

Title of Programme: MPhys (Hons) Physics and Astrophysics

Programme Code: PMMPHY

Programme Specification

This programme specification is relevant to students entering:
01 September 2023

Associate Dean of School (Academic Quality Assurance):
Mariana Lilley



A programme specification is a collection of key information about a programme of study (or course). It identifies the aims and learning outcomes of the programme, lists the modules that make up each stage (or year) of the programme, and the teaching, learning and assessment methods used by teaching staff. It also describes the structure of the programme, its progression requirements and any programme-specific regulations. This information is therefore useful to potential students to help them choose the right programme of study, to current students on the programme, and to staff teaching and administering the programme.

Summary of amendments to the programme:

Section	Amendment
D	4PAM2006 Mathematical Methods (Semester A) and 4PAM2016 Applications of Calculus (Semester B) replace 4PAM1034.
D	4PAM2018 Computational Modeling replaces 4PAM1070.
D	5ENT1014 Aerothermodynamics phased out (last run in the academic session 2021-22).
D	6PAM1027 Further Numerical Methods will not be offered in the 2023-24 academic session.
D	Programming 5PAM2016 replaces Programming 5PAM1023.
D	Motion and Tensors 5PAM2018 replaces Motion and Tensors 5PAM1053.
D	Professional Teaching Skills 5PAM2017 replaces Professional Teaching Skills 5PAM1025.

D	Numerical Methods 5PAM2022 replaces Numerical Methods 5PAM1029.
D	Differential Equations 5PAM2015 replaces Differential Equations 5PAM1032.
D	Aerospace Aerodynamics 7ENT1139 replaces Aerospace Aerodynamics 7ENT1111 .
D	MRI Science and Principles 7HSK0101 and CT Science and Principles 7HSK0102 not running in 2023/24.
D	CFD and Applications 7ENT1133 replaces CFD Techniques 7ENT1007.

If you have any queries regarding the changes please email AQO@herts.ac.uk

Programme Specification MPhys Physics and Astrophysics

This programme specification (PS) is designed for prospective students, enrolled students, academic staff and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs) and Module Guides.

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	College Lane, Bayfordbury Observatory
Programme accredited by	Institute of Physics (IOP)
Final Qualification	MPhys (Hons)
All Final Award titles	
(Qualification and Subject)	MPhys (Hons) Astrophysics MPhys (Hons) Astrophysics with Space Science MPhys (Hons) Physics MPhys (Hons) Physics with Space Science

Note: All awards listed above are available with an optional Sandwich award, or Study Aboard or Year Abroad

FHEQ level of award 7

A. Programme Rationale

The MPhys Physics and Astrophysics programme aims to train physicists and astrophysicists to a level commensurate with the requirements of the profession and to gain the relevant research skills required for further study. The modules are designed to reflect the importance of fundamental concepts and ideas that underpin the physical sciences. They aim to instil in the student an appreciation of the beauty of the physical world and the remarkable success that analytical, observational and experimental techniques have achieved in predicting and explaining its behaviour. Emphasis is placed on practical work in the laboratories, at the observatory and in computer suites.

The MPhys programmes allow students to study physics or astrophysics to a greater depth and breadth than possible within the BSc programmes. They provide a unified, coherent and broadly-based training in physics or astrophysics, and aim to give students a greater understanding and appreciation of the subject enabling them to work in academic or industrial research.

The University has a proud history in Space Science and has developed close links to the national and international space industry e.g. Goonhilly Earth Station (GES), Airbus Defence and Space (in Stevenage), the UK Space Agency, NASA, and Earth Observation companies. Students access a range of exciting placement and project opportunities, and those on the Space Science degrees will go on a week long field trip to GES to obtain hands-on experience with its deep space communication facilities, and training in mission operations. In addition the University Observatory at Bayfordbury is one of the best astronomical teaching observatories in the UK, and hosts to a suite of space science instrumentation (observing and measuring the atmosphere) for research and project work.

The programme endeavours to recruit students with a genuine enthusiasm and interest in the subject area. It seeks to foster a creative spirit in students to help them fulfil their potential, to become creative scientists and

to become successful in a wide range of graduate professions where logical and analytical thinking is required.

The common level 4 studies and other core elements, reflect the belief that there is a backbone of physical theory and supporting mathematics which must underpin the whole programme. The final year project tests a wide variety of skills and brings together various aspects of the course.

Communication skills are addressed directly within the programme through compulsory modules at levels 4, 5 and 6 and are continually supported by requirements for written coursework, individual and teamwork and a substantial level 7 project. In particular, electronic communication is introduced at the outset and is used thereafter both in the taught modules and projects. At level 5 students have to choose one of two modules that address professional issues relevant to a professional career. One module is aimed at career physicists whilst the other is tailored specifically to the teaching of physics and mathematics in schools.

B. Educational Aims of the Programme

The programme has been devised in accordance with the University's graduate attributes of programmes of study as set out in [UPR TL03](#).

Additionally this programme aims to:

- offer an education and training based on the core requirements of the Institute of Physics that is suited to the abilities and career aspirations of students and which, by offering choices of study path, will help them realise their own potential and provide the opportunity for postgraduate work in physics and astrophysics.
- offer a stimulating and supportive environment which encourages students to be critically receptive to new ideas
- offer potential postgraduate students a platform which will enable them to embark upon further study in areas such as physics, astrophysics and other related disciplines
- develop competence in communicating scientific results to other experts and to non-specialists, including the use of computers and software packages for information retrieval and presentation;
- develop the ability to approach problem-solving activities using physical insight and laboratory/observatory skills aided where appropriate, by computer-based techniques.
- develop students' project-working skills and attributes to a level suitable for entry to postgraduate research degrees.

C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced to the QAA benchmark statements for Physics, Astronomy and Astrophysics and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014) and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education (2021) have been used as a guiding framework for curriculum design.

