Physics and Astronomy undergraduate regulations

Faculty of Science

INDEX

Regulations are presented in programme code order. An alphabetical index of programme titles is as follows:

PHYU01 PHYSICS (BSc) (JACS F300)

Level 1

1. A candidate shall take the programme of study prescribed at Level 1 in the Regulations for the Degree of MPhys in Physics (PHYU02).

Level 2

2. A candidate shall take

(a)	PHY202	F5	Quantum Mechanics	10
	PHY203	F5	Thermal Physics	10
	PHY204	F5	Solids	10
	PHY205	F5	Electromagnetism	10
	PHY206	F5	Atomic Spectra and Relativity	10
	PHY221	F5	Topics in Classical Physics	10
	PHY226	F5	Mathematical Methods for Physics and Astronomy	10
	PHY227	F5	Optics	10
	PHY230	F5	Experimental Physics I	10
	PHY231	F5	Experimental Physics II	10
(b)	units to the value of *twenty* credits from the following			
	MPY205	F5	Aspects of Medical Imaging and Technology	10
	PHY104	F4	Introduction to Astrophysics	10
	PHY207	F5	Numerical and Computational Physics	10
	PHY213	F5	Stellar Structure and Evolution	10
	PHY216	F5	Galaxies	10
	PHY225	F5	Programming in C	10
	PHY229	F5	Extra-Solar Planets and Astrobiology	10
	PHY232	F5	The Dynamic Interstellar Medium	10
	PHY240	F5	The Physics of Music	10

Level 3

3. A candidate shall take

(a)	PHY303	F6	Nuclear Physics	10
	PHY304	F6	Particle Physics	10
	PHY315	F7	Techniques of Problem Solving in Physics	10
	PHY330	F6	Metals, Semiconductors and Insulators	10
	PHY331	F6	Magnetism and Advanced Electrodynamics	10
	PHY332	F6	Atomic and Laser Physics	10
	PHY341	F6	Physics Project 1	10
	PHY343	F6	Group Project in Physics	10
(b)	units to the value of *forty* credits from the following			
	PHY207	F5	Numerical and Computational Physics	10
	PHY225	F5	Programming in C	10
	PHY306	F6	Introduction to Cosmology	10
	PHY309	F7	Further Quantum Mechanics	10
	PHY313	F6	Mathematical Physics	10
	PHY314	F6	Relativity and Cosmology	10
	PHY320	F6	Nuclear Astrophysics	10
	PHY323	F7	Dark Matter and the Universe	10
	PHY324	F7	History of Astronomy	10
	PHY333	F7	Statistical Physics	10
	PHY410	F7	Physics of Semiconductors	10
	PHY411	F7	Aspects of Modern Physics (Half Module)	10
	PHY412	F7	Aspects of Modern Physics (Full Module)	20
	PHY435	F7	Physics in an Enterprise Culture	10

PHYU02 PHYSICS (MPhys) (JACS F301)

Level 1

1. A candidate shall take

(a)	MAS165	F4	Mathematics for Physicists	10
	PHY101	F4	Mechanics, Vibrations and Waves	20
	PHY102	F4	Quanta and Matter	20
	PHY113	F4	Professional Skills in Physics I	10
	PHY114	F4	Professional Skills in Physics II	10
(b)	*one* of the following			
(i)	PHY112	F4	Introductory Mathematics for Physicists and Astronomers	20
	unrestricted units to the value of *thirty* credits			
(ii)	MAS100	F4	Mathematics with Maple	10
	MAS101	F4	Probability, Sets and Complex Numbers	10
	MAS103	F4	Differential and Difference Equations	10
	MAS170	F4	Practical Calculus	10
	MAS171	F4	Matrices and Geometry	10

Level 2

2. A candidate shall take

(a)	PHY202	F5	Quantum Mechanics	10
	PHY203	F5	Thermal Physics	10
	PHY204	F5	Solids	10
	PHY205	F5	Electromagnetism	10
	PHY206	F5	Atomic Spectra and Relativity	10
	PHY221	F5	Topics in Classical Physics	10
	PHY225	F5	Programming in C	10
	PHY226	F5	Mathematical Methods for Physics and Astronomy	10
	PHY227	F5	Optics	10
	PHY230	F5	Experimental Physics I	10
	PHY231	F5	Experimental Physics II	10
(b)	a unit to the value of *ten* credits from the following			
	MPY205	F5	Aspects of Medical Imaging and Technology	10
	PHY104	F4	Introduction to Astrophysics	10
	PHY207	F5	Numerical and Computational Physics	10

	PHY216	F5	Galaxies	10
	PHY229	F5	Extra-solar Planets and Astrobiology	10
	PHY232	F5	The Dynamic Interstellar Medium	10
	PHY240	F5	The Physics of Music	10

Level 3

3. A candidate shall take

(a)	PHY303	F6	Nuclear Physics	10
	PHY304	F6	Particle Physics	10
	PHY309	F7	Further Quantum Mechanics	10
	PHY315	F7	Techniques of Problem Solving in Physics	10
	PHY330	F6	Metals, Semiconductors and Insulators	10
	PHY331	F6	Magnetism and Advanced Electrodynamics	10
	PHY332	F6	Atomic and Laser Physics	10
	PHY333	F7	Statistical Physics	10
	PHY341	F6	Physics Project 1	10
	PHY343	F6	Group Project in Physics	10

(b) units to the value of *twenty* credits from the following

	PHY207	F5	Numerical and Computational Physics	10
	PHY306	F6	Introduction to Cosmology	10
	PHY313	F6	Mathematical Physics	10
	PHY314	F6	Relativity and Cosmology	10
	PHY320	F6	Nuclear Astrophysics	10
	PHY323	F7	Dark Matter and the Universe	10
	PHY324	F7	History of Astronomy	10

