GHENT UNIVERSITY

Study Programme

Academic year 2024-2025

Programme jointly offered by Ghent University,Vrije Universiteit Brussel
Master of Science in Photonics Engineering

Language of instruction: English

Programme version 5

1 General Courses — 52 credits

These general courses are taught in parallel at Ghent University and at Vrije Universiteit Brussel (with lecturers from both universities).

A key feature of this programme is that students can choose to take the first master year without being physically present in Belgium, because all courses from the programme will be live streamed and/or recorded.
Students who choose this option, select the 'O' sessions ("online") in their curriculum.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E024800	Optical Materials *Jeroen Beeckman -- Department of Electronics and Information Systems*	6		1	A:1, O:1	180
2	E030761	Microphotonics *Dries Van Thourhout -- Department of Information Technology*	6		1	A:1, O:1	180
3	E030660	Lasers *Geert Morthier -- Department of Information Technology*	4		1	A:1, O:1	120
4	E002640	Mathematics in Photonics *Peter Bienstman -- Department of Information Technology*	4		1	A:1, O:1	120
5	E012420	Optical Communication Systems *Geert Morthier -- Department of Information Technology*	6		1	A:2, O:2	180
6	E008446	Sensors, Actuators and Electronic Microsystems *Herbert De Smet -- Department of Electronics and Information Systems*	6		1	A:2	180
7	E031521	Physics of Semiconductor Technologies and Devices *Geert Van Steenberge -- Department of Electronics and Information Systems*	4		1	A:2, O:2	120
8	E030740	Recent Trends in Photonics *Wim Bogaerts -- Department of Information Technology*	4		2	A:1	120

1.1 General Courses: Entrepreneurship — 6 credits

Subscribe to 6 credit units from the following list. Subject to approval by the faculty.
Subscribe to:
- either 6 credit units courses with reference a,
- either 3 credit units courses with reference b and 3 credit units courses with reference c

The courses with the 'O' sessions ("online") are live streamed and/or recorded.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E076951	Engineering Economy *Sofie Verbrugge -- Department of Information Technology*	6	a	1	A:1	180
2	F000892	Innovation Management *Katrien Verleye -- Department of Marketing, Innovation and Organisation*	3	b	1	A:2, O:2	90
3	E076431	Introduction to Entrepreneurship *Petra Andries -- Department of Marketing, Innovation and Organisation*	3	c	1	A:1	90
4	E900660	Business Management and Entrepreneurship *Marc Goldchstein -- Vrije Universiteit Brussel*	3	c	1	O:1	90

1.2 General Courses: Laboratories in Photonics Research — 6 credits

Subscribe to no less than 4 and no more than 6 credit units from the following list. Subject to approval by the faculty.
- Students with the classes on campus: Laboratories in Photonics Research (E030721)
- Students with the first year online: Laboratories in Photonics (E030725)

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E030721	Laboratories in Photonics Research *Alberto Curto -- Department of Information Technology*	6		1	A:2	180

2	E030725	Laboratories in Photonics *Alberto Curto -- Department of Information Technology*	4	2	A:1	120

2 Elective Courses

Subscribe to no less than 38 and no more than 40 credit units from 2 modules from the following list. Subject to approval by the faculty.
Divided as:
- first year: 12 credits (on campus students) or 18 credits (online students)
- second year: 26 credits (on campus students) or 22 credits (online students)

2.1 Elective Photonics Courses

Subscribe to no less than 16 and no more than 20 credit units from no less than 1 and no more than 3 module(s) from the following list.
Subject to approval by the faculty.

2.1.1 Basic Photonics

Depending on the previous degree of the student and subject to approval by the faculty.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E030620	Photonics *Günther Roelkens -- Department of Information Technology*	4		1	A:1, O:1	120

2.1.2 Advanced Courses Photonics

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E030961	Design of Refractive and Diffractive Optical Imaging Systems *Michael Vervaeke -- Vrije Universiteit Brussel*	4			A:1, O:1	120
2	C003128	Optical Spectroscopy of Materials *Dirk Poelman -- Department of Solid State Sciences*	4			A:1	120
3	E032411	Display Technology *Filip Strubbe -- Department of Electronics and Information Systems*	4				120
4	E030920	Optical Sensors *Thomas Geernaert -- Vrije Universiteit Brussel*	4			A:1, O:1	120
5	E900132	Photovoltaic Energy Conversion *Filip Strubbe -- Department of Electronics and Information Systems*	4			A:2, O:2	120
6	E030630	High Speed Photonic Components *Geert Morthier -- Department of Information Technology*	4			A:1, O:1	120
7	E099221	Short Internship in Photonics *Geert Morthier -- Department of Information Technology*	5			A:J, B:1	150
8	E099232	Long Internship in Photonics *Jeroen Beeckman -- Department of Electronics and Information Systems*	10			A:J, B:1	300
9	E030930	Biophotonics *Nicolas Le Thomas -- Department of Information Technology*	4			A:1, O:1	120
10	E030881	Optical Design of Non-Imaging Systems with Ray-tracing Software *Wendy Meulebroeck -- Vrije Universiteit Brussel*	4			A:1, O:1	120
11	E030890	Technological Processes for Photonics and Electronics: Laboratory *Günther Roelkens -- Department of Information Technology*	4			A:J	120
12	E023930	Quantum Optics *Guy Van Der Sande -- Vrije Universiteit Brussel*	4			A:2, O:2	120
13	E023940	Non-linear Optics *Bart Kuyken -- Department of Information Technology*	4			A:1, O:1	120
14	E030782	Micro- and Nanophotonic Semiconductor Devices *Dries Van Thourhout -- Department of Information Technology*	4			A:2, O:2	120
15	E901176	Introduction to Quantum Physics for Electrical Engineering *Guy Van Der Sande -- Vrije Universiteit Brussel*	4			A:1, O:1	120
16	E030790	Photonic Integrated Circuits *Wim Bogaerts -- Department of Information Technology*	4			O:2, A:2	120
17	E030730	Lighting Technology *Lien Smeesters -- Vrije Universiteit Brussel*	4			O:2, A:2	120
18	E030710	Research in Photonics *Yanlu Li -- Department of Information Technology*	6			O:2, B:2, A:1	150
19	E901130	Machine Learning in Photonics *Francesco Ferranti -- Vrije Universiteit Brussel*	4			O:2, A:2	120

