GHENT UNIVERSITY

Study Programme

Academic year 2024-2025

Faculty of Sciences

Master of Science in Physics and Astronomy

Language of instruction: English

Programme version 1

1 General Courses 36 credits

Full-time standard learning track: Students can choose which of these course units will be taken in the first respectively the second year of study; together with the elective courses, a total of 60 credits is taken in the first and a total of 30 credits in the second year of study.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C004503	Solid State and Nano Physics *Christophe Detavernier -- Department of Solid State Sciences*	6			A:1	180
2	C004504	Computational Physics *Toon Verstraelen -- Department of Physics and Astronomy*	6			A:1	180
3	C004502	Subatomic Physics *Ben Page -- Department of Physics and Astronomy*	6			A:1	180
4	C004505	Theoretical and Numerical Astrophysics *Maarten Baes -- Department of Physics and Astronomy*	6			A:1	180
5	C004506	Quantum Field Theory *Thomas Mertens -- Department of Physics and Astronomy*	6			A:1	180
6	C004451	General Relativity *Archisman Ghosh -- Department of Physics and Astronomy*	6			A:1	180

2 Elective Courses 54 credits

Subscribe to 54 credit units, with:
- at least 30 credit units from 2.1-2.5
- at least 6 credit units from 2.6-2.7, including at least 4 credits from 2.6, subject to approval by the faculty.

Please note: some elective courses are offered only every two years or require specific initial competences. Keep this in mind when choosing your elective courses.

2.1 Astronomy

Subscribe to no more than 36 credit units from the following list.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C002349	Astroparticle Physics *Archisman Ghosh -- Department of Physics and Astronomy*	6			A:2	180
2	C002512	Cosmology and Galaxy Formation [nl] *Sven De Rijcke -- Department of Physics and Astronomy*	6			A:1	180
3	C004452	Evolution of Stars and Stellar Systems *Vrije Universiteit Brussel, Dany Vanbeveren*	6			A:2	180
4	C003131	Observational Techniques in Astronomy *Arjen van der Wel -- Department of Physics and Astronomy*	6			A:2	180
5	C004507	Nuclei: Structure, Synthesis and Interactions *Natalie Jachowicz -- Department of Physics and Astronomy*	6			A:2	180
6	C003939	Radiative Transfer Simulations in Astrophysics *Maarten Baes -- Department of Physics and Astronomy*	6			(A:2)[d]	180

2.2 Solid State Physics

Subscribe to no more than 48 credit units from the following list.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C003120	Physics and Chemistry of Nanostructures *Zeger Hens -- Department of Chemistry*	6			A:2	180
2	E006800	Modelling and Engineering of Nanoscale Materials *Louis Vanduyfhuys -- Department of Applied Physics*	6			A:1	180

3	C003122	Nuclear Methods in Material Research *Stefaan Cottenier -- Department of Electromechanical, Systems and Metal Engineering*	6			A:2	180
4	C004508	Structure Analysis of Solids *Jolien Dendooven -- Department of Solid State Sciences*	6			A:2	180
5	C003128	Optical Spectroscopy of Materials *Dirk Poelman -- Department of Solid State Sciences*	4			A:1	120
6	C003208	Luminescence *Jonas Joos -- Department of Solid State Sciences*	6			(A:1)[d]	180
7	C004509	Nanomagnetism *Bartel Van Waeyenberge -- Department of Solid State Sciences*	5			A:2	150
8	E024122	Computational Materials Physics *Stefaan Cottenier -- Department of Electromechanical, Systems and Metal Engineering*	6			B:1	180
9	C004523	Materials for Energy Applications *Christophe Detavernier -- Department of Solid State Sciences*	6			(A:1)[c]	180
10	C004511	Thin Films: Physics and Analysis *Jolien Dendooven -- Department of Solid State Sciences*	6			A:1	180
11	C004512	Thin Films: Atomic Scale Processing and Analysis *Jolien Dendooven -- Department of Solid State Sciences*	3			A:1	90
12	C004513	The Theory of Metals: from Path Integrals to Experiment *Nick Bultinck -- Department of Physics and Astronomy*	6			A:1	180

