

Master of Science in Physics and Astronomy

Language of instruction: Dutch

Programme version 15

1 General Courses 30 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	C001747 Quantum Field Theory <i>Thomas Mertens -- Department of Physics and Astronomy</i>	6			A:1	180
2	C002329 Astrophysical Simulations <i>Maarten Baes -- Department of Physics and Astronomy</i>	6			A:1	180
3	C001827 Computational Physics <i>Jan Ryckebusch -- Department of Physics and Astronomy</i>	6			A:1	180
4	C001213 Solid State and Nano Physics <i>Christophe Detavernier -- Department of Solid State Sciences</i>	6			A:1	180
5	C003119 Subatomic Physics II <i>Didar Dobur -- Department of Physics and Astronomy</i>	6			A:1	180

2 Elective Courses 60 credits

Subscribe to 1 option from the following list. Subject to approval by the faculty.

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 general courses, a total of 60 credits is taken in the first and a total of 30 credits in the second year of study.

2.1 Option Research 60 credits

Subscribe to 60 credit units from the following list. Module 2.1.2. (mobility requirement) is obligatory.

It is legitimate to subscribe to 60 credit units of module 2.1.1. under the condition that one includes at least 2 courses with reference a.

2.1.1 Minor Research

Subscribe to no less than 30 credit units from the following list.

Please note: some elective courses are offered every two years. Keep this in mind when choosing your minor courses.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	C003120 Physics and Chemistry of Nanostructures [en] <i>Zeger Hens -- Department of Chemistry</i>	6			B:2	180
2	E006800 Modelling and Engineering of Nanoscale Materials [en] <i>Louis Vanduyfhuys -- Department of Applied Physics</i>	6			A:1	180
3	C001882 Radioactivity and Radiation Dosimetry <i>Matthieu Boone -- Department of Physics and Astronomy</i>	6			A:1 ^a	180
4	C004106 Complexity and Criticality [en] <i>Jan Ryckebusch -- Department of Physics and Astronomy</i>	6			A:2	180
5	C000819 Quantum Electrodynamics <i>Dimitri Van Neck -- Department of Physics and Astronomy</i>	6			(B:2) ^d	180
6	C003122 Nuclear Methods in Material Research [en] <i>Stefaan Cottenier -- Department of Electromechanical, Systems and Metal Engineering</i>	6			A:2	180
7	C001759 Many-body Physics <i>Dimitri Van Neck -- Department of Physics and Astronomy</i>	6			A:2	180
8	C001678 Structural Analysis Techniques in Solid State Physics <i>Jolien Dendooven -- Department of Solid State Sciences</i>	6			A:2	180
9	C003123 Nuclear Instrumentation [en] <i>Luc Van Hoorebeke -- Department of Physics and Astronomy</i>	6			A:1	180