Knowledge and Understanding

**Teaching and learning
methods**

Assessment strategy

<p>A1. Demonstrate knowledge and understanding of the fundamental concepts, ideas and theories of Physics and Astrophysics;</p>	<p>Acquisition of knowledge and understanding is through a combination of lectures, workshops, problem-based learning, electronic resources, small group tutorials, coursework, directed study, feedback from assessment and practical work at each level, together with an investigation undertaken at level 6 (A1-A3).</p>	<p>Knowledge and understanding are assessed through a combination of unseen examinations (A1, A2), practical examinations (A2, A3), in-course assessments (A1-A3) in the form of laboratory reports and logbooks (A2, A3), class tests (A1, A2), coursework assignments (A1-A4), project report (A1-A4), oral and poster presentation (A1-A4).</p>
<p>A2. Demonstrate knowledge and understanding of the mathematical and computational techniques used to frame and solve physical problems;</p>	<p>Acquisition of A4 takes place predominantly during Level 7 of the MPhys programmes and is developed across a wide range of modules, including the project, as well as more standard taught units undertaken at the university.</p>	
<p>A3. Demonstrate knowledge and understanding of the techniques of practical work in Physics;</p>	<p>Throughout, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.</p>	
<p>A4. Demonstrate knowledge and understanding of the techniques of practical work in Astrophysics;</p>	<p>Additional support is provided by StudyNet, the Mathematics Drop-In Centre and the in the case of level 4, personal tutors.</p>	
<p>A5. Demonstrate knowledge and understanding of selected recent developments within some current research areas of physics, building upon the knowledge and understanding acquired through points A1-3 above</p>		
<p>A6. Demonstrate knowledge and understanding of selected recent developments within some current research areas of space science, building upon the knowledge and understanding acquired through points A1-3 above</p>		
Intellectual skills	Teaching and learning methods	Assessment strategy
<p>B1. Formulate and tackle problems in physics and astrophysics; to advanced levels in physics for the Physics award, and to advanced levels in astrophysics for the Astrophysics awards;</p>	<p>Intellectual skills are developed through the programme by the methods and strategies outlined in section A above. Learning Outcomes B1-B3 are developed through tutorial exercises, workshops, coursework, group-work, laboratory or observatory work and project work.</p>	<p>Intellectual skills are assessed through a combination of unseen examinations (B1, B3), practical examinations (B3), assessed individual in-course assignments (B1-B5), laboratory/observatory reports (B2), workbooks and logbooks (B1-B3), class tests (B1,B3), presentations (B1-B3) and final year project report (B1-B5).</p>
<p>B2. Plan, execute and report the results of an experiment or an investigation; to advanced levels in physics for the Physics award, and to advanced levels in astrophysics for the Astrophysics awards;</p>	<p>B4 is developed primarily within the mathematics, computing and project module.</p>	<p>B7 is assessed by written/verbal reports from the student, the placement organisation and the placement tutor.</p>
<p>B3. Use mathematics and computing to describe the</p>	<p>The cognitive development leading to B5 takes place mainly at Level 7.</p>	

<p>physical world or an investigation;</p> <p>B4. Discuss critically the role of numerical modeling, uncertainty and approximations in physics;</p> <p>B5. Critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), make judgments, and frame appropriate questions to achieve a solution or identify a range of solutions to a problem.</p> <p>B6. Plan, execute and report the results of an experiment or an investigation; to advanced levels in space science for the space science awards</p> <p>And in the case of Sandwich students:</p> <p>B7. Obtain significant practical experience of working in a suitable environment, alongside professionals or others engaged in scientific or commercial work.</p> <p>And in the case of students studying abroad:</p> <p>B8. Obtain significant practical experience of studying in a foreign country.</p>	<p>Acquisition of Learning Outcome B7 is through a professional placement in a suitable scientific or commercial organisation.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study</p>	<p>B8 is assessed through relevant modules studied at an overseas institution.</p>
<p>Practical skills</p>	<p>Teaching and learning methods</p>	<p>Assessment strategy</p>
<p>C1. Perform experimental work and draw conclusions;</p> <p>C2. Apply appropriate analytical and modelling techniques to physical problems;</p> <p>C3. Produce clear and accurate scientific reports on complex topics, and prepare and give technical presentations;</p> <p>C4. Make appropriate and effective use of scientific literature, such as textbooks and refereed research articles.</p>	<p>Practical skills are developed through a series of laboratory classes at levels 4 to 5 (C1, C2) and a level 6 project (C2) and Level 7 project. C3 and C4 are developed through a number of modules at Level 7.</p> <p>Throughout, the learner is expected to consolidate their development of practical computing skills by use of appropriate personal computers available in the learning resources centre.</p>	<p>Practical skills are assessed through laboratory reports (C1) and coursework and assignments (C1, C2).</p> <p>C3 and C4 are assessed during the project and also some option modules at Level 7 that require students to research and write a technical review on an aspect of physics.</p>
<p>Transferable skills</p>	<p>Teaching and learning methods</p>	<p>Assessment strategy</p>

D1. Communicate effectively, both orally and in writing;	Transferable skills are developed through problem solving workshops and group presentations (D1-D3), individual assignments (D1, D3), writing practical reports (D1) and project work (D1-D4).	Transferable skills are assessed through a combination of group presentations (D1-D3), individual assignments (D1, D3), written practical reports (D1-D3), project posters and reports) (D1-D4).
D2. Work effectively in a team;		
D3. Demonstrate time, personal management and IT skills.	Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.	
D4. Retrieve, synthesize and evaluate information and data from a variety of sources.		

D. Programme Structures, Features, Levels, Modules, and Credits

The programme is offered in full-time (4 years), sandwich/year abroad (5 years) and part-time (8 years) modes, and leads to the award of a:

1. MPhys Degree in Physics
2. MPhys Degree in Astrophysics
3. MPhys Degree in Physics with Space Science
4. MPhys Degree in Astrophysics with Space Science

In addition, the BSc (Hons) degrees in the above subjects are available as an exit award after three years of study.

Entry is normally at level 4 (with suitable A-level or equivalent qualifications), but is possible at level 5 or 6 with suitable qualifications (e.g. successful completion of relevant studies at the correct level at another institution). Intake is normally semester A (September).