2.3 Nuclear and Particle Physics

Subscribe to no more than 48 credit units from the following list.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C004507	Nuclei: Structure, Synthesis and Interactions *Natalie Jachowicz -- Department of Physics and Astronomy*	6			A:2	180
2	C004560	Particle Radiation Detection and Measurement *Vrije Universiteit Brussel*	6			A:1	180
3	C004450	Medical Radiation Physics and Dosimetry *Klaus Bacher -- Department of Human Structure and Repair*	6			A:2	180
4	C003129	Capita Selecta Particle Physics *Joscha Knolle -- Department of Physics and Astronomy*	6			A:2	180
5	C003212	Extensions of the Standard Model *Vrije Universiteit Brussel, Steven Lowette*	6			A:1	180
6	C003211	Electroweak and Strong Force *Vrije Universiteit Brussel, Alexandre Sevrin*	6			A:2	180
7	C003214	Experimental Techniques in Particle Physics *Vrije Universiteit Brussel, Steven Lowette*	6			A:1	180
8	C002349	Astroparticle Physics *Archisman Ghosh -- Department of Physics and Astronomy*	6			A:2	180

2.4 Theoretical Physics

Subscribe to no more than 48 credit units from the following list.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C004514	Quantum Electrodynamics *Dimitri Van Neck -- Department of Physics and Astronomy*	6			(A:2)[d]	180
2	C004515	Many-body Physics *Dimitri Van Neck -- Department of Physics and Astronomy*	6			A:2	180
3	C003668	Quantum Computing *Frank Verstraete -- Department of Physics and Astronomy*	6			A:2	180
4	C004516	Holography *Michal Heller -- Department of Physics and Astronomy*	6			(A:2)[d]	180
5	C004561	Quantum Black Holes *Thomas Mertens -- Department of Physics and Astronomy*	6			A:2[a]	180
6	C004071	Strongly Correlated Quantum Systems *Jutho Haegeman -- Department of Physics and Astronomy*	6			A:2	180
7	C004421	Relativistic Hydrodynamics - from Quantum Field Theory to Black Holes *Michal Heller -- Department of Physics and Astronomy*	6			A:1[a]	180

8	C004517	Dynamics: from Newton to Schrödinger *Sven De Rijcke -- Department of Physics and Astronomy*	6			A:1	180
9	C004513	The Theory of Metals: from Path Integrals to Experiment *Nick Bultinck -- Department of Physics and Astronomy*	6			A:1	180
10	C004518	Field Theory for Statistical Mechanics *Nick Bultinck -- Department of Physics and Astronomy*	6			(A:2)[d]	180
11	C004106	Complexity and Criticality *Jan Ryckebusch -- Department of Physics and Astronomy*	6			A:2	180

