GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

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 2025-2026

A (semester 1)	Dutch	Gent	lecture
			seminar

Lecturers in academic year 2025-2026

Eeckhout, Lieven	TW06	lecturer-in-charge

Offered in the following programmes in 2025-2026	**crdts**	**offering**
Bachelor of Science in Computer Science	6	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 impluse response; filtering; Fourier transform; sampling theorem
- Source coding: source models; entropy; source coding theorem; rate-distorsion 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; Hammind 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-distorsion 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

Seminar, Lecture

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.