Level 4

4. A candidate shall take

(a)

PHY480	F7	Research Project in Physics and Astronomy	40

One of the following

(b)

(i)	PHY411	F7	Aspects of Modern Physics (Half Module)	10

units to the value of *seventy* credits from the following, not more than *twenty* being selected from (iii)

(ii)	PHY323	F7	Dark Matter and the Universe	10
	PHY324	F7	History of Astronomy	10
	PHY402	F7	Cosmic Origins	10
	PHY408	F7	Literature Search in Physics	10
	PHY410	F7	Physics of Semiconductors	10
	PHY435	F7	Physics in an Enterprise Culture	10
	PHY461	F7	High Energy Astrophysics	10
	PHY466	F7	Development of Particle Physics	10
	PHY469	F7	Physics of Soft Condensed Matter	10
	PHY472	F7	Advanced Quantum Mechanics	10
	PHY475	F7	Optical Properties of Solids	10

(iii) units listed at 3(b) above

or

(c)

(i)	PHY412	F7	Aspects of Modern Physics (Full Module)	20

(ii) units to the value of *sixty* credits from 4b(ii) and (iii) above, not more than *twenty* being selected from 4b(iii)

5. A candidate must satisfy the requirements of the General Regulations for First Degrees as to progression in order to continue as a candidate for the Degree of MPhys in Physics (PHYU02). A candidate who fails to satisfy these requirements may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01).

6 A candidate shall take at least 120 credits at F7 level in levels 3 and 4 combined in order to receive the degree of MPhys in Physics (PHYU02).

PHYU04 THEORETICAL PHYSICS (BSc) (JACS F344)

Level 1

1. A candidate shall take the programme of study prescribed at Level 1 in the Regulations for the Degree of MPhys in Theoretical Physics (PHYU16).

Level 2

2. A candidate shall take the programme of study prescribed at Level 2 in the Regulations for the Degree of MPhys in Theoretical Physics (PHYU16).

Level 3

3. A candidate shall take the programme of study prescribed at Level 3 in the Regulations for the Degree of MPhys in Theoretical Physics (PHYU16)

4 A candidate must achieve a weighted mean grade of 59.5 or above at Level 1 in order to continue as a candidate for the Degree of BSc in Theoretical Physics. A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01)

PHYU05 PHYSICS WITH MEDICAL PHYSICS (BSc) (JACS F350)

Level 1

1. A candidate shall take the programme of study prescribed at Level 1 in the Regulations for the Degree of MPhys in Physics with Medical Physics (PHYU10).

Level 2

2. A candidate shall take the programme of study prescribed at Level 2 in the Regulations for the Degree of MPhys in Physics with Medical Physics (PHYU10).

Level 3

3. A candidate shall take

(a)	COM3001	F6	Modelling and Simulations of Natural Systems	10
	MPY308	F6	Clinical Engineering and Computational Mechanics	10
	MPY321	F6	Medical Physics Project 1	10
	MPY322	F6	Medical Physics Project 2	10
	PHY303	F6	Nuclear Physics	10
	PHY315	F7	Techniques of Problems Solving in Physics	10
	PHY330	F6	Metals, Semiconductors and Insulators	10
	PHY331	F6	Magnetism and Advanced Electrodynamics	10
	PHY332	F6	Atomic and Laser Physics	10
	PHY342	F6	Physics Project 2	10

(b) units to the value of *twenty* credits from the following

	PHY225	F5	Programming in C	10

PHY304	F6	Particle Physics	10
PHY333	F7	Statistical Physics	10
PHY410	F7	Physics of Semiconductors	10
PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY435	F7	Physics in an Enterprise Culture	10

PHYU06 PHYSICS AND ASTROPHYSICS (BSc) (JACS FF35)

Level 1

1. A candidate shall take the programme of study prescribed at Level 1 in the Regulations for the Degree of MPhys in Physics and Astrophysics (PHYU11).

Level 2

2. A candidate shall take the programme of study prescribed at Level 2 in the Regulations for the Degree of MPhys in Physics and Astrophysics (PHYU11).

Level 3

3. A candidate shall take

(a)

PHY305	F6	Stellar Atmospheres	10
PHY306	F6	Introduction to Cosmology	10
PHY307	F7	Problem Solving in Physics and Astrophysics	10
PHY319	F6	Astronomy Project	10
PHY320	F6	Nuclear Astrophysics	10

(b) a unit to the value of *ten* credits from the following

PHY341	F6	Physics Project 1	10
PHY342	F6	Physics Project 2	10
PHY343	F6	Group Project in Physics	10

(c) units to the value of *twenty* credits from the following

PHY303	F6	Nuclear Physics	10
PHY304	F6	Particle Physics	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY331	F6	Advanced Electrodynamics and Magnetism	10
PHY332	F6	Atomic and Laser Physics	10

(d) a unit to the value of *ten* credits from the following

PHY314	F6	Relativity and Cosmology	10
PHY323	F7	Dark Matter and the Universe	10
PHY324	F7	History of Astronomy	10

(e) units to the value of *thirty* credits from the following, with not more than *ten* credits taken from (ii)

(i)

PHY309	F7	Further Quantum Mechanics	10
PHY313	F6	Mathematical Physics	10
PHY333	F7	Statistical Physics	10
PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY435	F7	Physics in an Enterprise Culture	10

units listed at (c) and (d) above

(ii)

PHY207	F5	Numerical and Computational Physics	10
PHY225	F5	Programming in C	10
PHY2227	F5	Optics	10

PHYU10 PHYSICS WITH MEDICAL PHYSICS (MPhys) (JACS F371)