2.5 Interdisciplinary Elective Courses

Subscribe to no more than 48 credit units from the following list.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	E006900	Plasma Technology and Fusion Technology *Rino Morent -- Department of Applied Physics*	6			A:1	180
2	E026260	Magnetohydrodynamics of Plasmas *Roger Jaspers -- Department of Applied Physics*	6			A:2	180
3	C003940	History and Philosophy of Sciences: Physics and Astronomy [nl] *Maarten Van Dyck -- Department of Philosophy and Moral Sciences*	6			A:1	180
4	C003758	Machine Learning *Yvan Saeys -- Department of Applied Mathematics and Computer Science*	6			A:1	180
5	C001427	Introduction to the Dynamics of Atmospheres [nl] *Piet Termonia -- Department of Physics and Astronomy*	6			A:1	180
6	E040430	Continuum Mechanics *Geert Verdoolaege -- Department of Applied Physics*	6			A:2	180
7	E006500	Quantum Optics *Bart Kuyken -- Department of Information Technology*	6			A:1	180
8	E024641	Physics of Semiconductor Devices *Benoit Bakeroot -- Department of Electronics and Information Systems*	6			B:2	180
9	E029040	Physical Chemistry *Iwan Moreels -- Department of Chemistry*	6			B:2	180
10	C004453	Modeling Complex Systems *Vrije Universiteit Brussel, Sophie De Buyl*	6			A:2	180
11	E006400	Wave Physics in Living Matter *Wout Joseph -- Department of Information Technology*	6			A:2	180
12	C004106	Complexity and Criticality *Jan Ryckebusch -- Department of Physics and Astronomy*	6			A:2	180
13	C004517	Dynamics: from Newton to Schrödinger *Sven De Rijcke -- Department of Physics and Astronomy*	6			A:1	180
14	F000920	Networks in Socio-Economic Systems *Luis Enrique Correa da Rocha -- Department of Economics*	6			A:2	180

2.6 Professional Skills and Internships

Subscribe to at least 4 and no more than 24 credit units from the following list.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C004519	Professional Skills for Scientists [en, nl] *Philippe Smet -- Department of Solid State Sciences*	4			(A:J)[c]	120
2	E076471	Dare to Start *Wouter Haerick -- Department of Information Technology*	3			A:2	90
3	E076460	Dare to Venture *Johan Verrue -- Department of Marketing, Innovation and Organisation*	4			A:2	120
4	C004520	Internship A *Matthieu Boone -- Department of Physics and Astronomy*	4			A:J	120
5	C004521	Internship B *Matthieu Boone -- Department of Physics and Astronomy*	6			A:J	180
6	C004522	Project Work *Christophe Detavernier -- Department of Solid State Sciences*	4			A:J	120

2.7 Social and Economic Elective Courses

Subscribe to no more than 20 credit units from the following list.

Nr	Course		CRDT	Ref	MT1	Session	Study

1	C004523	Materials for Energy Applications *Christophe Detavernier -- Department of Solid State Sciences*	6			(A:1)[c]	180
2	E039060	Sustainable Energy and Rational Use of Energy *Jeroen Beeckman -- Department of Electronics and Information Systems*	4			A:2	120
3	E065460	Rational Use of Materials *Tom Depover -- Department of Materials, Textiles and Chemical Engineering*	5			A:1	150
4	E076320	The Information Society and ICT [nl] *Erik Mannens -- Department of Electronics and Information Systems*	3			A:2	90
5	F000551	Business Skills *Mieke Audenaert -- Department of Marketing, Innovation and Organisation*	4			C:2	120
6	A001900	Introduction to Psychology [nl] *Wim Notebaert -- Department of Experimental Psychology*	3			A:1	90
7	H001977	Coaching and Diversity [nl] *Elisabeth De Schauwer -- Department of Special Education*	3	UKV		A:J	90
8	E076450	Basic Entrepreneurship [nl] *Yannick Dillen -- Department of Marketing, Innovation and Organisation*	3	UKV		A:1	90
9	E078010	Technology and Environment *Luc Martens -- Department of Information Technology*	3			A:1	90
10	F000982	Complexity Economics and Agent-Based Modelling *Luis Enrique Correa da Rocha -- Department of Economics*	6			A:2	180

2.8 Elective Courses UGent or other Universities

Subscribe to maximum 18 credit units from UGent courses, including the Ghent University elective courses, courses from other Flemish Universities or an Erasmus+ Partner University. Maximum 12 credit units can be chosen from Bachelor programmes. Subject to approval by the faculty.

3 Master's Dissertation 30 credits

Subscribe for the Master's Dissertation in year 2 of the full-time standard learning track.

Nr	Course		CRDT	Ref	MT1	Session	Study
1	C004524	Master's Dissertation *Philippe Smet -- Department of Solid State Sciences*	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