

Faculty of Sciences

Master of Science in Physics and Astronomy

Language of instruction: English

Programme version 2

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 <i>Christophe Detavernier -- Department of Solid State Sciences</i>	6			A:1	180
2	C004504 Computational Physics <i>Toon Verstraeten -- Department of Physics and Astronomy</i>	6			A:1	180
3	C004502 Subatomic Physics <i>Didar Dobur -- Department of Physics and Astronomy</i>	6			A:1	180
4	C004505 Theoretical and Numerical Astrophysics <i>Maarten Baes -- Department of Physics and Astronomy</i>	6			A:1	180
5	C004506 Quantum Field Theory <i>Thomas Mertens -- Department of Physics and Astronomy</i>	6			A:1	180
6	C004451 General Relativity <i>Archisman Ghosh -- Department of Physics and Astronomy</i>	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.

Courses with reference a are taught at VUB.

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 <i>Archisman Ghosh -- Department of Physics and Astronomy</i>	6			A:2	180
2	C002512 Cosmology and Galaxy Formation [nl] <i>Sven De Rijcke -- Department of Physics and Astronomy</i>	6			A:1	180
3	C003131 Observational Techniques in Astronomy <i>Arjen van der Wel -- Department of Physics and Astronomy</i>	6			A:2	180
4	C004507 Nuclei: Structure, Synthesis and Interactions <i>Natalie Jachowicz -- Department of Physics and Astronomy</i>	6			A:2	180
5	C003939 Radiative Transfer Simulations in Astrophysics <i>Maarten Baes -- Department of Physics and Astronomy</i>	6			(A:2) ^d	180
6	C004651 Stellar Structure and Evolution <i>Pablo Marchant Campos -- Department of Physics and Astronomy</i>	6			A:1	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 <i>Zeger Hens -- Department of Chemistry</i>	6			A:2	180
2	E006800 Modelling and Engineering of Nanoscale Materials <i>Louis Vanduyfhuys -- Department of Applied Physics</i>	6			A:1	180

3	C003122	Nuclear Methods in Material Research <i>Stefaan Cottelier -- Department of Electromechanical, Systems and Metal Engineering</i>	6			A:2	180
4	C004508	Structure Analysis of Solids <i>Jolien Dendooven -- Department of Solid State Sciences</i>	6			A:2	180
5	C003128	Optical Spectroscopy of Materials <i>Dirk Poelman -- Department of Solid State Sciences</i>	4			A:1	120
6	C003208	Luminescence <i>Jonas Joos -- Department of Solid State Sciences</i>	6			(A:1) ^d	180
7	C004509	Nanomagnetism <i>Jonathan Leliaert -- Department of Solid State Sciences</i>	5			A:2	150
8	E024122	Computational Materials Physics <i>Stefaan Cottelier -- Department of Electromechanical, Systems and Metal Engineering</i>	6			B:1	180
9	C004523	Materials for Energy Applications <i>Christophe Detavernier -- Department of Solid State Sciences</i>	6			A:1	180
10	E006700	Thin Films: Physics and Technology <i>Diederik Depla -- Department of Solid State Sciences</i>	6			A:1	180
11	C004512	Thin Films: Atomic Scale Processing and Analysis <i>Jolien Dendooven -- Department of Solid State Sciences</i>	3			A:1	90
12	C004513	The Theory of Metals: from Path Integrals to Experiment <i>Nick Bultinck -- Department of Physics and Astronomy</i>	6			A:1 ^a	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 <i>Natalie Jachowicz -- Department of Physics and Astronomy</i>	6			A:2	180
2	C004560 Particle Radiation Detection and Measurement <i>Michael Tytgat -- Department of Physics and Astronomy</i>	6	a		A:1	180
3	C004450 Medical Radiation Physics and Dosimetry <i>Klaus Bacher -- Department of Human Structure and Repair</i>	6			A:2	180
4	C003129 Capita Selecta Particle Physics <i>Didar Dobur -- Department of Physics and Astronomy</i>	6			A:2	180
5	C003212 Extensions of the Standard Model <i>Steven Lowette -- Vrije Universiteit Brussel</i>	6	a		A:1	180
6	C003211 Electroweak and Strong Force <i>Alexandre Sevrin -- Vrije Universiteit Brussel</i>	6	a		A:2	180
7	C003214 Experimental Techniques in Particle Physics <i>Steven Lowette -- Vrije Universiteit Brussel</i>	6	a		A:2	180
8	C002349 Astroparticle Physics <i>Archisman Ghosh -- Department of Physics and Astronomy</i>	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 <i>Dimitri Van Neck -- Department of Physics and Astronomy</i>	6			(A:2) ^d	180
2	C004515 Many-body Physics <i>Dimitri Van Neck -- Department of Physics and Astronomy</i>	6			A:2 ^a	180
3	C003668 Quantum Computing <i>Frank Verstraete -- Department of Physics and Astronomy</i>	6			A:2	180
4	C004516 Holography <i>Michal Heller -- Department of Physics and Astronomy</i>	6			(A:2) ^d	180
5	C004561 Quantum Black Holes <i>Thomas Mertens -- Department of Physics and Astronomy</i>	6			A:2 ^a	180
6	C004071 Strongly Correlated Quantum Systems <i>Jutho Haegeman -- Department of Physics and Astronomy</i>	6			A:2 ^a	180
7	C004421 Relativistic Hydrodynamics - from Quantum Field Theory to Black Holes <i>Michal Heller -- Department of Physics and Astronomy</i>	6			A:1 ^a	180