Level 1

1. A candidate shall take

EEE140	F4	Introduction to Electric Circuits	10
MAS165	F4	Mathematics for Physicists	10
MAT191	F4	Introduction to Biomedical Engineering	10
MPY101	F4	Physics of Living Systems 2	10
PHY101	F4	Mechanics, Vibrations and Waves	20
PHY102	F4	Quanta and Matter	20
PHY112	F4	Introductory Mathematics for Physicists and Astronomers	20
PHY113	F4	Professional Skills in Physics I	10
PHY114	F4	Professional Skills in Physics II	10

Level 2

2. A candidate shall take

MAT291	F5	Biomedical Instrumentation	10
MAT2510	F5	Tissue Structure and Function	10
MPY205	F5	Aspects of Medical Imaging and Technology	10
PHY202	F5	Quantum Mechanics	10
PHY203	F5	Thermal Physics	10
PHY204	F5	Solids	10
PHY205	F5	Electromagnetism	10
PHY206	F5	Atomic Spectra and Relativity	10
PHY221	F5	Topics in Classical Physics	10
PHY226	F5	Mathematical Methods for Physics and Astronomy	10
PHY227	F5	Optics	10
PHY231	F5	Experimental Physics 2	10

Level 3

3. A candidate shall take

(a)

COM3001	F6	Modelling and Simulation of Natural Systems	10
MPY308	F6	Clinical Engineering and Computational Mechanics	10
MPY321	F6	Medical Physics Project 1	10
MPY322	F6	Medical Physics Project 2	10
PHY225	F5	Programming in C	10
PHY303	F6	Nuclear Physics	10
PHY309	F7	Further Quantum Mechanics	10
PHY315	F7	Techniques of Problem Solving in Physics	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY331	F6	Magnetism and Advanced Electrodynamics	10
PHY342	F6	Physics Project 2	10

(b) a unit to the value of *ten* credits from the following

PHY207	F5	Numerical and Computational Physics	10
PHY313	F6	Mathematical Physics	10
PHY314	F6	Relativity and Cosmology	10
PHY320	F6	Nuclear Astrophysics	10
PHY323	F7	Dark Matter and the Universe	10

Level 4

4. A candidate shall take

(a)

MPY401	F7	Medical Physics Research Project	40
MPY424	F7	Hospital or Industrial Placement	20
PHY304	F6	Particle Physics	10
PHY332	F6	Atomic and Laser Physics	10
PHY333	F7	Statistical Physics	10

(b) units to the value of *thirty* credits from the following

PHY403	F7	Advanced Statistical Physics	10
PHY408	F7	Literature Search in Physics	10
PHY410	F7	Physics of Semiconductors	10

PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY412	F7	Aspects of Modern Physics (Full Module)	20
PHY435	F7	Physics in an Enterprise Culture	10
PHY466	F7	The Development of Particle Physics	10
PHY469	F7	Physics of Soft Condensed Matter	10
PHY472	F7	Advanced Quantum Mechanics	10
PHY475	F7	Optical Properties of Solids	10

5. A candidate must satisfy the requirements of the General Regulations for First Degrees as to progression in order to continue as a candidate for the Degree of MPhys in Physics with Medical Physics (PHYU10). A candidate who fails to satisfy these requirements may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics with Medical Physics (PHYU05).

PHYU11 PHYSICS AND ASTROPHYSICS (MPhys) (JACS F3F5)

Level 1

1. A candidate shall take

MAS165	F4	Mathematics for Physicists	10
PHY101	F4	Mechanics, Vibrations and Waves	20
PHY102	F4	Quanta and Matter	20
PHY104	F4	Introduction to Astrophysics	10
PHY106	F4	The Solar System	10
PHY111	F4	Our Evolving Universe	10
PHY112	F4	Introductory Mathematics for Physicists and Astronomers	20
PHY115	F4	Professional Skills in Physics and Astronomy I	10
PHY116	F4	Professional Skills in Physics and Astronomy II	10

Level 2

2. A candidate shall take

PHY202	F5	Quantum Mechanics	10
PHY203	F5	Thermal Physics	10
PHY204	F5	Solids	10
PHY205	F5	Electromagnetism	10
PHY206	F5	Atomic Spectra and Relativity	10
PHY213	F5	Stellar Structure and Evolution	10
PHY216	F5	Galaxies	10
PHY217	F5	Techniques of Observation	10
PHY226	F5	Mathematical Methods for Physics and Astronomy	10
PHY229	F5	Extra-solar Planets and Astrobiology	10
PHY230	F5	Experimental Physics 1	10
PHY232	F5	The Dynamic Interstellar Medium	10

Level 3

3. A candidate shall take

(a)

PHY225	F5	Programming in C	10
PHY304	F6	Particle Physics	10
PHY305	F6	Stellar Atmospheres	10
PHY306	F6	Introduction to Cosmology	10
PHY307	F7	Problem Solving in Physics and Astrophysics	10
PHY309	F7	Further Quantum Mechanics	10
PHY319	F6	Astronomy Project	10
PHY332	F6	Atomic and Laser Physics	10

(b) a unit to the value of *ten* credits from the following

PHY341	F6	Physics Project 1	10
PHY342	F6	Physics Project 2	10
PHY343	F6	Group Project in Physics	10

(c) a unit to the value of *ten* credits from the following

PHY303	F6	Nuclear Physics	10
PHY320	F6	Nuclear Astrophysics	10

(d) a unit to the value of *ten* credits from the following

PHY207	F5	Numerical and Computational Physics	10
PHY227	F5	Optics	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY331	F6	Magnetism and Advanced Electrodynamcis	10

(e) a unit to the value of *ten* credits from the following

PHY314	F6	Relativity and Cosmology	10
PHY323	F7	Dark Matter and the Universe	10
PHY324	F7	History of Astronomy	10

Level 4

4. A candidate shall take

(a)