10	C002676	Continuum Mechanics [en] <i>Geert Verdoolaege -- Department of Applied Physics</i>	6		A:2	180
11	E026221	Plasma Physics [en] <i>Geert Verdoolaege -- Department of Applied Physics</i>	6		A:1	180
12	E006900	Plasma Technology and Fusion Technology [en] <i>Rino Morent -- Department of Applied Physics</i>	6		A:1	180
13	C000064	Nuclear Astrophysics <i>Natalie Jachowicz -- Department of Physics and Astronomy</i>	6		A:2	180
14	C003793	Hadrons and Nuclei from a Theoretical Perspective [en] <i>Jan Ryckebusch -- Department of Physics and Astronomy</i>	6		A:2 ^a	180
15	C003126	Medical Physics [en] <i>Klaus Bacher -- Department of Human Structure and Repair</i>	6		A:2	180
16	C001427	Introduction to the Dynamics of Atmospheres <i>Piet Termonia -- Department of Physics and Astronomy</i>	6		A:1	180
17	C003127	Capita Selecta Solid-state Physics [en] <i>Henk Vrielinck -- Department of Solid State Sciences</i>	6		A:2	180
18	C002349	Astroparticle Physics [en] <i>Archisman Ghosh -- Department of Physics and Astronomy</i>	6		A:2	180
19	C003128	Optical Spectroscopy of Materials [en] <i>Dirk Poelman -- Department of Solid State Sciences</i>	4		A:1	120
20	C003129	Capita Selecta Particle Physics [en] <i>Didar Dobur -- Department of Physics and Astronomy</i>	6		A:2	180
21	E025010	Atomic and Molecular Physics [en, nl] <i>Veronique Van Speybroeck -- Department of Applied Physics</i>	6		A:1, B:1	180
22	C003131	Observational Techniques in Astronomy [en] <i>Angelos Nersesian -- Department of Physics and Astronomy</i>	6		A:2	180
23	C002512	Cosmology and Galaxy Formation <i>Sven De Rijcke -- Department of Physics and Astronomy</i>	6		A:1	180
24	C003940	History and Philosophy of Sciences: Physics and Astronomy <i>Johan Braeckman -- Department of Philosophy and Moral Sciences</i>	6		A:1	180
25	C004105	Nanomagnetism [en] <i>Bartel Van Waeyenberge -- Department of Solid State Sciences</i>	6		A:1, B:2	180
26	C003939	Radiative Transfer Simulations in Astrophysics [en] <i>Maarten Baes -- Department of Physics and Astronomy</i>	6		(A:2) ^d	180
27	C003208	Luminescence [en] <i>Jonas Joos -- Department of Solid State Sciences</i>	6		A:2	180
28	E024121	Computational Materials Physics [en] <i>Stefaan Cottenier -- Department of Electromechanical, Systems and Metal Engineering</i>	6		B:1	180
29	C003668	Quantum Computing [en] <i>Frank Verstraete -- Department of Physics and Astronomy</i>	6		A:2	180
30	C003690	Quantum Black Holes and Holography [en, nl] <i>Michal Heller -- Department of Physics and Astronomy</i>	6		(A:2) ^d	180
31	C004071	Strongly Correlated Quantum Systems [en] <i>Jutho Haegeman -- Department of Physics and Astronomy</i>	6		A:2	180
32	C003758	Machine Learning [en] <i>Yvan Saeys -- Department of Mathematics, Computer Science and Statistics</i>	6		A:1	180
33	C004421	Relativistic Hydrodynamics - from Quantum Field Theory to Black Holes [en] <i>Michal Heller -- Department of Physics and Astronomy</i>	6		A:1 ^a	180
34	C003210	Advanced Field Theory [en] <i>Vrije Universiteit Brussel, Ben Craps</i>	6	a	A:1	180
35	C003211	Electroweak and Strong Force [en] <i>Vrije Universiteit Brussel, Alexandre Sevrin</i>	6	a	A:2	180
36	C003212	Extensions of the Standard Model [en] <i>Vrije Universiteit Brussel, Steven Lowette</i>	6	a	A:1	180
37	C003213	Non-linear Dynamics and Chaos [en] <i>Vrije Universiteit Brussel, Sophie De Buyl</i>	6	a	A:2	180

38	C003214	Experimental Techniques in Particle Physics [en] <i>Vrije Universiteit Brussel, Steven Lowette</i>	6	a	A:1	180
39	C003215	Object Oriented Programming (C++) for Physicists [en] <i>Vrije Universiteit Brussel, Olivier Devroede</i>	6	a	A:2	180
40	C003829	Early Universe Cosmology [en] <i>Vrije Universiteit Brussel, Ben Craps</i>	6	a	A:2	180
41	C003217	Stellar Systems: Origin, Structure, Evolution [en] <i>Vrije Universiteit Brussel, Dany Vanbeveren</i>	6	a	A:2	180
42	C003218	General Relativity [en] <i>Vrije Universiteit Brussel, Alexandros Spyridon Arvanitakis</i>	6	a	A:1	180
43	C003219	Simulation of Physics Phenomena and Detectors in Modern Physics [en] <i>Vrije Universiteit Brussel, Steven Lowette</i>	6	a	A:1	180

2.1.2 Mobility

Subscribe to courses with a mobility aspect for at least 10 credit units. This can be accomplished by doing an internship in a research-oriented organisation, or by following courses from another university (including VUB). For further guidance with regard to this mobility requirement please consult the promotor of your Master's Dissertation. An internship that is part of the Master's Dissertation can not be counted as extra credit units, but as mobility units (2 mobility units for one week of internship). An internship that is not directly connected with the Master's Dissertation counts for 2 credit units for one week of internship.

