

# EUROPEAN MASTER OF SCIENCE IN PHOTONICS

Organised jointly by Ghent University and Vrije Universiteit Brussel

120 ECTS CREDITS – LANGUAGE: ENGLISH – DEGREE: MASTER OF SCIENCE

## COURSE CONTENT

Photonics is now widely recognised as a major innovation enabling discipline for the 21st century. It can be defined as the field of science and technology where the fundamental properties of light and its interaction with matter are studied and applied.

For several decades photonics has been penetrating in more and more applications and household appliances. At the moment, photonics is a discipline of key importance in industrial sectors such as tele- and data communication, display and camera industry, biotechnology, solar energy, medical instrumentation, laser material processing, etc.

The European Master of Science in Photonics is a multidisciplinary programme covering basic physics, material technologies, electronics and applications in different fields. Students will be trained to become specialists in the field. Key features of this programme are the extensive student mobility opportunities and the multidisciplinary engineering modules in Electronics & Information Technology, Physics & Materials or Life Sciences.

## COURSE STRUCTURE

The European Master of Science in Photonics is a two year (120 credits) English taught programme, based on four pillars: a strong backbone of core photonics courses, specialisation in a broad spectrum of advanced photonics courses, a secondary specialisation in a related field (multidisciplinary engineering modules) and a master's dissertation.

During the first year, the focus is on courses covering the fundamentals of photonics: light propagation in complex media, basic understanding of the properties of optical materials and lasers. Thereby both theoretical knowledge as well as practical skills are addressed.

During the second year there is room for advanced photonics electives, multidisciplinary engineering courses and the master's dissertation.

### Engineering Modules

As photonics engineers mostly work in multidisciplinary environments where the knowledge and skills in other engineering domains are important assets, students can, besides further taking up specialized photonics electives, broaden their horizon by taking up one of the Engineering Modules. The modules on offer are: Electronics & Information Technology, Physics & Materials, Life Sciences and Business Engineering & Entrepreneurship.

### Mobility Opportunities

Students have a broad range of options for engaging in international mobility:

Taking courses (30 credits) at a partner institute; carrying out their Master's dissertation fully or partly at a partner institute (30 credits); courses (30 credits) AND master's dissertation (30 credits) at a partner institute; carrying out a long internship (>10 weeks, 10 credits) at a company or research institute abroad.

### About the partner institutes

The programme has set up collaborations with a number of European universities and research institutes offering high quality programmes in photonics. Some of these partner institutes offer a full programme (courses + dissertation) while others offer only courses or only a dissertation. For the partner institutes offering courses the programme board has preselected a number of specialised photonics courses and multi-disciplinary courses from which the student can easily construct a programme fulfilling the requirements. The partner institutes are geographically spread over Europe and have their own specific profile allowing the student to specialise in virtually any subdiscipline of photonics. More details about the partner institutes can be found on the website of the programme ([www.masterphotonics.be](http://www.masterphotonics.be)).

At the end the master, a summer symposium is organised, bringing together all students at a single location. At this symposium the second master students present their master's dissertation and lectures will be held by leading international experts in photonics.

### > Master's dissertation

The master's dissertation is an original work about a specific topic in photonics. In general it consists of a literature study combined with practical work in the form of simulation, modelling, fabrication and/or measurements of photonic devices and/or systems. The completion of the master's dissertation is a requirement to obtain the degree of master of science in photonics engineering. The master dissertation can optionally be carried out in collaboration with an industrial partner or with a partner abroad.

### CAREER PERSPECTIVE

The aim of this master's programme is to form engineers and scientists with solid basic knowledge in the field of photonics and with the skills to apply this knowledge to the design, realisation and the management of photonic systems for a broad range of application domains.

Furthermore the students will have the opportunity to broaden their knowledge and skills in other domains such as ICT, biosciences, physics and chemistry of materials, industrial management etc. Therefore graduates are expected to be offered a broad range of future opportunities, including: research in high technology companies, in particular photonics related companies; research in academic laboratories and research institutes (possibly in PhD context); development of new photonic products in industry; technical support in a company for its products or services; technical marketing and sales.

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## TOELATINGSVOORWAARDEN VOOR HOUDERS VAN EEN VLAAMS DIPLOMA

### Rechtstreeks:

- Ba ingenieurswetenschappen: elektrotechniek
- Ba ingenieurswetenschappen: toegepaste natuurkunde
- Ba ingenieurswetenschappen: afstudeerrichting elektrotechniek
- Ba ingenieurswetenschappen, afstudeerrichting: elektronica en informatietechnologie
- Ma ingenieurswetenschappen (alle, met titel burgerlijk ingenieur - uitz. Ma ingenieurswetenschappen: architectuur)
- Ma in Engineering (alle, met titel burgerlijk ingenieur - uitz. Ma in Architectural Engineering)
- Ma bio-ingenieurswetenschappen (alle, met titel bio-ingenieur)
- Ma fysica en sterrenkunde
- Ma fysica
- Ma in Physics
- Ma of Materials Engineering
- Ma of Nuclear Engineering
- Ma of Nanophysics