PHY333	F7	Statistical Physics	10
PHY401	F7	Cosmic Origins	20
PHY461	F7	High Energy Astrophysics	10
PHY480	F7	Research Project in Physics and Astronomy	40

(b) units to the value of *twenty* credits from the following, not more than *ten* being selected from (ii)

(i)

PHY410	F7	Physics of Semiconductors	10
PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY435	F7	Physics in an Enterprise Culture	10
PHY466	F7	Development of Particle Physics	10
PHY469	F7	Physics of Soft Condensed Matter	10
PHY472	F7	Advanced Quantum Mechanics	10
PHY475	F7	Optical Properties of Solids	10

(ii)

PHY408	F7	Literature Search in Physics	10
PHY445	F7	Directed Reading in Astronomy	10

(c) units to the value of *twenty* credits from those listed at (b)(i), and 3(c),(d) and (e) above

5. A candidate must satisfy the requirements of the General Regulations for First Degrees as to progression in order to continue as a candidate for the Degree of MPhys in Physics and Astrophysics (PHYU11). A candidate who fails to satisfy these requirements may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics and Astrophysics (PHYU06).

6. A candidate may be permitted by the Head of Department to pursue Level 4 of the programme of study at the Isaac Newton Group of Telescopes (ING) in La Palma, Canary Islands, in which case the following units shall be taken.

PHY445	F7	Directed Reading in Astronomy	10
PHY451	F7	Research Design Study	10
PHY456	F7	Project Management and Presentation	10
PHY473	F7	Working at the ING	30
PHY474	F7	Extended Research Project in Astronomy	60

PHYU12 PHYSICS WITH MATHEMATICS (MPhys) (JACS F3G1)

Level 2

2. A candidate shall take

MAS201	F5	Linear Mathematics for Applications	10
MAS202	F5	Advanced Calculus	10
MAS203	F5	Mechanics	10
MAS270	F5	Vectors and Fluids	10
MAS271	F5	Methods for Differential Equations	10
MAS272	F5	Applied Differential Equations	10
PHY202	F5	Quantum Mechanics	10
PHY203	F5	Thermal Physics	10
PHY204	F5	Solids	10
PHY206	F5	Atomic Spectra and Relativity	10
PHY226	F5	Mathematical Methods of Physics and Astronomy	10
PHY231	F5	Experimental Physics 2	10

Level 3

3. A candidate shall take

(a)	PHY205	F5	Electromagnetism	10
	PHY225	F5	Programming in C	10
	PHY227	F5	Optics	10
	PHY309	F7	Further Quantum Mechanics	10
	PHY332	F6	Atomic and Laser Physics	10
	PHY333	F7	Statistical Physics	10
(b)	a unit to the value of *ten* credits from the following			
	PHY341	F6	Physics Project 1	10
	PHY342	F6	Physics Project 2	10
(c)	units to the value of *twenty* credits from the following			
	PHY303	F6	Nuclear Physics	10
	PHY304	F6	Particle Physics	10
	PHY315	F7	Techniques of Problem Solving in Physics	10
	PHY330	F6	Metals, Semiconductors and Insulators	10
(d)	units to the value of *thirty* credits from the following			
	MAS310	F6	Continuum Mechanics	10
	MAS312	F6	Classical Control	10
	MAS314	F6	Introduction to Relativity	10
	MAS315	F6	Waves	10
	MAS320	F6	Fluid Mechanics I	10
	MAS321	F6	Numerical Solution of Partial Differential Equations	10
	MAS322	F6	Operations Research	10
	MAS323	F6	Differential Equations: A Case Study	10
	MAS324	F6	Milestones in Applied Mathematics II	10
	MAS325	F6	Mathematical Methods	10
	MAS330	F6	Topics in Number Theory	10
	MAS332	F6	Complex Analysis	10
	MAS334	F6	Combinatorics	10
	MAS336	F6	Differential Geometry	10
	MAS341	F6	Graph Theory	10
	MAS342	F6	Applicable Analysis	10
	MAS345	F6	Codes and Cryptography	10

Level 4

4. A candidate shall take

(a)	PHY331	F6	Magnetism and Advanced Electrodynamics	10
	PHY480	F7	Research Project in Physics and Astronomy	40
(b)	units to the value of *twenty* credits from the following			
	PHY303	F6	Nuclear Physics	10
	PHY304	F6	Particle Physics	10
	PHY315	F7	Techniques of Problem Solving in Physics	10
	PHY330	F6	Metals, Semiconductors and Insulators	10
(c)	units to the value of *twenty* credits from the following, not more than *ten* credits being selected from (ii)			
(i)	PHY403	F7	Advanced Statistical Physics	10
	PHY410	F7	Physics of Semiconductors	10
	PHY411	F7	Aspects of Modern Physics (Half Module)	10
	PHY435	F7	Physics in an Enterprise Culture	10
	PHY469	F7	Physics of Soft Condensed Matter	10
	PHY472	F7	Advanced Quantum Mechanics	10
	PHY475	F7	Optical Properties of Solids	10
(ii)	PHY408	F7	Literature Search in Physics	10
	PHY444	F7	Reading in Theoretical Physics II	10
(d)	units to the value of *thirty* credits from the following			
	MAS411	F7	Topics in Advanced Fluid Mechanics	20
	MAS412	F7	Anaytical Dynamics and Classical Field Theory	20
	MAS422	F7	Magnetohydrodynamics	10
	MAS423	F7	Advanced Operations Research	10
	MAS424	F7	Differential Equations	10
	MAS420	F7	Signal Processing	10
	MAS441	F7	Optics and Symplectic Geometry	10

5. A candidate must satisfy the requirements of the General Regulations for First Degrees as to progression in order to continue as a candidate for the Degree of MPhys in Physics with Mathematics (PHYU12). A candidate who fails to satisfy these requirements may be required by the Faculty to become instead a candidate for the Degree of BSc in Mathematics and Physics (MASU23).