2.2 Multidisciplinary Engineering Electives

Subscribe to no less than 18 and no more than 22 credit units from no less than 1 and no more than 5 module(s) from the following list. Subject to approval by the faculty.
The clusters below list multidisciplinary engineering electives. The student can choose the electives across the different clusters. Students may also suggest other elective courses, possibly but not necessarily linked to the thematic clusters below. Subject to approval by the faculty.

2.2.1 Cluster Electronics and Information Technology

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E022230	Antennas and Propagation *Hendrik Rogier -- Department of Information Technology*	6			A:1	180
2	E031440	VLSI Technology and Design *Jan Doutreloigne -- Department of Electronics and Information Systems*	6			A:1	180
3	E003600	Information Theory *Heidi Steendam -- Department of Telecommunications and Information Processing*	6			B:2	180
4	E033640	High-speed Electronics *Johan Bauwelinck -- Department of Information Technology*	6			A:2	180
5	E061330	Machine Learning *Joni Dambre -- Department of Electronics and Information Systems*	6			B:1	180
6	E012130	Modulation and Detection *Nele Noels -- Department of Telecommunications and Information Processing*	6			B:1	180
7	E033021	Electromagnetic-aware High Frequency Design *Hendrik Rogier -- Department of Information Technology*	6			A:1	180

2.2.2 Cluster Physics and Materials

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E024641	Physics of Semiconductor Devices *Benoit Bakeroot -- Department of Electronics and Information Systems*	6			B:2	180
2	E066170	Physical Materials Science *Leo Kestens -- Department of Electromechanical, Systems and Metal Engineering*	6			C:1	180
3	E029040	Physical Chemistry *Iwan Moreels -- Department of Chemistry*	6			B:2	180
4	E025010	Atomic and Molecular Physics *Veronique Van Speybroeck -- Department of Applied Physics*	6			A:1	180
5	C003120	Physics and Chemistry of Nanostructures *Zeger Hens -- Department of Chemistry*	6			B:2	180

2.2.3 Cluster Life Sciences

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E092623	Modelling of Physiological Systems *Patrick Segers -- Department of Electronics and Information Systems*	5			A:2	150
2	E092662	From Genome to Organism *Fransiska Malfait -- Department of Biomolecular Medicine*	3			A:1	90
3	E074011	Quantitative Cell and Tissue Analysis *Andre Skirtach -- Department of Biotechnology*	6			A:1	180
4	E063671	Biomaterials and Tissue Engineering *Peter Dubruel -- Department of Organic Chemistry*	5			A:1	150
5	E063682	Biomechanics *Charlotte Debbaut -- Department of Electronics and Information Systems*	6			A:1	180
6	E010371	Medical Imaging *Stefaan Vandenberghe -- Department of Electronics and Information Systems*	6			A:1	180

2.2.4 Cluster Operations Management

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E076951	Engineering Economy *Sofie Verbrugge -- Department of Information Technology*	6			A:1	180
2	E004153	Heuristics and Search Methods *Sidharta Gautama -- Department of Industrial Systems Engineering and Product Design*	3			A:1	90
3	E060240	Quality Engineering and Industrial Statistics *Stijn De Vuyst -- Department of Industrial Systems Engineering and Product Design*	6			A:2	180
4	E076221	Manufacturing Planning and Control *Birger Raa -- Department of Industrial Systems Engineering and Product Design*	6			A:1	180

5	E003422	Fundamentals of Statistical Sensor Processing	6		A:1	180
		Hiep Luong -- Department of Telecommunications and Information Processing				

2.2.5 Elective Courses Ghent University/VUB

Choose other multidisciplinary engineering courses from the programmes of the Faculty of Engineering and Architecture (Ghent University) or the Faculty of Engineering (VUB), possibly but not necessarily linked to the thematic clusters above. Subject to approval by the faculty.

3 Master's Dissertation 30 credits

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E091106	Master's Dissertation	30		2	A:J	900

Teaching

When a course is not taught (solely) in the programme's language of instruction, the effectively used languages are indicated in square brackets following the cours name, using the following ISO codes:

bg: Bulgarian	de: German	es: Spanish	ja: Japanese	pl: Polish	sh: Kroatian/Serbian	zh: Chinese
cs: Czech	el: Greek	fr: French	nl: Dutch	pt: Portuguese	sl: Slovene	
da: Danish	en: English	it: Italian	no: Norwegian	ru: Russian	sv: Swedish	

Semester

Semesters are indicated by their number (1 or 2); semester 3 represents the summer period and J indicates a course spanning semesters 1 and 2.
When a capital letter precedes a semester number, the course has multiple offerings. The letter indicates the offering concerned.
When a semester is shown in brackets, the course in not offered this year in the specific offering.
The offering frequency and first year of offering are indicated by the following codes:

a: bi-annually	c: annually, from 2025-2026	f: annually, from 2026-2027	i: annually, from 2027-2028
b: tri-annually	d: bi-annually, from 2025-2026	g: bi-annually, from 2026-2027	j: bi-annually, from 2027-2028
	e: tri-annually, from 2025-2026	h: tri-annually, from 2026-2027	k: tri-annually, from 2027-2028