### Rechtstreeks: (naar brugprogramma - 120 studiepunten)

- Ma chemie
- Ma nanowetenschappen en de nanotechnologie
- Ma nanowetenschappen, nanotechnologie en nano-engineering
- Ma biochemie en de biotechnologie
- Ma biochemie
- Ma in Chemistry
- Ma in Biochemistry and Biotechnology
- Ma industriële wetenschappen:
  - elektronica-ICT (zonder afstudeerrichting)
  - elektronica-ICT, afstudeerrichting ICT
  - elektronica-ICT, afstudeerrichting elektronica
  - elektronica-ICT, afstudeerrichting ingebedde systemen
  - elektrotechniek
  - energie
  - chemie
  - elektromechanica
  - kunststofverwerking
  - industriële kunststofverwerking
- Ma in Electronics and ICT Engineering Technology
- Ma in Chemical Engineering Technology
- Ma in Electromechanical Engineering Technology

### Via voorbereidingsprogramma: (max. 90 studiepunten)

- andere Ba ingenieurswetenschappen (uitz. architectuur)
- Ba bio-ingenieurswetenschappen
- Ba fysica en sterrenkunde
- Ba fysica
- Ba chemie
- Ba biochemie en biotechnologie
- Ba biochemie
- Ba industriële wetenschappen elektronica-ICT
- Ba industriële wetenschappen, afstudeerrichting: elektronica-ICT
- Ba ingenieurswetenschappen (KMS)
- Ba in Engineering Technology, afstudeerrichting Electronics Engineering
- Ma in Bioscience Engineering: Human Health Engineering
- Ma bio-ingenieurswetenschappen: biosysteemtechniek

- Ma of Agro- and Ecosystems Engineering
- Ma in Water Resources Engineering
- Ma in de nanowetenschappen, nanotechnologie en nano-engineering
- Ma of Nanoscience, Nanotechnology and Nanoengineering

### TAAL

Je voldoet aan de taalvoorwaarden op basis van je Vlaams diploma.

## PRAKTISCHE INFORMATIE

### Studieprogramma:

<https://studiegids.ugent.be>

> faculteiten > opleidingstypes > ga naar de opleiding van je keuze

### Alternatieve trajecten

Meer informatie over voorbereidings- en brugprogramma's op [www.ugent.be/ea](http://www.ugent.be/ea)

volg > alles voor toekomstige studenten > voor wie al een diploma heeft

### Infomomenten

#### Masterbeurs

[www.ugent.be/masterbeurs](http://www.ugent.be/masterbeurs)

#### Infosessie

24 april 2019 - 17 u.-19 u. doorlopend, Campus Ufo, Ufo, Sint-Pietersnieuwstraat 33 - Foyer  
[www.ugent.be/nl/studeren/masteropleidingen](http://www.ugent.be/nl/studeren/masteropleidingen)

### Contact

Prof Dr Peter Bienstman

Faculty of Engineering and Architecture

Study Programme Committee Photonics Engineering

Tech Lane Ghent Science Park 126, 9052 Zwijnaarde

Peter.Bienstman@ugent.be - [www.masterphotonics.be](http://www.masterphotonics.be)

### Meer info

Afdeling Studieadvies – Campus Ufo, Ufo,

Sint-Pietersnieuwstraat 33, 9000 Gent, T 09 331 00 31

[studieadvies@ugent.be](mailto:studieadvies@ugent.be) – [www.ugent.be/studieadvies](http://www.ugent.be/studieadvies)

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## ADMISSION REQUIREMENTS FOR INTERNATIONAL DEGREE STUDENTS

Foreign students need to be in possession of a bachelor's degree in Electrical engineering, in (Applied) Physics, Material Science or an equivalent of this to be admitted to the programme.

Students in possession of another bachelor's degree might need to follow a preparatory programme. The educational board will make the final decision whether to accept the application or not.

## LANGUAGE

More information regarding the required knowledge of English:

[www.ugent.be/languagerequirements](http://www.ugent.be/languagerequirements)

See also: [www.masterphotonics.be](http://www.masterphotonics.be)

## PRACTICAL INFORMATION

### Study programme

[www.ugent.be/coursecatalogue](http://www.ugent.be/coursecatalogue)

> by Faculty > Programme types > select your programme

### Application deadline for international degree students

The International master's programmes have a specific application procedure. See: [www.masterphotonics.be](http://www.masterphotonics.be)

### Enrolling institution

Ghent University

### Tuition fee

More information is to be found on:

[www.ugent.be/tuitionfee](http://www.ugent.be/tuitionfee) and on [www.masterphotonics.be](http://www.masterphotonics.be)

Last update: January 2019

## Contact

Faculty of Engineering and Architecture

International Relations Officer – Degree students

Annelies Vermeir – [annelies.vermeir@ugent.be](mailto:annelies.vermeir@ugent.be)

T +32 9 264 36 99 – [internationalplateau.ea@ugent.be](mailto:internationalplateau.ea@ugent.be)