6 A candidate shall take at least 120 credits at F7 level in levels 3 and 4 combined in order to receive the degree of MPhys in Physics with Mathematics (PHYU12).

PHYU14 PHYSICS AND PHILOSOPHY (BSc) (JACS FV35)

Level 1

1. A candidate shall take

(a)	MAS165	F4	Mathematics for Physicists	10
	PHY101	F4	Mechanics, Vibrations and Waves	20
	PHY102	F4	Quanta and Matter	20
	PHY112	F4	Introductory Mathematics for Physicists and Astronomers	20
	PHY118	F4	Professional Skills in Physics	10
(b)	units to the value of *forty* credits from the following			
	PHI103	F4	Self & Society	10
	PHI107	F4	The Philosophy of Religion	10
	PHI113	F4	Key Arguments	10
	PHI114	F4	History of Philosophy	10
	PHI115	F4	Reason and Argument	10
	PHI116	F4	Elementary Logic	10
	PHI121	F4	Knowledge, Justification and Doubt	10
	PHI124	F4	Philosophy of Space and Time	10
	PHI125	F4	Matters of Life and Death	20
	PHI126	F4	Mind, Brain and Personal Identity	20
	PHI128	F4	Philosophy of Art and Literature	20

Level 2

2. A candidate shall take

(a)	PHY202	F5	Quantum Mechanics	10
	PHY203	F5	Thermal Physics	10
	PHY204	F5	Solids	10
	PHY206	F5	Atomic Spectra and Relativity	10
	PHY226	F5	Mathematical Methods for Physics and Astronomy	10
(b)	a unit to the value of *ten* credits from the following			
	PHY230	F5	Experimental Physics 1	10
	PHY231	F5	Experimental Physics 2	10
(c)	units to the value of *sixty* credits from the following			
	PHI201	F5	Reference and Truth	20
	PHI202	F5	Philosophy of Mind	20
	PHI203	F5	Formal Logic	20
	PHI204/219	F5	Ethics: Theoretical and Practical	20
	PHI205	F5	Descartes and the Empiricists	20
	PHI208/220	F5	Political Philosophy	20
	PHI211	F5	Theory of Knowledge	20
	PHI212	F5	Philosophy of Art and Literature	20
	PHI216	F5	Feminism: Rationality and Politics	20
	PHI218	F5	The Rationalists	20
	PHI221	F5	Paradoxes	20
	PHI223	F5	Topics in Ancient Philosophy	20

Level 3

3. A candidate shall take

(a)	PHY205	F5	Electromagnetism	10
	PHY315	F7	Techniques of Problem Solving in Physics	10

(b) a unit to the value of *ten* credits from the following

PHY341	F6	Physics Project 1	10
PHY342	F6	Physics Project 2	10

(c) units to the value of *twenty* credits from the following

PHY303	F6	Nuclear Physics	10
PHY304	F6	Particle Physics	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY332	F6	Atomic and Laser Physics	10

(d) a unit to the value of *ten* credits from the following

PHY225	F5	Programming in C	10
PHY227	F5	Optics	10
PHY306	F6	Introduction to Cosmology	10
PHY309	F7	Further Quantum Mechanics	10
PHY313	F6	Mathematical Physics	10
PHY314	F6	Relativity and Cosmology	10
PHY320	F6	Nuclear Astrophysics	10
PHY323	F7	Dark Matter and the Universe	10
PHY324	F7	History of Astronomy	10
PHY333	F7	Statistical Physics	10

units listed at (c) above

(e) units to the value of *sixty* credits from the following

PHI302	F6	Metaphysics	20
PHI313	F6	Epistemology	20
PHI315	F6	Hegel	20
PHI320	F6	Pragmatism	20
PHI324	F6	Feminism: Rationality and Politics	20
PHI331	F6	Value Theory	20
PHI332	F6	Philosophy of Psychology	20
PHI335	F6	Philosophical Problems I	20
PHI337	F6	Methods of Analysis	20
PHI340	F6	Aristotle	20
PHI346	F6	Desires of One's Own	20
PHI349	F6	Philosophy of Mathematics	20
PHI355	F6	Philosophical Project 1	20
PHI356	F6	Philosophical Project 2	20
PHI357	F7	Images and Experiences	20
PHI360	F6	Political Philosophy in Practice	20
PHI361	F6	Film and Philosophy	20

PHYU16 THEORETICAL PHYSICS (MPhys) (JACS F321)

Level 1

1. A candidate shall take

(a)

MAS165	F4	Mathematics for Physicists	10
PHY101	F4	Mechanics, Vibrations and Waves	20
PHY102	F4	Quanta and Matter	20
PHY113	F4	Professional Skills in Physics I	10
PHY114	F4	Professional Skills in Physics II	10

(b) *one* of the following

(i)

PHY112	F4	Introductory Mathematics for Physicists and Astronomers	20

unrestricted units to the value of *thirty* credits

(ii) units to the value of *fifty* credits from

MAS100	F4	Mathematics with Maple	10
MAS101	F4	Probability, Sets and Complex Numbers	10
MAS103	F4	Differential and Difference Equations	10
MAS170	F4	Practical Calculus	10
MAS171	F4	Matrices and Geometry	10
PHY104	F4	Introduction to Astrophysics	10

Level 2

2. A candidate shall take

(a)

PHY202	F5	Quantum Mechanics	10
PHY203	F5	Thermal Physics	10
PHY204	F5	Solids	10
PHY205	F5	Electromagnetism	10
PHY206	F5	Atomic Spectra and Relativity	10
PHY207	F5	Numerical and Computational Physics	10
PHY221	F5	Topics In Classical Physics	10
PHY225	F5	Programming in C	10
PHY226	F5	Mathematical Methods for Physics and Astronomy	10
PHY227	F5	Optics	10

