Science in Industrial Engineering and Operations Research</a>	4	A
<a href="#">Master of Science in Electrical Engineering (main subject Communication and Information Technology )</a>	4	A
<a href="#">Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)</a>	4	A
<a href="#">Master of Science in Industrial Engineering and Operations Research</a>	4	A
<a href="#">Master of Science in Computer Science Engineering</a>	4	A
<a href="#">Master of Science in Computer Science Engineering</a>	4	A
<a href="#">Master of Science in Industrial Engineering and Operations Research</a>	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 in discrete time: 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'); note that prior knowledge of continuous-time queueing theory (see e.g. course 'Queueing analysis and simulation') is absolutely not required.

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 the electronic learning platform)

#### 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