GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Advanced Modulation and Coding (E012210)

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

Credits 4.0 **Study time 120 h**

Course offerings and teaching methods in academic year 2025-2026

A (semester 2)	English	Gent	lecture
			seminar

Lecturers in academic year 2025-2026

Steendam, Heidi	TW07	lecturer-in-charge
Noels, Nele	TW07	co-lecturer

Offered in the following programmes in 2025-2026	crdts	offering
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	4	A
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	4	A
Master of Science in Computer Science Engineering	4	A

Teaching languages

English

Keywords

modulation, coding, detection, estimation

Position of the course

This course deals with communication systems that make use of advanced modulation, coding, detection and estimation. A selection of the topics mentioned below will be covered

Contents

- Advanced coding: turbo codes; LDPC codes
- Advanced modulation and detection: Modulation and detection for systems with multiple antennas (MIMO)
- Iterative ("turbo") estimation and detection: decoding; equalization; synchronization

Initial competences

Communication Theory

Final competences

1 Recognize and use factor graphs.
2 Analyse and apply turbo codes, LDPC codes.
3 Evaluate systems with multiple antennas.
4 Apply turbo estimation.
5 Understand and use techniques to reduce the effect of interference.
6 Understand and use iterative techniques to reach theoretical performance bounds.

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: Slides

Name: Advanced modulation and coding
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Slides : 200
Oldest Usable Edition : version of 2015
Available on Ufora : Yes
Online Available : Yes
Available in the Library : No
Available through Student Association : No

References

H. Wymeersch, Iterative Receiver Design, Cambridge University Press, ISBN: 978-0521873154

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

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

Oral assessment

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

Oral assessment

Examination methods in case of permanent assessment

Oral assessment, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

During examination period: oral closed-book exam
During semester: graded report independent work; graded oral presentation. Second chance: Not possible

Calculation of the examination mark

Evaluation throughout semester as well as during examination period. Special conditions:
Evaluation throughout semester : 75% Examination : 25%