BSC (HONS) PHYSICS

Overview

NFQ Level 8, Major Award

Students may enter Second Science from the First Science Area of Study Physics and Astrophysics (CK408 (https://ucc-ie-public.courseleaf.com/programmes/bscpy/)), and may proceed to a BSc Single Honours Degree in Astrophysics, Science Education (Physics Route only) (for students who entered **prior to 2023/24**) or Physics, or a Joint Honours Degree in Mathematical Sciences and Physics.

BSc Single Honours Degree

To progress to **Second Science Single Honours Physics** students must have passed the First Science Examination overall.

Students registered for the BSc Single Honours Degree in Physics may re-register for the **BSc Single Honours in Astrophysics** programme (or vice versa) at the end of their First or Second Years, subject to having passed the First Science Examination overall.

Students in the **Physics and Astrophysics Area of Study (CK408 (https://ucc-ie-public.courseleaf.com/programmes/bscpy/))** wishing to proceed to the *Chemical Physics* degree programme must have taken either CM1006 (10 credits) or CM1007 (15 credits) from the list of electives for CK408 and passed First Science in order to be eligible for entering the *Chemical Physics* degree programme.

BSc Joint Honours

Students in the **Physics and Astrophysics Area of Study (CK408 (https://ucc-ie-public.courseleaf.com/programmes/bscpy/))** who have passed First Science are eligible to enter the Joint Honours programme in *Mathematical Sciences and Physics*.

Students from the **Mathematical Sciences Area of Study (CK407 (https://ucc-ie-public.courseleaf.com/programmes/bscms/))** who have taken the Physics modules PY1052 and PY1053 in First Science, and who pass First Science, will be eligible to enter the Joint Honours programme in *Mathematical Sciences and Physics*.

The programme structures for Physics are shown in Table 7.

Table 7 - Physics

First Science	Second Science	Third Science	Fourth Science
CK408:			
		Physics	Physics
PY + AM + MA + AM/CM/CS/MA/PY/ST/BL	PY (40 credits) + AM (10 credits) + MA/AM/CM (10 credits)	PY (40 credits) + AM (20 credits)	PY (60 credits)
		or	or
		Astrophysics	Astrophysics
		PY (45 credits)	PY (60 credits)
		AM (15 credits)	
BSc Joint Honours			
CK408:			
PY + AM + MA + ST	PY (30 credits) + AM (25 credits) + MA (5 credits)	PY (30 credits) + AM (30 credits)	PY (30 credits) + AM (30 credits)
	or	or	
	PY (30 credits) + AM (10 credits) + MA (20 credits)	PY (30 credits) + MA (30 credits)	PY (30 credits) + MA/MF (30 credits)

BSc Single Honours - Physics or Astrophysics

Notes :

1. At most 35 credits can be taken in any one Semester.
2. The substitution of taught modules by Project modules requires special permission from the Head of the Department.
3. Other Elective modules may be selected from outside the Physics Department with the approval of the Head of Department.
4. Individual elective modules may occasionally not be offered in some calendar years.

Examinations
Single Honours

Students who pass the Third University Examination and qualify to proceed into Fourth Science may opt instead to be conferred with a BSc Ordinary Degree.

Students who pass the Third University Examination in Science, but do not qualify to proceed into Fourth Science will be awarded a BSc Ordinary Degree.

Joint Honours

Students who pass the Third University Examination in Science (Physics) and who qualify to proceed into Fourth Science may opt instead to be conferred with a BSc Ordinary degree.

The Fourth Science Research Project **must** be passed for the award of a BSc (Hons) Degree. There is no Autumn Supplemental Examination in the Research Project module which, if failed, must be repeated in a repeat year.

BSc Ordinary Degree - NFQ Level 7, Major Award

Students who pass Third Year may choose not to proceed to Fourth Year and may opt instead to be conferred with a BSc Ordinary Degree (https://ucc-ie-public.courseleaf.com/programmes/bscpas/).

Programme Requirements

For information about modules, module choice, options and credit weightings, please go to Programme Requirements (p. 1).

Programme Requirements

Code	Title	Credits
Year 1		
Students take **60** credits from one of the following Options:		
Option 1		
Students take **60** credits as follows - all listed core modules (**40** credits) and **20** credits of elective modules:		
Core Modules		
AM1052	Introduction to Mechanics	5
PY1052	Introductory Physics I	10
PY1053	Introductory Physics II	10
MA1011	Mathematical Methods I	5
MA1012	Mathematical Methods II	5

ST1051	Introduction to Probability and Statistics	5

Elective Modules

Students take modules to the value of **20** credits from the following:		20
AM1053	Introduction to Mathematical Modelling	5
AM1054	Mathematical Software	5
BL1002	Cells, Biomolecules, Genetics and Evolution	5
BL1004	Physiology and Structure of Plants and Animals	5
BL1006	Habitats and Ecosystems	5
CM1006	Introduction to Chemistry for Physicists and Mathematicians	10
CM1007	Introduction to Chemistry for Physicists	15
CS1061	Programming in C	5
CS1065	Computer Applications Programming	5
CS1068	Introductory Programming in Python	5
MA1057	Introduction to Abstract Algebra	5
PY1054	Special Topics in Physics	5
ST1050	Statistical Programming in R	5

Option 2

Students take **60** credits as follows - all listed core modules (**45** credits) and **15** credits of elective modules:

Core Modules

PY1052	Introductory Physics I	10
PY1053	Introductory Physics II	10
AM1052	Introduction to Mechanics	5
MA1058	Introduction to Linear Algebra	5
MA1059	Calculus	5
MA1060	Introduction to Analysis	5
ST1051	Introduction to Probability and Statistics	5

Elective Modules

Students take modules to the value of **15** credits from the following:		15
AM1053	Introduction to Mathematical Modelling	
AM1054	Mathematical Software	
BL1002	Cells, Biomolecules, Genetics and Evolution	
BL1004	Physiology and Structure of Plants and Animals	
BL1006	Habitats and Ecosystems	
CM1006	Introduction to Chemistry for Physicists and Mathematicians	
CM1007	Introduction to Chemistry for Physicists	
CS1061	Programming in C	
CS1065	Computer Applications Programming	
CS1068	Introductory Programming in Python	
MA1057	Introduction to Abstract Algebra	
PY1054	Special Topics in Physics	
ST1050	Statistical Programming in R	

*Option 3 (for students who entered **prior to 2023/24**)*

Students take **60** credits as follows – all listed core modules (**50** credits) and **10** credits of elective modules:

Core Modules

PY1052	Introductory Physics I	10
PY1053	Introductory Physics II	10
MA1058	Introduction to Linear Algebra	5
MA1059	Calculus	5
MA1060	Introduction to Analysis	5

CM1007	Introduction to Chemistry for Physicists	15

Elective Modules

Students take modules to the value of **10** credits from the following:		10
BL1002	Cells, Biomolecules, Genetics and Evolution	
BL1004	Physiology and Structure of Plants and Animals	
BL1006	Habitats and Ecosystems	

Year 2

Physics

Students take 60 credits as follows - all listed core modules (**55** credits) and **5** credits of elective modules:

Core Modules

PY2101	Classical Mechanics	5
PY2102	Introduction to Quantum Physics	5
PY2103	Electrostatics and Magnetostatics	5
PY2104	Introduction to Thermodynamics and Statistical Physics	5
PY2105	Introduction to Computational Physics	5
PY2106	Introduction to Astrophysics and Special Relativity	5
PY2107	Experimental Physics I	5
PY2108	Experimental Methods I	5

Applied Mathematics

AM2060	Object Oriented Programming with Applications	5
AM2071	Fourier Methods	5

Mathematics

MA2071		

Elective Modules

Students take modules to the value of **5** credits from the following:		5
AM2052	Mathematical Modelling (5)	
MA2054	Ordinary Differential Equations (5)	
MA2055	Linear Algebra (5)	
CM2003	Energetics and Kinetics (5)	
CM2004	States of Matter (5)	

Year 3

Physics

Students take 60 credits as follows - all listed core modules (**50** credits) and **10** credits of elective modules:

Core Modules

PY3101	Optics	5
PY3102	Quantum Mechanics	5
PY3103	Electromagnetism	5
PY3104	Statistical Thermodynamics	5
PY3105	Introduction to Condensed Matter Physics	5
PY3106	Nuclear and Particle Physics	5
PY3107	Experimental Physics II	5
PY3108	Experimental Methods II	5

Minors

AM2061	Computer Modelling and Numerical Techniques	5
AM3051	Vector and Tensor Methods	5

Elective Modules

Students take modules to the value of **10** credits from the following:		10
AM3052	Introduction to Fluid Mechanics and Wave Theories (5)	
AM3062	Optimisation and the Calculus of Variations (5) [1]	

AM3064	Computational Techniques (5)	
PY3109	Observational Astrophysics (5)	

Year 4

Physics

Students take 60 credits as follows - all listed core modules (**10 credits**) and **50 credits** of elective modules:

Core Modules

PY4115	Research Project	10

Elective Modules

Students take modules to the value of **50 credits** from the following: 50

AM3052	Introduction to Fluid Mechanics and Wave Theories (5)	
AM3062	Optimisation and the Calculus of Variations (5) [1]	
PY4102	Advanced Quantum Mechanics (5)	
PY4103	Advanced Electromagnetism (5)	
PY4104	Advanced Condensed Matter Physics (5)	
PY4105	Atomic and Molecular Physics (5)	
PY4106	Relativistic Quantum Theory (5)	
PY4108	Introduction to Lasers and Photonics (5)	
PY4109	Advanced Computational Physics (5)	
PY4110	Stars and the Interstellar Medium (5)	
PY4111	Galactic and Extragalactic Astrophysics (5)	
PY4112	Gravitation and Cosmology (5)	
PY4113	Experimental Physics III (5)	
PY4117	Quantum Optics (5)	
PY4118	Physics of Semiconductor Devices (5)	

[1] If AM3062 is not taken in Third Science then it must be taken in Fourth Science.

Examinations

Full details and regulations governing Examinations for each programme will be contained in the *Marks and Standards Book* and for each module in the *Book of Modules*.

Programme Learning Outcomes

Programme Learning Outcomes for BSc in Physics (NFQ Level 8, Major Award)

On successful completion of this programme, students should be able to:

- Derive and apply solutions from knowledge of physics and mathematics;
- Identify, formulate, analyse and solve physics problems;
- Design an experiment to test a hypothesis or theory in physics;
- Prepare written laboratory reports that provide a description of the experiment, explain the experiment and reasoning clearly, and provide an appropriate conclusion;
- Communicate effectively with the physics community.