Professional and Statutory Regulatory Bodies

The MPhys Physics and Astrophysics awards are accredited by the Institute of Physics and graduates may apply for associate membership of the society.

Work-Based Learning, including Sandwich Programmes

An award in the sandwich mode is made if at least 30 weeks of approved, supervised work experience is undertaken in addition to the period required for full-time award, please refer to [UPR AS11](#).

Student Exchange programme

Incoming Exchange

N/A

Study Abroad

An award in the “Year Abroad” mode is made to a student who has successfully completed the requirements for a full-time BSc award, and also successfully completed a two-semester programme of study at a partner institution in a non-UK country, as organised and approved by the University’s Study Abroad Office. The Year Abroad typically occurs between Level 5 and Level 6 of the programme and typically takes place over Semester A and Semester B.

The programme of study for the Year Abroad mode will be negotiated and approved by the Study Abroad Office in consultation with appropriate others, such as the Programme Leader (or equivalent) and the appropriate representative at the hosting institution. The programme provided by the host institution may

consist of (for example): taught modules, a research project, field studies, or a mixture of these components. Prior to starting the Year Abroad, the student and programme officers from UH and the host institution.

Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the Honours award. Any interim awards are identified in Table 1b. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure

MPhys (Hons) Physics

Mode of study Full Time/Part Time

Entry point Semester A

Level 4

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Experimental Physics	4PAM1068	15	0	100	0	A
Mathematical Methods	4PAM2006	15	30	70	0	A
The Physical Universe	4PAM1013	30	60	40	0	AB
Special Relativity and Quantum Physics	4PAM1066	30	60	40	0	AB
Small Group Tutorial (Level 4)	4PAM1072	0	0	100	0	AB
Applications of Calculus	4PAM2016	15	30	70	0	B
Computational Modelling	4PAM2018	15	0	100	0	B

If a Level 4 student (FT or PT) is not progressing into Level 5, then the module status code for 4PAM1072 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

Level 5

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Multivariable Calculus	5PAM2012	15	60	40	0	A
Programming*	5PAM2016	15	0	100	0	A
Professional Teaching Skills*	5PAM2017	15	0	100	0	A
Electromagnetism	5PAM1044	15	0	100	0	A
Career Planning and Development	5PAM1049	0	0	100	0	A
Small Group Tutorial (Level 5)	5PAM1048	0	0	100	0	AB

Optics and Lasers	5PAM1045	15	60	40	0	B
Thermodynamics	5PAM1046	15	0	100	0	B
Quantum Mechanics	5PAM2025	15	40	60	0	B

* One or both of these two

If a Level 5 student (FT or PT) is not progressing into Level 6, then the module status code for 5PAM1048 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules (choose 30 or 15 credits)						
Module Title						
Physics of the Solar System	5PAM1050	15	0	100	0	A
Motion and Tensors	5PAM2018	15	60	40	0	A
Numerical Methods	5PAM2022	15	60	40	0	B
Differential Equations	5PAM2015	15	60	40	0	B
Extra-solar Planets	5PAM1051	15	60	40	0	B
Plasma Physics and Fusion Reactors	5PAM1052	15	70	30	0	B

Optional year for Professional Placement, Year Abroad, or Placement with Study Abroad

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Professional Placement	6PAM0011	0	0	P/F	0	AB
Year Abroad	6PAM0030	0	0	P/F	0	AB
Placement with Study Abroad	6PAM1033	0	0	P/F	0	AB

Level 6

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Condensed States of Matter	6PAM1050	15	60	40	0	A
Physics Project and Investigative Skills	6PAM1052	30	0	100	0	AB
The Physics of Elementary Particles	6PAM1051	15	0	100	0	B
Geophysical Fluid Dynamics	6PAM1053	15	60	40	0	B

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Rocket Performance and Propulsion	6AAD0026	15	60	40	0	A
Computational Physics	6PAM1004	15	0	100	0	A
Partial Differential Equations	6PAM1023	15	80	20	0	A
Foundations of Cosmology	6PAM1056	15	60	40	0	A
The Physics of Astronomical Spectra	6PAM1057	15	60	40	0	A
Lagrangian Dynamics	6PAM1061	15	80	20	0	A
Applied Photonics	6PAM2003	15	0	100	0	A
Space Dynamics	6PAM0027	15	0	100	0	B
Further Numerical Methods*	6PAM1027	15	80	20	0	B
Nonlinear Systems	6PAM1030	15	80	20	0	B
Star Formation and Evolution	6PAM1055	15	60	40	0	B
Quantum Optics and Information Theory	6PAM1059	15	0	100	0	B

*6PAM1027 is not running in 2023/24

Level 7

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Physics Research Project	7PAM1028	60	0	100	0	AB
Statistics and Analysis	7PAM1035	15	50	50	0	A
Relativity and Field Theory *	7PAM1027	15	80	20	0	A
Nature of the Climate System *	7PAM1036	15	60	40	0	B

*At least one of these modules

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Titles						
CFD and Applications	7ENT1133	15	50	50	0	A
MRI Science and Principles**	7HSK0101	15	0	100	0	A
Relativity and Field Theory *	7PAM1027	15	80	20	0	A
Aerospace Aerodynamics	7ENT1139	15	60	40	0	B
CT Science and Principles**	7HSK0102	15	0	100	0	B
High Energy Astrophysics	7PAM1020	15	50	50	0	B
General Relativity	7PAM1033	15	50	50	0	B
Quantum Field Theory	7PAM1034	15	60	40	0	B
Nature of the Climate System *	7PAM1036	15	60	40	0	B

***At least one of these modules**

****HSK0101 and 7HSK0102 are not running in 2023/24**

Table 1a Outline Programme Structure

MPhys (Hons) Physics with Space Science

Mode of study Full Time/Part time

Entry point Semester A

Level 4

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Experimental Physics	4PAM1068	15	0	100	0	A
Mathematical Methods	4PAM2006	15	30	70	0	A
The Physical Universe	4PAM1013	30	60	40	0	AB
Special Relativity and Quantum Physics	4PAM1066	30	60	40	0	AB
Small Group Tutorial (Level 4)	4PAM1072	0	0	100	0	AB
Applications of Calculus	4PAM2016	15	30	70	0	B
Computational Modeling	4PAM2018	15	0	100	0	B