8	C004517	Dynamics: from Newton to Schrödinger <i>Sven De Rijcke -- Department of Physics and Astronomy</i>	6		A:1	180
9	C004513	The Theory of Metals: from Path Integrals to Experiment <i>Nick Bultinck -- Department of Physics and Astronomy</i>	6		A:1 ^a	180
10	C004518	Field Theory for Statistical Mechanics <i>Nick Bultinck -- Department of Physics and Astronomy</i>	6		(A:2) ^d	180
11	C004106	Complexity and Criticality <i>Jan Ryckebusch -- Department of Physics and Astronomy</i>	6		A:2	180
12	C004652	String Theory and Holography <i>Externe lesgever -- Vrije Universiteit Brussel</i>	6	a	A:1	150
13	C004653	Quantum Field Theory 2 <i>Ben Page -- Department of Physics and Astronomy</i>	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 <i>Rino Morent -- Department of Applied Physics</i>	6			A:1	180
2	E026260 Magnetohydrodynamics of Plasmas <i>Roger Jaspers -- Department of Applied Physics</i>	6			A:2	180
3	C003940 History and Philosophy of Sciences: Physics and Astronomy [nl] <i>Maarten Van Dyck -- Department of Philosophy and Moral Sciences</i>	6			A:2	180
4	C003758 Machine Learning <i>Yvan Saeys -- Department of Mathematics, Computer Science and Statistics</i>	6			A:1	180
5	C001427 Introduction to the Dynamics of Atmospheres [nl] <i>Piet Termonia -- Department of Physics and Astronomy</i>	6			A:1	180
6	E040430 Continuum Mechanics <i>Geert Verdoolaege -- Department of Applied Physics</i>	6			A:2	180
7	E006500 Quantum Optics <i>Bart Kuyken -- Department of Information Technology</i>	6			A:1	180
8	E024641 Physics of Semiconductor Devices <i>Benoit Bakeroot -- Department of Electronics and Information Systems</i>	6			B:2	180
9	E029040 Physical Chemistry <i>Iwan Moreels -- Department of Chemistry</i>	6			B:2	180
10	C004453 Modeling Complex Systems <i>Sophie De Buyl -- Vrije Universiteit Brussel</i>	6	a		A:2	180
11	E006400 Wave Physics in Living Matter <i>Wout Joseph -- Department of Information Technology</i>	6			A:2	180
12	C004106 Complexity and Criticality <i>Jan Ryckebusch -- Department of Physics and Astronomy</i>	6			A:2	180
13	C004517 Dynamics: from Newton to Schrödinger <i>Sven De Rijcke -- Department of Physics and Astronomy</i>	6			A:1	180
14	F000920 Networks in Socio-Economic Systems <i>Luis Enrique Correa da Rocha -- Department of Economics</i>	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] <i>Philippe Smet -- Department of Solid State Sciences</i>	4			A:J	120
2	E076471 Dare to Start <i>Wouter Haerick -- Department of Information Technology</i>	3			A:2	90
3	F001022 Dare to Venture <i>Johan Verrue -- Department of Marketing, Innovation and Organisation</i>	4			A:2	120
4	C004520 Internship A <i>Matthieu Boone -- Department of Physics and Astronomy</i>	4			A:J	120
5	C004521 Internship B <i>Matthieu Boone -- Department of Physics and Astronomy</i>	6			A:J	180

6	C004522	Project Work <i>Bartel Van Waeyenberge -- Department of Solid State Sciences</i>	4			A:J	120
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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 <i>Christophe Detavernier -- Department of Solid State Sciences</i>	6			A:1	180
2	E039060 Sustainable Energy and Rational Use of Energy <i>Filip Strubbe -- Department of Electronics and Information Systems</i>	4			A:2	120
3	E065460 Rational Use of Materials <i>Tom Depover -- Department of Materials, Textiles and Chemical Engineering</i>	5			A:1	150
4	E076321 Digital Innovation for People and Society [nl] <i>Erik Mannens -- Department of Electronics and Information Systems</i>	3			A:2	90
5	F000551 Business Skills <i>Mieke Audenaert -- Department of Marketing, Innovation and Organisation</i>	4			C:2	120
6	A001900 Introduction to Psychology [nl] <i>Wim Notebaert -- Department of Experimental Psychology</i>	3			A:1	90
7	H001977 Coaching and Diversity [nl] <i>Elisabeth De Schauwer -- Department of Special Education</i>	3	UKV		A:J	90
8	F001021 Basic Entrepreneurship [nl] <i>Evy Van Lancker -- Department of Marketing, Innovation and Organisation</i>	3	UKV		A:1	90
9	E078010 Technology and Environment <i>Luc Martens -- Department of Information Technology</i>	3			A:1	90
10	F000982 Complexity Economics and Agent-Based Modelling <i>Luis Enrique Correa da Rocha -- Department of Economics</i>	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 <i>Philippe Smet -- Department of Solid State Sciences</i>	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 course name, using the following ISO codes:

bg: Bulgarian	de: German	es: Spanish	ja: Japanese	pl: Polish	sh: Croatian/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 is 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 2027-2028	f: annually, from 2028-2029	i: annually, from 2029-2030
b: tri-annually	d: bi-annually, from 2027-2028	g: bi-annually, from 2028-2029	j: bi-annually, from 2029-2030
	e: tri-annually, from 2027-2028	h: tri-annually, from 2028-2029	k: tri-annually, from 2029-2030