

## Introduction to Telecommunications (C003787)

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

**Credits 6.0**

**Study time 180 h**

**Course offerings and teaching methods in academic year 2024-2025**

A (semester 1)

Dutch

Gent

seminar

lecture

**Lecturers in academic year 2024-2025**

Eeckhout, Lieven

TW06

lecturer-in-charge

**Offered in the following programmes in 2024-2025**

[Bachelor of Science in Computer Science](#)

**crdts**

6

**offering**

A

[Preparatory Course Master of Science in Computer Science Engineering](#)

6

A

**Teaching languages**

Dutch

**Keywords**

Telecommunication, signals, datacommunication, source and channel coding.

**Position of the course**

The purpose of this introductory course is to provide knowledge and insight with respect to basic principles of telecommunication systems in general, and the operation and performance of coding techniques for (digital) communication more in particular.

**Contents**

- Introduction to communication system; analog and digital data, signals and transmission
- Systems and signals: signals as functions; basic concepts: frequency, spectrum, bandwidth; linear time-invariant (LTI) systems: frequency response and impulse response; filtering; Fourier transform; sampling theorem
- Source coding: source models; entropy; source coding theorem; rate-distortion theory; coding of discrete and continuous sources; lossless and lossy compression
- Channel coding: discrete channel models; channel capacity; linear block codes; cyclic codes; error detection and correction; error probability; Hamming distance; syndrome computation; soft versus hard decoding

**Initial competences**

Knowledge and experience regarding probability and statistics, as well as differentiation and integration.

**Final competences**

- 1 Explain source coding and rate-distortion theorem.
- 2 Ability to use algorithms for source and channel coding.
- 3 To carry out error detection and correction based on syndrome computation.
- 4 Understand and apply fundamental aspects of (digital) communication systems.
- 5 Understand and apply sampling theorem.
- 6 Understand and apply Fourier transform.

**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**

## Study material

### Type: Syllabus

Name: theory, exercises, exams previous years  
Indicative price: Free or paid by faculty  
Optional: no  
Language : Dutch  
Number of Pages : 250  
Available on Ufora : Yes  
Online Available : Yes  
Available in the Library : No  
Available through Student Association : No

### Type: Slides

Name: theory  
Indicative price: Free or paid by faculty  
Optional: no  
Language : Dutch  
Number of Slides : 500  
Available on Ufora : Yes  
Online Available : Yes  
Available in the Library : No  
Available through Student Association : No

## References

- "Structure and Interpretation of Signals and Systems, Second Edition", Edward Ashford Lee and Pravin Varaiya, UC Berkeley, LeeVaraiya.org, 2011
- "Communication Systems Engineering, 2nd Edition", John G. Proakis and Masoud Salehi, Prentice Hall, 2002
- "Data and Computer Communications, Tenth Edition", William Stallings, Pearson, 2014

## Course content-related study coaching

The lecturer(s) is/are available during contact hours, on appointment and via e-mail.

## Assessment moments

end-of-term and continuous assessment

## Examination methods in case of periodic assessment during the first examination period

Written assessment

## Examination methods in case of periodic assessment during the second examination period

Written assessment

## Examination methods in case of permanent assessment

Assignment

## Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

## Extra information on the examination methods

- Periodical evaluation: written exam, closed book.
- Non-periodical evaluation (three projects): report and/or presentation.

## Calculation of the examination mark

- 85% periodical evaluation
- 15% non-periodical evaluation.

Student can only pass the course if the student passes the periodical evaluation.

If the score for the periodic evaluation is lower than 10/20 and the total score is higher than 9/20, the total score will be reduced to 9/20. (Student can only pass the course if the student passes the periodical evaluation.)

The score for the non-periodical evaluation is transferred to the second examination period, but if the student wishes, the assignment can be further completed.