If a Level 4 student (FT or PT) is not progressing into Level 5, then the module status code for 4PAM1072 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

Level 5

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Multivariable Calculus	5PAM2012	15	60	40	0	A
Programming	5PAM2016	15	0	100	0	A
Electromagnetism	5PAM1044	15	0	100	0	A
Career Planning and Development	5PAM1049	0	0	100	0	A
Space Science and Systems	5PAM2000	15	0	100	0	A
Small Group Tutorial (Level 5)	5PAM1048	0	0	100	0	AB
Optics and Lasers	5PAM1045	15	60	40	0	B
Thermodynamics	5PAM1046	15	0	100	0	B
Quantum Mechanics	5PAM2025	15	40	60	0	B

If a Level 5 student (FT or PT) is not progressing into Level 6, then the module status code for 5PAM1048 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Motion and Tensors	5PAM2018	15	60	40	0	A
Numerical Methods	5PAM2022	15	60	40	0	B
Differential Equations	5PAM2015	15	60	40	0	B
Plasma Physics and Fusion Reactors	5PAM1052	15	70	30	0	B

Optional year for Professional Placement, Year Abroad, or Placement with Study Abroad

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Professional Placement	6PAM0011	0	0	P/F	0	AB
Year Abroad	6PAM0030	0	0	P/F	0	AB
Placement with Study Abroad	6PAM1033	0	0	P/F	0	AB

Level 6

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Rocket Performance and Propulsion	6AAD0026	15	60	40	0	A
Condensed States of Matter	6PAM1050	15	60	40	0	A
Space Science and Physics Project and Investigative Skills	6PAM2000	30	0	100	0	AB
Space Dynamics	6PAM0027	15	0	100	0	B
The Physics of Elementary Particles	6PAM1051	15	0	100	0	B
Geophysical Fluid Dynamics	6PAM1053	15	60	40	0	B

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Computational Physics	6PAM1004	15	0	100	0	A
Partial Differential Equations	6PAM1023	15	80	20	0	A
Foundations of Cosmology	6PAM1056	15	60	40	0	A

The Physics of Astronomical Spectra	6PAM1057	15	60	40	0	A
Lagrangian Dynamics	6PAM1061	15	80	20	0	A
Applied Photonics	6PAM2003	15	0	100	0	A
Satellite Communications	6ENT1172	15	0	100	0	B
Further Numerical Methods*	6PAM1027	15	80	20	0	B
Nonlinear Systems	6PAM1030	15	80	20	0	B
Star Formation and Evolution	6PAM1055	15	60	40	0	B

*6PAM1027 is not running in 2023/24

Level 7

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Physics Research Project	7PAM1028	60	0	100	0	AB
Statistics and Analysis	7PAM1035	15	50	50	0	A
Space Systems	7ENT1158	15	60	40	0	A
Nature of the Climate System	7PAM1036	15	60	40	0	B

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Titles						
CFD and Applications	7ENT1133	15	50	50	0	A
Aerospace Aerodynamics	7ENT1139	15	60	40	0	B
High Energy Astrophysics	7PAM1020	15	50	50	0	B

Table 1a Outline Programme Structure

MPhys (Hons) Astrophysics

Mode of study Full Time/Part time

Entry point Semester A

Level 4

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Experimental Physics	4PAM1068	15	0	100	0	A
Mathematical Methods	4PAM2006	15	30	70	0	A
The Physical Universe	4PAM1013	30	60	40	0	AB
Special Relativity and Quantum Physics	4PAM1066	30	60	40	0	AB
Small Group Tutorial (Level 4)	4PAM1072	0	0	100	0	AB
Applications of Calculus	4PAM2016	15	30	70	0	B
Computational Modeling	4PAM2018	15	0	100	0	B

If a Level 4 student (FT or PT) is not progressing into Level 5, then the module status code for 4PAM1072 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

Level 5

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Multivariable Calculus	5PAM2012	15	60	40	0	A
Programming*	5PAM2016	15	0	100	0	A
Professional Teaching Skills*	5PAM2017	15	0	100	0	A
Electromagnetism	5PAM1044	15	0	100	0	A
Career Planning and Development	5PAM1049	0	0	100	0	A
Small Group Tutorial (Level 5)	5PAM1048	0	0	100	0	AB
Optics and Lasers	5PAM1045	15	60	40	0	B
Thermodynamics	5PAM1046	15	0	100	0	B
Quantum Mechanics	5PAM2025	15	40	60	0	B

* One or both of these two

If a Level 5 student (FT or PT) is not progressing into Level 6, then the module status code for 5PAM1048 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Physics of the Solar System*	5PAM1050	15	0	100	0	A
Motion and Tensors	5PAM2018	15	60	40	0	A
Numerical Methods	5PAM2022	15	60	40	0	B
Differential Equations	5PAM2015	15	60	40	0	B
Extra-solar Planets*	5PAM1051	15	60	40	0	B
Plasma Physics and Fusion Reactors	5PAM1052	15	70	30	0	B

* One or both of these two

Optional year for Professional Placement, Year Abroad, or Placement with Study Abroad

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Professional Placement	6PAM0011	0	0	100	0	AB
Year Abroad	6PAM0030	0	0	100	0	AB
Placement with Study Abroad	6PAM1033	0	0	100	0	AB

Level 6

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Condensed States of Matter	6PAM1050	15	60	40	0	A
Foundations of Cosmology	6PAM1056	15	60	40	0	A
Astrophysics Project and Investigative Skills	6PAM1054	30	0	100	0	AB
The Physics of Elementary Particles	6PAM1051	15	0	100	0	B
Star Formation and Evolution	6PAM1055	15	60	40	0	B

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Rocket Performance and Propulsion	6AAD0026	15	60	40	0	A

