

Optical Communication and Information Processing (E030470)

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

Credits 4.0 **Study time 120 h**

Course offerings in academic year 2025-2026

A (semester 2) English Gent

Lecturers in academic year 2025-2026

Morthier, Geert TW05 lecturer-in-charge

Offered in the following programmes in 2025-2026

Master of Science in Silicon Photonics	crdts	offering
	4	A

Teaching languages

English

Keywords

Optical interconnects, optical receivers, signal to noise ratio, neuromorphic and quantum computing

Position of the course

Expose the students to basic concepts of optical communication and computing

Contents

- Optical communication systems: Historical perspective, Basic concepts, Introduction to noise
- Optical transmitters, modulators, receivers, amplifiers
- Architectures of communication systems
- Dispersion management: Pre- and post-compensation, Dispersion compensation
- Multi channel systems: Modulation and multiplexing, WDM systems, WDM components, TDM (optical)
- Introduction to coherent communication
- Neuromorphic computing
- AI accelerator
- On-chip quantum information processing

Initial competences

Basic optics and electromagnetics, laser diodes, analogue electronics

Final competences

- 1 Understand where optical communication is used and why.
- 2 Understand how optical communication is implemented using PICs.
- 3 Understand how PICs are used to improve signal processing and computing.

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, Independent work

Study material

Type: Slides

Name: Slides and course notes used during the course

Indicative price: € 11

Optional: no

Additional information: Available electronically (free) or through the student organization (8/11,5 Euro member/non-member)

References

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, Written assessment open-book

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

Oral assessment, Written assessment open-book

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

- During examination period: written open-book assessment and oral closed-book assessment.
- During semester: lab report.

Calculation of the examination mark

30% written, 40% oral exam, 30% lab work.