

Laboratories in Photonics (E030725)

Due to Covid 19, the education and assessment methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size *(nominal values; actual values may depend on programme)*
Credits 4.0 **Study time 120 h** **Contact hrs** 50.0h

Course offerings in academic year 2021-2022

A (semester 1) English Gent

Lecturers in academic year 2021-2022

Le Thomas, Nicolas TW05 lecturer-in-charge
 Ottevaere, Heidi VUB co-lecturer

Offered in the following programmes in 2021-2022

	crdts	offering
Master of Science in Photonics Engineering	4	A

Teaching languages

English, Dutch

Keywords

Photonics, lab work, lasers, interferometry

Position of the course

The aim of this course is to teach the student the basic concepts of laboratory work in photonics.

The student will acquire the expertise and insight needed to operate laboratory and demonstrator setups. These include the elementary skills, which will allow the student to work with optical elements and optical systems and give him insight in the relevant optics theory. Both free space optical systems (interferometry, characterization of laser beams, 4f processor) and fiber based and integrated optical systems (laserdiodes, waveguides) are studied. The student also comes in contact with typical measurement software such as LabView. The basic experiments will be divided over 6 modules in which the core measurement techniques are covered. The lab exercises illustrate in an integrated manner basic knowledge gained through the courses photonics, lasers, microphotonics and optical materials.

Contents

Alignment of a HeNe laser, characterization of different types of sources (lasers, LEDs, white light sources), study the polarization behavior of light, characterization of optical components (mirrors, filters, lenses, prisms, gratings, beam splitters), study of different types of materials and coatings, coupling light into fibers and study fiber characteristics, characterization of waveguides, spatial filtering and building a 4f processor, control different instruments by LabView software, applications of light sources (lasers in interferometry, white light sources in spectroscopy).

Initial competences

course photonics, microphotonics, optical materials and lasers or similar

Final competences

- 1 Basic measurement techniques for photonic applications.
- 2 Having insight in diverse optical phenomena.
- 3 Interpret measurement results.
- 4 Present scientific results in paper.
- 5 Build, explain and describe a scientific experiment in group.
- 6 Use advanced software for conducting lab experiments.

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

Practicum

Extra information on the teaching methods

Lab sessions; Team work

Learning materials and price

Syllabus (English), free

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 examination, Assignment

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

Oral examination, Assignment

Examination methods in case of permanent assessment

Skills test

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: graded oral presentation; graded team work. During semester: graded lab sessions.

Calculation of the examination mark

- Answering to questions which are asked during the lab (20%-individual)

Students are asked to have prepared the exercises before the start of every lab session. This is checked during the duration of the laboratory by interrogating the students. The quality of their responses are part of their final score on this course.

- Attitude in the lab + progress made (20%-individual)

- Content of the laboratory logbook (20%-group)

During the lab students are asked to keep a scientific logbook (one per group) on their practical experiments. They also receive a quotation on the quality of the logbook.

- Oral presentation of scientific work + answers to questions (20%-individual)

At the end of this laboratory course each group of students has to present during 20 minutes their results on one of the practical lab modules. After the presentation the students' knowledge about the different laboratories is tested on an individual basis and orally.

- Writing a research paper of one of the laboratories (20%-individual)