Computational Physics	6PAM1004	15	0	100	0	A
Partial Differential Equations	6PAM1023	15	80	20	0	A
The Physics of Astronomical Spectra	6PAM1057	15	60	40	0	A
Lagrangian Dynamics	6PAM1061	15	80	20	0	A
Applied Photonics	6PAM2003	15	0	100	0	A
Space Dynamics	6PAM0027	15	0	100	0	B
Further Numerical Methods*	6PAM1027	15	80	20	0	B
Nonlinear Systems	6PAM1030	15	80	20	0	B
The Early Universe and Galaxy Formation	6PAM1058	15	0	100	0	B
Quantum Optics and Information Theory	6PAM1059	15	0	100	0	B

*6PAM1027 is not running in 2023/24

Level 7

Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Astrophysics Research Project	7PAM1029	60	0	100	0	AB
Statistics and Analysis	7PAM1035	15	50	50	0	A
Galaxy Structure and Evolution *	7PAM1030	15	60	40	0	B
High Energy Astrophysics *	7PAM1020	15	50	50	0	B

*At least one of these modules

Module Titles	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
CFD and Applications	7ENT1133	15	50	50	0	A
MRI Science and Principles*	7HSK0101	15	0	100	0	A
Relativity and Field Theory	7PAM1027	15	80	20	0	A
Aerospace Aerodynamics	7ENT1139	15	60	40	0	B
CT Science and Principles	7HSK0102	15	0	100	0	B
High Energy Astrophysics*	7PAM1020	15	50	50	0	B
Galaxy Structure and Evolution	7PAM1030	15	60	40	0	B
General Relativity	7PAM1033	15	50	50	0	B
Quantum Field Theory	7PAM1034	15	60	40	0	B
Nature of the Climate System	7PAM1036	15	60	40	0	B

*7HSK0101 and 7HSK0102 will not run in 2023/24

Table 1a Outline Programme Structure

BSc (Hons) Astrophysics with Space Science

Mode of study Full Time/Part time

Entry point Semester A

Level 4 BSc

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Experimental Physics	4PAM1068	15	0	100	0	A
Mathematical Methods	4PAM2006	15	30	70	0	A
The Physical Universe	4PAM1013	30	60	40	0	AB
Special Relativity and Quantum Physics	4PAM1066	30	60	40	0	AB
Small Group Tutorial (Level 4)	4PAM1072	0	0	100	0	AB
Applications of Calculus	4PAM2016	15	30	70	0	B
Computational Modeling	4PAM2018	15	0	100	0	B

If a Level 4 student (FT or PT) is not progressing into Level 5, then the module status code for 4PAM1072 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

Level 5

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Multivariable Calculus	5PAM2012	15	60	40	0	A
Career Planning and Development	5PAM1049	0	0	100	0	A
Space Science and Systems	5PAM2000	15	0	100	0	A
Programming	5PAM2016	15	0	100	0	A
Quantum Mechanics	5PAM2025	15	40	60	0	B
Thermodynamics	5PAM1046	15	0	100	0	B
Optics and Lasers	5PAM1045	15	60	40	0	B
Electromagnetism	5PAM1044	15	0	100	0	A
Small Group Tutorial (Level 5)	5PAM1048	0	0	100	0	AB

If a Level 5 student (FT or PT) is not progressing into Level 6, then the module status code for 5PAM1048 should be set to DEFC (at Programme Board), to ensure the student is registered on this module in the following year.

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Physics of the Solar System	5PAM1050	15	0	100	0	A
Extra-solar Planets	5PAM1051	15	60	40	0	B

Optional year for Professional Placement, Year Abroad, or Placement with Study Abroad

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Professional Placement	6PAM0011	0	0	100	0	AB
Year Abroad	6PAM0030	0	0	100	0	AB
Placement with Study Abroad	6PAM1033	0	0	100	0	AB

Level 6

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules						
Module Title						
Rocket Performance and Propulsion	6AAD0026	15	60	40	0	A
Condensed States of Matter	6PAM1050	15	60	40	0	A
Space Science and Astrophysics Project and Investigative Skills	6PAM2001	30	0	100	0	AB
Space Dynamics	6PAM0027	15	0	100	0	B
The Physics of Elementary Particles	6PAM1051	15	0	100	0	B
Star Formation and Evolution	6PAM1055	15	60	40	0	B

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Optional Modules						
Module Title						
Computational Physics	6PAM1004	15	0	100	0	A
Foundations of Cosmology	6PAM1056	15	60	40	0	A
The Physics of Astronomical Spectra	6PAM1057	15	60	40	0	A
Lagrangian Dynamics	6PAM1061	15	80	20	0	A

Applied Photonics	6PAM2003	15	0	100	0	A
Satellite Communications	6ENT1172	15	0	100	0	B
Further Numerical Methods*	6PAM1027	15	80	20	0	B
Nonlinear Systems	6PAM1030	15	80	20	0	B
The Early Universe and Galaxy Formation	6PAM1058	15	0	100	0	B

*6PAM1027 is not running in 2023/24

Level 7

Compulsory Modules Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
Astrophysics Research Project	7PAM1029	60	0	100	0	AB
Space Systems	7ENT1158	15	60	40	0	A
Statistics and Analysis	7PAM1035	15	50	50	0	A
Galaxy Structure and Evolution *	7PAM1030	15	60	40	0	B
High Energy Astrophysics *	7PAM1020	15	50	50	0	B

* At least one of these modules

Optional Modules Module Titles	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
CFD and Applications	7ENT1133	15	50	50	0	A
Aerospace Aerodynamics	7ENT1139	15	60	40	0	B
High Energy Astrophysics *	7PAM1020	15	50	50	0	B
Galaxy Structure and Evolution *	7PAM1030	15	60	40	0	B
Nature of the Climate System	7PAM1036	15	60	40	0	B

* At least one of these modules

Progression to level 5 requires a minimum of 90 credits. The maximum study rate in such an instance would be 150 credits and students would be expected to remedy any failed modules from level 4 in the first instance.