2.1.3 Elective Courses UGent

Select courses for a total amount of credit units not exceeding 20. These courses can be taken from all UGent programs, from the [Ghent University elective courses](#), and from the courses in the minor research of the Master of Science in physics and astronomy. At most 12 credit units can be taken from courses offered in a Bachelor program.

2.2 Economics and Business Administration 60 credits

2.2.1 Minor Economics and Business Administration 30 credits

Subscribe to 30 credit units from no less than 1 and no more than 2 modules from the following list.

2.2.1.1 General Courses

Subscribe to no less than 24 and no more than 30 credit units from the following list, distributed over the first standard learning path as follows: no more than 24 credit units in year 1.

Dare to Venture can be chosen if you have already subscribed to Introduction to Entrepreneurship.

Nr	Course	CRDT	Ref	MT1	Session	Study
1	F000758 Economics <i>Bruno Merlevede -- Department of Economics</i>	5			A:1	150
2	E076930 Financial and Cost Price Reporting in Companies <i>Faculteit Economie en Bedrijfskunde, Sophie Maussen -- Department of Accounting, Corporate Finance and Taxation</i>	6			A:1	180
3	E076431 Introduction to Entrepreneurship [en] <i>Petra Andries -- Department of Marketing, Innovation and Organisation</i>	3			A:1	90
4	E076460 Dare to Venture [en] <i>Johan Verrue -- Department of Marketing, Innovation and Organisation</i>	4			A:2	120
5	F000845 Business Administration <i>Mirjam Knockaert -- Department of Marketing, Innovation and Organisation</i>	4			A:2	120
6	F000551 Business Skills [en] <i>Mieke Audenaert -- Department of Marketing, Innovation and Organisation</i>	4			C:2	120
7	F000768 Marketing Management <i>Maggie Geuens -- Department of Marketing, Innovation and Organisation</i>	6			A:1	180
8	F000855 Organization Theory [en] <i>Gosia Kozusznik -- Department of Marketing, Innovation and Organisation</i>	4			A:2	120
9	F000596 Business Cycles and Growth <i>Freddy Heylen -- Department of Economics</i>	6			A:1	180
10	F000446 Markets and Prices <i>Dirk Van de gaer -- Department of Economics</i>	6			A:1	180
11	F000093 Financial Markets and Institutions <i>Rudi Vander Vennet -- Department of Economics</i>	5			A:2	150
12	F000752 Environmental Economics and Policy <i>Brent Bleys -- Department of Economics</i>	4			B:2	120
13	F000859 Corporate Social Responsibility <i>Saskia Crucke -- Department of Marketing, Innovation and Organisation</i>	3			A:2	90

2.2.1.2 Elective Courses UGent

Subscribe to courses for no more than 6 credit units to be chosen from the courses of UGent.

2.2.2 Elective Courses Research

Subscribe to no less than 12 credit units from the lists 2.1.1 and 2.1.2 with a maximum of 3 credit units from 2.1.2.

2.2.3 Elective Courses UGent

Subscribe to courses for no more than 18 credit units to be chosen from the courses of UGent. (max. 12 credit units bachelor courses)

3 Master's Dissertation 30 credits

Nr	Course	CRDT	Ref	MT1	Session	Study
1	C002315 Master's Dissertation N. N.	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 2023-2024	f: annually, from 2024-2025	i: annually, from 2025-2026
b: tri-annually	d: bi-annually, from 2023-2024	g: bi-annually, from 2024-2025	j: bi-annually, from 2025-2026
	e: tri-annually, from 2023-2024	h: tri-annually, from 2024-2025	k: tri-annually, from 2025-2026