(b) units to the value of *twenty* credits from the following

MAS201	F5	Linear Mathematics for Applications	10
MAS202	F5	Advanced Calculus	10
MAS203	F5	Mechanics	10
MAS204	F5	Numerical Linear Algebra	10
MAS270	F5	Vectors and Fluids	10
MAS271	F5	Methods for Differential Equations	10
MPY205	F5	Aspects of Medical Imaging and Technology	10
PHY104	F4	Introduction to Astrophysics	10
PHY213	F5	Stellar Structure and Evolution	10
PHY216	F5	Galaxies	10
PHY229	F5	Extra-solar Planets and Astrobiology	10
PHY230	F5	Experimental Physics 1	10
PHY231	F5	Experimental Physics 2	10
PHY232	F5	The Dynamic Interstellar Medium	10
PHY240	F5	The Physics of Music	10

Level 3

3. A candidate shall take

(a)

PHY303	F6	Nuclear Physics	10
PHY304	F6	Particle Physics	10
PHY309	F7	Further Quantum Mechanics	10
PHY313	F6	Mathematical Physics	10
PHY315	F7	Techniques of Problem Solving in Physics	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY331	F6	Magnetism and Advanced Electrodynamics	10
PHY332	F6	Atomic and Laser Physics	10
PHY333	F7	Statistical Physics	10
PHY341	F6	Physics Project 1	10

(b) units to the value of *twenty* credits from the following

MAS310	F6	Continuum Mechanics	10
MAS320	F6	Fluid Mechanics 1	10
MAS321	F6	Numerical Solution of PDEs	10
MAS323	F6	Differential Equations: Case Study	10
MAS336	F6	Differential Geometry	10
PHY306	F6	Introduction to Cosmology	10
PHY314	F6	Relativity and Cosmology	10
PHY320	F6	Nuclear Astrophysics	10
PHY323	F7	Dark Matter and the Universe	10
PHY344	F6	Reading in Theoretical Physics 1	10

Level 4

4. A candidate shall take

(a)

PHY444	F7	Reading in Theoretical Physics II	10
PHY472	F7	Advanced Quantum Mechanics	10
PHY480	F7	Research Project in Physics and Astronomy	40

(b) units to the value of *sixty* credits from the following, not more than *twenty* being selected from (ii)

(i)

MAS422	F7	Magnetohydrodynamics	10
MAS411	F7	Topics in Advanced Fluid Mechanics	20
MAS412	F7	Analytical Dynamics and Classical Field Theory	20
PHY402	F7	Cosmic Origins	10
PHY410	F7	Physics of Semiconductors	10
PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY412	F7	Aspects of Modern Physics (Full Module)	20
PHY435	F7	Physics in Enterprise Culture	10
PHY436	F7	Aspects of Modern Physics A	10

F=Framework for Higher Education Qualifications (FHEQ) Level

	PHY461	F7	High Energy Astrophysics	10
	PHY466	F7	The Development of Particle Physics	10
	PHY469	F7	Physics of Soft Condensed Matter	10
	PHY475	F7	Optical Properties of Solids	10
	PMA416	F7	Optics and Symplectic Geometry	10
(ii)	MAS310	F6	Continuum Mechanics	10
	MAS320	F6	Fluid Mechanics 1	10
	MAS321	F6	Numerical Solution of PDEs	10
	MAS323	F6	Differential Equations: A Case Study	10
	MAS336	F6	Differential Geometry	10
	PHY306	F6	Introduction to Cosmology	10
	PHY314	F6	Relativity and Cosmology	10
	PHY320	F6	Nuclear Astrophysics	10
	PHY323	F7	Dark Matter and the Universe	10

5. A candidate must achieve a weighted mean grade of 59.5 *or* above at Level 1 in order to continue as a candidate for the Degree of MPhys in Theoretical Physics. A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01).

6. A candidate must satisfy the requirements of the General Regulations for First Degrees as to progression in order to continue as a candidate for the Degree of Mphys in Theoretical Physics (PHYU16). A candidate who fails to satisfy these requirements may be required by the Faculty to become instead a candidate for the Degree of BSc in Theoretical Physics (PHYU04).

PHYU18 PHYSICS WITH COMPUTER SCIENCE (BSc) (JACS F3G4)

Level 1

1. A candidate shall take the programme of study prescribed at Level 1 in the Regulations for the Degree of Mphys in Physics with Computer Science (PHYU19).

Level 2

2. A candidate shall take the programme of study prescribed at Level 2 in the Regulations for the Degree of Mphys in Physics with Computer Science (PHYU19).

Level 3

3. A candidate shall take the programme of study prescribed at Level 3 in the Regulations for the Degree of Mphys in Physics with Computer Science (PHYU19).

PHYU19 PHYSICS WITH COMPUTER SCIENCE (Mphys) (JACS F3GK)

Level 1

1. A candidate shall take

COM160	F4	Computer Problem Solving & Object Oriented Design	
MAS165	F4	Mathematics for Physicists	10
PHY101	F4	Mechanics, Vibrations and Waves	20
PHY102	F4	Quanta and Matter	20
PHY112	F4	Introductory Mathematics for Physicists and Astronomers	20
PHY113	F4	Professional Skills in Physics I	10
PHY114	F4	Professional Skills in Physics II	10

unrestricted units to the value of *ten* credits.