Progression to non-honours level 5 with 75 credits may be permissible. The maximum study rate in such an instance would normally be 120 credits and students would be expected to remedy any failed modules from level 4 in the first instance.

Progression to level 6 requires 210 credits. The maximum study rate in such an instance would be 150 credits and students would be expected to remedy any failed modules from level 5 in the first instance.

At the end of Level 5 the student must be performing at 2(ii) standard or better to continue studying on the MPhys. If this is not the case, they may be transferred onto the appropriate BSc (Hons) study path.

Progression to non-honours level 6 with 180 credits may be permissible. The maximum study rate in such an instance would normally be 120 credits and students would be expected to remedy any failed modules from level 5 in the first instance.

Progression to Level 7 requires 360 credit points passed with a minimum of at least 120 credits at level 6.

Honours classification

The University has approved structure and assessment regulations common to all programmes. Full details are provided in [UPR AS14](#), Section D.

Table 1b Final and interim awards available

The programme provides the following final and interim awards:

Final Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
MPhys (Hons)	Physics	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7	7	A1, A2, A3, A5, B1, B2, B3, B4, B5, C1, C2, C4 D1, D2, D3, D4
MPhys (Hons)	Astrophysics	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7	7	A1, A2, A4, A5, B1, B2, B3, B5, C1, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Physics (Sandwich)	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A3, A5, B1, B2, B3, B4, B5, B7, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Astrophysics (Sandwich)	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A4, B1, B2, B3, B4, B5, B6, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Physics with a Year Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A3, A5, B1, B2, B3, B4, B5, B8, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Astrophysics with a Year Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A4, A5, B1, B2, B3, B4, B5, B8, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Physics (Sandwich) with Study Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed	7	A1, A2, A3, A5, B1, B2, B3, B4, B5, B7, B8, C1, C2, C3, C4 D1, D2, D3, D4

		by the Professional Training Certification Panel.		
MPhys (Hons)	Astrophysics (Sandwich) with Study Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A4, A5, B1, B2, B3, B5, B7, B8, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Physics with Space Science	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7	7	A1, A2, A3, A5, A6, B1, B2, B3, B4, B5, B6, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Astrophysics with Space Science	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7	7	A1, A2, A4, A5, A6, B1, B2, B3, B5, B6, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Physics with Space Science (Sandwich)	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A3, B1, B2, B3, B4, B5, B6, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Astrophysics with Space Science (Sandwich)	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A4, A5, A6, B1, B2, B3, B5, B6, B7, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Physics with Space Science with a Year Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A3, A5, A6, B1, B2, B3, B4, B5, B6, B8, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Astrophysics with Space Science with a Year Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A4, A5, A6, B1, B2, B3, B5, B6, B8, C1, C2, C3, C4 D1, D2, D3, D4

MPhys (Hons)	Physics with Space Science (Sandwich) with Study Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A3, A5, A6, B1, B2, B3, B4, B5, B6, B7, B8, C1, C2, C3, C4 D1, D2, D3, D4
MPhys (Hons)	Astrophysics with Space Science (Sandwich) with Study Abroad	480 credits, including at least 360 at Level 7/6/5 of which at least 240 must be at Level 7/6 and at least 120 must be at Level 7. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	7	A1, A2, A4, B1, B2, B3, B4, B5, B6, B7, C1, C2, C3, C4 D1, D2, D3, D4

Interim Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
University Certificate		45 credit points at level 4	4	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Certificate of Higher Education		120 credit points at level 4	4, 5	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Diploma of Higher Education		240 credit points including at least 120 at level 5	5, 6	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
BSc	Physics	300 credit points including 180 at level 6/5 of which 60 must be at level 6	6	A1, A2, A3, B1, B2, B3, C1, C2, D2
BSc	Astrophysics	300 credit points including 180 at level 6/5 of which 60 must be at level 6	6	A1, A2, A4, B1, B2, B3, C1, C2, D2
BSc	Physics (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, B1, B2, B3, B7, C1, C2, D2
BSc	Astrophysics (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B7, C1, C2, D2
BSc	Physics with a Year Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6. With one academic year	6	A1, A2, A3, B1, B2, B3, B8, C1, C2, D2

		of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.		
BSc	Astrophysics with a Year Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B8, C1, C2, D2
BSc	Physics (Sandwich) with Study Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, B1, B2, B3, B7, B8, C1, C2, D2
BSc	Astrophysics (Sandwich) with Study Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B7, B8, C1, C2, D2
BSc	Physics with Space Science	300 credit points including 180 at level 6/5 of which 60 must be at level 6	6	A1, A2, A3, A6, B1, B2, B3, C1, C2, D2
BSc	Astrophysics with Space Science	300 credit points including 180 at level 6/5 of which 60 must be at level 6	6	A1, A2, A4, A6, B1, B2, B3, C1, C2, D2
BSc	Physics with Space Science (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, A6, B1, B2, B3, B7, C1, C2, D2
BSc	Astrophysics with Space Science (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Supervised placement as defined in UPR AS11, plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, A6, B1, B2, B3, B7, C1, C2, D2
BSc	Physics with Space Science with a Year Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed	6	A1, A2, A3, A6, B1, B2, B3, B8, C1, C2, D2

		by the Professional Training Certification Panel.		
BSc	Physics with Space Science (Sandwich) with Study Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, B1, B2, B3, B6, B8, C1, C2, D2
BSc	Astrophysics with Space Science (Sandwich) with Study Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B6, B8, C1, C2, D2
BSc (Hons)	Physics	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6	A1, A2, A3, B1, B2, B3, B4, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6	A1, A2, A4, B1, B2, B3, C1, C3, C4, D1, D2, D3, D4
BSc (Hons)	Physics with Space Science	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6	A1, A2, A3, A6, B1, B2, B3, B4, B5, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics with Space Science	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6	A1, A2, A4, B1, B2, B3, C1, C3, C4, D1, D2, D3, D4
BSc (Hons)	Physics (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Supervised placement as defined in UPR AS11 plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, B1, B2, B3, B4, B7, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Supervised placement as defined in UPR AS11 plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B7, C1, C3, D1, D2, D3, D4
BSc (Hons)	Physics with Space Science (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Supervised placement as defined in UPR AS11 plus must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, A6, B1, B2, B3, B4, B7, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics with Space Science (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Supervised placement as defined in UPR AS11 plus must	6	A1, A2, A4, A6, B1, B2, B3, B6, B7, C1, C3, D1, D2, D3, D4

