

## 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**

4

**offering**

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.