Level 2

2. A candidate shall take

COM165	F4	Computer Systems Architectures	10
COM166	F4	Computer Network Technologies	10
PHY202	F5	Quantum Mechanics	10
PHY203	F5	Thermal Physics	10
PHY204	F5	Solids	10
PHY205	F5	Electromagnetism	10
PHY206	F5	Atomic Spectra and Relativity	10
PHY221	F5	Topics in Classical Physics	10
PHY225	F5	Programming in C	10
PHY226	F5	Mathematical Methods for Physics and Astronomy	10
PHY227	F5	Optics	10
PHY231	F5	Experimental Physics II	10

Level 3

3. A candidate shall take

(a)	COM262	F5	Data Structures and Algorithms	10
	COM3001	F6	Modelling and Simulation of Natural Systems	10
	PHY207	F5	Numerical and Computational Physics	10
	PHY303	F6	Nuclear Physics	10
	PHY304	F6	Particle Physics	10
	PHY315	F7	Techniques of Problem Solving in Physics	10
	PHY330	F6	Metals, Semiconductors and Insulators	10
	PHY331	F6	Magnetism and Advanced Electrodynamics	10
	PHY332	F6	Atomic and Laser Physics	10
	PHY342	F6	Physics Project 2	10

(b) units to the value of *twenty* credits from the following

PHY306	F6	Introduction to Cosmology	10
PHY313	F6	Mathematical Physics	10
PHY314	F6	Relativity and Cosmology	10
PHY320	F6	Nuclear Astrophysics	10
PHY323	F7	Dark Matter and the Universe	10

Level 4

4. A candidate shall take

(a)	PHY309	F7	Further Quantum Mechanics	10
	PHY333	F7	Statistical Physics	10
	PHY480	F7	Research Project in Physics and Astronomy	40

(b) units to the value of *sixty* credits from the following

COM4502	F7	Speech Processing	15
COM4508	F7	Introduction to Computational Systems Biology	15
COM4509	F7	Machine Learning and Adaptive Intelligence	15
PHY402	F7	Cosmic Origins	10
PHY408	F7	Literature Search in Physics	10
PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY412	F7	Aspects of Modern Physics (Full Module)	20
PHY435	F7	Physics in an Enterprise Culture	10
PHY466	F7	The Development of Particle Physics	10
PHY469	F7	Physics of Soft Condensed Matter	10
PHY472	F7	Advanced Quantum Mechanics	10
PHY475	F7	Optical Properties of Solids	10

a unit to the value of *ten* credits from 3(b) above.

5. A candidate must satisfy the requirements of the General Regulations for First Degrees as to progression in order to continue as a candidate for the Degree of MPhys in Physics with Computer Science (PHYU19). A candidate who fails to satisfy these requirements may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics with Computer Science (PHYU18).

PHYU22 PHYSICS WITH STUDY IN EUROPE (BSc) (JACS F302)

Level 2

2. A candidate shall take

(a)

PHY202	F5	Quantum Mechanics	10
PHY203	F5	Thermal Physics	10
PHY204	F5	Solids	10
PHY205	F5	Electromagnetism	10
PHY206	F5	Atomic Spectra and Relativity	10
PHY221	F5	Topics in Classical Physics	10
PHY226	F5	Mathematical Methods for Physics and Astronomy	10
PHY227	F5	Optics	10
PHY230	F5	Experimental Physics I	10
PHY231	F5	Experimental Physics II	10

(b) *one* of the following

(i) (GCSE Language Stream)
a unit to the value of *ten* credits from the following

MLT260I	F5	French 3A	10
MLT262I	F5	Spanish 3A	10
MLT264I	F5	German 3A	10

a unit to the value of *ten* credits from the following

MLT221I	F5	French Placement Preparation	10
MLT222I	F5	German Placement Preparation	10
MLT223I	F5	Spanish Placement Preparation	10

(ii) (A-level Language Stream)
a unit to the value of *ten* credits from the following

MLT310	F5	French 4A	10
MLT312	F5	Spanish 4A	10
MLT314	F5	German 4A	10

a unit to the value of *ten* credits from the following

MLT221I	F5	French Placement Preparation	10
MLT222I	F5	German Placement Preparation	10
MLT223I	F5	Spanish Placement Preparation	10

Level 3

3. A candidate shall take

(a)

PHY303	F6	Nuclear Physics	10
PHY304	F6	Particle Physics	10
PHY315	F7	Techniques of Problem Solving in Physics	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY331	F6	Magnetism and Advanced Electrodynamics	10
PHY332	F6	Atomic and Laser Physics	10
PHY341	F6	Physics Project 1	10
PHY343	F6	Group Project in Physics	10

(b) units to the value of *forty* credits from the following

PHY207	F5	Numerical and Computational Physics	10
PHY225	F5	Programming in C	10
PHY309	F7	Further Quantum Mechanics	10
PHY313	F6	Mathematical Physics	10
PHY314	F6	Relativity and Cosmology	10
PHY320	F6	Nuclear Astrophysics	10
PHY323	F7	Dark Matter and the Universe	10
PHY333	F7	Statistical Physics	10
PHY410	F7	Physics of Semiconductors	10
PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY412	F7	Aspects of Modern Physics (Full Module)	20
PHY435	F7	Physics in an Enterprise Culture	10

F7 Level MLT units to the value of *twenty* credits

4. A candidate must satisfy the requirements of the General Regulations for First Degrees as to progression in order to continue as a candidate for the Degree of BSc in Physics with Study in Europe. A candidate who fails to satisfy these requirements may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01).A candidate must achieve a minimum of *eighty* MLT credits in order to be considered for the award of the Degree of BSc in Physics with Study in Europe.

5. Before proceeding to the final year a candidate shall spend one session in an appropriate country in attendance as a full-time student at a university *or* other approved institution, the arrangements being subject to the approval of the Head of Department. During this period the candidate shall undertake studies at the host institution and any other work prescribed by the Head of Department, which shall carry the value of *one hundred and twenty* credits including *twenty* credits from the MLTC year abroad units (codes MLT330H/MLT331H/MLT303H/MLT302H/MLT304H). A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01).