		perform satisfactorily as assessed by the Professional Training Certification Panel.		
BSc (Hons)	Physics with a Year Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, A4, B1, B2, B3, B4, B8, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics with a Year Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B8, C1, C2, C3, C4, D1, D2, D3, D4
BSc (Hons)	Physics with Space Science with a Year Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, A5, A6, B1, B2, B3, B4, B5, B8, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics with Space Science with a Year Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6. With one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Physics (Sandwich) with Study Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, B1, B2, B3, B4, B8, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics (Sandwich) with Study Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Minimum of an 18-week approved and supervised placement plus half of one academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B8, C1, C3, C4, D1, D2, D3, D4
BSc (Hons)	Physics with Space Science (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Minimum of an 18-week approved and supervised placement plus half of one	6	A1, A2, A3, A6, B1, B2, B3, B4, B6, B7, B8, C1, C2, C4, D1, D2, D3, D4

with Study Abroad	academic year of study at an approved institution in Europe or world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.
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Programme-specific assessment regulations

The programme complies with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12/UPR AS13](#) and [UPR AS14](#)) with the exception of those listed below, which have been approved by the University:

- Please note that requirements from the regulatory body require all core modules to be included in the final degree classification.

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
PMMPHY	MPHY4F, MPHY5S, MPHY7P, MPHY8P	MPhys Physics	All (non-elective) level 5, level 6, and level 7 modules to be included in the degree classification calculation at ratios of 20% level 5, 30% level 6, and 50% level 7.	yes

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
PMMPHYAP	MAST4F, MAST5S, MAST7P, MAST8P	MPhys Astrophysics	All (non-elective) level 5, level 6, and level 7 modules to be included in the degree classification calculation at ratios of 20% level 5, 30% level 6, and 50% level 7.	yes

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
PMMPHYSS	MPHYSS4F, MPHYSS5S, MPHYSS7P, MPHYSS8P	MPhys Physics with Space Science	All (non-elective) level 5, level 6, and level 7 modules to be included in the degree classification calculation at ratios of 20% level 5, 30% level 6, and 50% level 7.	yes

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
PMMPHYAPSS	MASTSS4F, MASTSS5S, MASTSS7P, MASTSS8P	MPhys Astrophysics with Space Science	All (non-elective) level 5, level 6, and level 7 modules to be included in the degree classification calculation at ratios of 20% level 5, 30% level 6, and 50% level 7.	yes

Further programme-specific regulations (requiring School-level approval) are given below:

- Progression from one level to the next depends on meeting the pre-requisite requirements of specific chosen modules as detailed in Table 1a to 1d and 1e above.
- To be eligible for any of the above awards a student must attain pass grades in compulsory courses listed in Table 1a to 1d.
- In the case of a Sandwich or Year Abroad award, students must also perform satisfactorily in the professional training year, as assessed by the Professional Training Certification Panel.
- The maximum length of time that a student can remain registered on the programme is: 5 years for Full-time, 6 years for Sandwich and 8 years for Part-time.

Further programme-specific regulations (requiring School-level approval) are given below:

- To be eligible for any of the above awards a student must attain pass grades in compulsory courses listed in Table 1a and 1b.

E. Management of Programme & Support for student learning.

Management

The programme is managed and administered through:

- The Physics and Astrophysics (P&A) Programme Leader, who has overall responsibility for the effective operationalisation of the programme and ensuring that academic standards are maintained, and an effective student learning experience is provided. The P&A Programme Leader also has overall responsibility for the quality assurance and enhancement of the programme providing advice and guidance to programme staff as appropriate.
- Four Year Tutors, one per level, as a first point of contact for students needing academic/pastoral support/advice.
- An Admissions Tutor with specific responsibility for open days and selection.
- Personal Tutors to provide academic and pastoral support.
- Placement Tutors to oversee students on sandwich or undertaking a year abroad.
- Project Tutors to guide students through their final year Project.
- Dean of School.
- Associate Dean Academic Quality Assurance (AQA).
- Associate Dean Learning, Teaching and Student Experience (LTSE).
- A programme committee, the membership of which includes; Physics and Astrophysics Programme Leader, Mathematics Programme Leader, 4 P&A Year Tutors (one each for Levels 4, 5, 6, and 7), 3 Mathematics Year Tutors (one each for Levels 4, 5, and 6), Dean of School, Associate Dean of School (AQA), Associate Dean of School (LTSE), student representatives, academic staff teaching modules. This Programme Committee is jointly chaired by the P&A Programme Leader and the Mathematics Programme Leader.

Support

Students are supported by:

- An induction week at the beginning of each new academic session.
- Overseas Orientation.
- English language support.
- Laboratories and an Observatory.
- Module option talks, which provide students with the opportunity to receive information relating to modules on offer for the following academic year.
- Module delivery information given out at the commencement of each module.
- The computing laboratories of the Department of Physics, Astronomy and Mathematics
- The Department of Physics, Astronomy and Mathematics Industrial Training Placements Office.
- A versatile on-line inter-active intranet and learning environment.
- Access to extensive digital and print collections of information resources.
- Attractive modern study environment in 2 Learning Resources Centres.

- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters, accommodation, international student support, etc.
- Office of Dean of Students, Student Wellbeing (incorporating Counselling, Mental Health and Disability Support), Chaplaincy and Day Nursery.
- Medical Centre.
- Student Success Hubs, which include a Mathematics Drop-In Centre.
- University Disability Advisors.
- A School Equality Committee.
- Hertfordshire Students' Union.
- Guided student-centred learning on Canvas module sites.
- Careers and Employment.
- Dedicated programme site.