PHYU23 PHYSICS WITH STUDY IN NORTH AMERICA (MPhys) (JACS F304)

Level 1

1. A candidate shall take the programme of study prescribed at Level 1 in the Regulations for the Degree of MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

Level 2

2. A candidate shall take the programme of study prescribed at Level 2 in the Regulations for the Degree of MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

Level 3

3. A candidate shall take an approved programme of study at an institution in North America (PHYU23).

During this period the candidate shall undertake programmes of study and attain a standard deemed satisfactory by the Faculty taken in the host institution which shall carry the value of *one hundred and twenty* credits. A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01) *or* BSc in Theoretical Physics (PHYU04).

Level 4

4. A candidate shall take

(a)

PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY480	F7	Research Project in Physics and Astronomy	40

(b) units to the value of *seventy* credits from the following, not more than *thirty* to be selected from (ii)

(i)

PHY402	F7	Cosmic Origins	10
PHY403	F7	Advanced Statistical Physics	10
PHY408	F7	Literature Search in Physics	10
PHY410	F7	Physics of Semiconductors	10
PHY435	F7	Physics in an Enterprise Culture	10
PHY436	F7	Aspects of Modern Physics: A	10
PHY461	F7	High Energy Astrophysics	10
PHY466	F7	Development of Particle Physics	10
PHY469	F7	Physics of Soft Condensed Matter	10
PHY472	F7	Advanced Quantum Mechanics	10
PHY475	F7	Optical Properties of Solids	10

(ii)

PHY303	F6	Nuclear Physics	10
PHY304	F6	Particle Physics	10
PHY306	F6	Introduction to Cosmology	10
PHY309	F7	Further Quantum Mechanics	10
PHY313	F6	Mathematical Physics	10
PHY314	F6	Relativity and Cosmology	10
PHY320	F6	Nuclear Astrophysics	10
PHY323	F7	Dark Matter and the Universe	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY331	F6	Magnetism and Advanced Electrodynamics	10
PHY332	F6	Atomic and Laser Physics	10
PHY333	F7	Statistical Physics	10

5. A candidate must achieve a weighted mean grade of 54.5 *or* above at Level 1 in order to continue as a candidate for the Degree of MPhys in Physics with Study in North America (PHYU23). A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

6. A candidate must achieve a weighted mean grade of 59.5 *or* above at Level 2 in order to continue as a candidate for the Degree of MPhys in Physics with Study in North America (PHYU23). A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01) *or* BSc in Theoretical Physics (PHYU04). A candidate with a weighted mean grade between 54.5 and 59.5 may alternatively be permitted to transfer to MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

7. For candidates whose initial registration is for the session 2005-06 *or* later, grades awarded in respect of units listed at 3 above shall carry the same weight as grades awarded at Level 2.

PHYU24 PHYSICS WITH STUDY IN AUSTRALASIA (MPhys) (JACS F305)

Level 1

1. A candidate shall take the programme of study prescribed at Level 1 in the Regulations for the Degree of MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

Level 2

2. A candidate shall take the programme of study prescribed at Level 2 in the Regulations for the Degree of MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

Level 3

3. A candidate shall take an approved programme of study at an institution in Australasia (PHYU24).

   During this period the candidate shall undertake courses of study and attain a standard deemed satisfactory by the Faculty taken in the host institution which shall carry the value of *one hundred and twenty* credits. A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01) *or* BSc in Theoretical Physics (PHYU04).

Level 4

4. A candidate shall take

(a)

PHY411	F7	Aspects of Modern Physics (Half Module)	10
PHY480	F7	Research Project in Physics and Astronomy	40

(b) units to the value of *seventy* credits from the following, not more than *thirty* to be selected from (ii)

(i)

PHY402	F7	Cosmic Origins	10
PHY408	F7	Literature Search in Physics	10
PHY410	F7	Physics of Semiconductors	10
PHY435	F7	Physics in an Enterprise Culture	10
PHY461	F7	High Energy Astrophysics	10
PHY466	F7	Development of Particle Physics	10
PHY469	F7	Physics of Soft Condensed Matter	10
PHY472	F7	Advanced Quantum Mechanics	10
PHY475	F7	Optical Properties of Solids	10

(ii)

PHY303	F6	Nuclear Physics	10
PHY304	F6	Particle Physics	10
PHY306	F6	Introduction to Cosmology	10
PHY309	F7	Further Quantum Mechanics	10
PHY313	F6	Mathematical Physics	10
PHY314	F6	Relativity and Cosmology	10
PHY320	F6	Nuclear Astrophysics	10
PHY323	F7	Dark Matter and the Universe	10
PHY330	F6	Metals, Semiconductors and Insulators	10
PHY331	F6	Magnetism and Advanced Electrodynamics	10
PHY332	F6	Atomic and Laser Physics	10
PHY333	F7	Statistical Physics	10

5. A candidate must achieve a weighted mean grade of 54.5 *or* above at Level 1 in order to continue as a candidate for the Degree of MPhys in Physics with Study in Australasia (PHYU24). A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

6. A candidate must achieve a weighted mean grade of 59.5 *or* above at Level 2 in order to continue as a candidate for the Degree of MPhys in Physics with Study in Australasia (PHYU24). A candidate who fails to satisfy this requirement may be required by the Faculty to become instead a candidate for the Degree of BSc in Physics (PHYU01) *or* BSc in Theoretical Physics (PHYU04). A candidate with a weighted mean grade between 54.5 and 59.5 may alternatively be permitted to transfer to MPhys in Physics (PHYU02) *or* MPhys in Theoretical Physics (PHYU16).

7. For candidates whose initial registration is for the session 2005-06 *or* later, grades awarded in respect of units listed at 3 above shall carry the same weight as grades awarded at Level 2.