F. Other sources of information

In addition to this Programme Specification, the University publishes guidance to registered students on the programme and its constituent modules:

- A Programme (or Student) Handbook;
- A Definitive Module Document (DMD) for each constituent module;

The [Ask Herts](#) website provides information on a wide range of resources and services available at the University of Hertfordshire including academic support, accommodation, fees, funding, visas, wellbeing services and student societies.

As a condition of registration, all students of the University of Hertfordshire are required to comply with the University's rules, regulations and procedures. These are published in a series of documents called 'University Policies and Regulations' (UPRs). The University requires that all students consult these documents which are available on-line, on the UPR web site, at: <http://www.herts.ac.uk/secreg/upr/>. In particular, [UPR SA07](#) 'Regulations and Advice for Students' Particular Attention - Index' provides information on the UPRs that contain the academic regulations of particular relevance for undergraduate and taught postgraduate students.

In accordance with section 4(5) of the Higher Education and Research Act 2017 (HERA), the UK Office for Students (OfS) has registered the University of Hertfordshire in the register of English higher education providers. The Register can be viewed at: <https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/>.

G. Entry requirements

The normal entry requirements for the programme are:

72-168 UCAS points

To include A Level Maths and Physics at Grade C or above or a BTEC qualification in Applied Science plus A level Maths at Grade C or above. Access to HE Diploma with 60 credits overall, 45 of these credits must be at Level 3. 30 of the Level 3 credits must be in Maths and Physics. IB must include Maths and Physics at HL grade 4 or above.

GCSE English and Maths at grade 4 or above.

The module 5PAM2017 may require satisfactory health clearance and DBS (Disclosure and Barring Service) clearance or equivalent. Similar clearance may also be required for 6PAM0011 and 6PAM0030

All international students are required to demonstrate an English Language capability of IELTS 6 in each band [or TOEFL 550 (79 IBT)].

For current entry tariff point requirements, please refer to the relevant page for the Course on the University website or on the online prospectus.

The programme is subject to the University's Principles, Policies and Regulations for the Admission of Students to Undergraduate and Taught Postgraduate Programmes (in [UPR SA03](#)), along with associated procedures. These will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

If you would like this information in an alternative format please contact:
Hutton Hub Student Administration Service: hhaq@herts.ac.uk

If you wish to receive a copy of the latest External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

MPhys Physics

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are delivered and assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

		Programme Learning Outcomes (as identified in section 1 and the following page)																																
		Knowledge & Understanding								Intellectual Skills								Practical Skills								Transferable Skills								
	Module Title	Module Code	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8	C1	C2	C3	C4	C5	C6	C7	C8	D1	D2	D3	D4	D5	D6	D7	D8
Level 4	Mathematical Methods	4PAM2006		x									x																					
	Applications of Calculus	4PAM2016		x									x																					
	Special Relativity and Quantum Physics	4PAM1066	x								x									x	x													
	The Physical Universe	4PAM1013	x		x							x								x														
	Computational Modelling	4PAM2018											x																					
	Small Group Tutorial (Level 4)	4PAM1072	x	x								x		x							x													
	Experimental Physics	4PAM1068			x								x								x								x					
Level 5	Mathematical Techniques 2	5PAM1022		x									x																					
	Career Planning and Development	5PAM1049																									x	x	x					
	Physics of the Solar System	5PAM1050	x			x					x									x	x													
	Extra-solar Planets	5PAM1051	x			x					x									x	x													
	Electromagnetism	5PAM1044	x																	x	x													
	Optics and Lasers	5PAM1045	x																	x	x													
	Thermodynamics	5PAM1046	x									x								x	x													
	Quantum Mechanics	5PAM2025	x									x																						
	Plasma Physics and Fusion Reactors	5PAM1052	x									x										x					x							
	Differential Equations	5PAM2015		x									x																					
	Programming	5PAM2016		x									x																	x				
	Motion and Tensors	5PAM2018		x									x																					
Numerical Methods	5PAM2022		x									x																						

MPhys Astrophysics

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

		Programme Learning Outcomes (as identified in section 1 and the following page)																															
		Knowledge & Understanding								Intellectual Skills								Practical Skills								Transferable Skills							
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8	C1	C2	C3	C4	C5	C6	C7	C8	D1	D2	D3	D4	D5	D6	D7	D8
Level 4	Module Title	Module Code																															
	Mathematical Methods	4PAM2006		x								x																					
	Applications of Calculus	4PAM2016		x								x																					
	Special Relativity and Quantum Physics	4PAM1066	x							x								x	x														
	The Physical Universe	4PAM1013	x		x						x							x															
	Computational Modelling	4PAM2018										x																					
	Small Group Tutorial (Level 4)	4PAM1072	x	x						x		x							x														
Experimental Physics	4PAM1068			x						x							x									x							
Level 5	Mathematical Techniques 2	5PAM1022		x								x																					
	Career Planning and Development	5PAM1049																								x	x	x					
	Physics of the Solar System	5PAM1050	x			x				x								x	x														
	Extra-solar Planets	5PAM1051	x			x				x								x	x														
	Electromagnetism	5PAM1044	x															x	x														
	Optics and Lasers	5PAM1045	x															x	x														
	Thermodynamics	5PAM1046	x							x								x	x														
	Quantum Mechanics	5PAM2025	x							x																							
	Plasma Physics and Fusion Reactors	5PAM1052	x							x											x					x							
	Differential Equations	5PAM2015		x								x																					
	Programming	5PAM2016		x								x																x					
	Motion and Tensors	5PAM2018		x								x																					
	Numerical Methods	5PAM2022		x								x																					
	Small Group Tutorial (Level 5)	5PAM1048	x	x						x		x							x														
	Professional Teaching Skills	5PAM2017																								x	x	x					
	Placement Year	6PAM0011														x																	

Aerospace Aerodynamics	7ENT1139	x	x	x	x	x	x
High Energy Astrophysics	7PAM1020	x									x																							
Galaxy Structure and Evolution	7PAM1030	x					x							x																				

MPhys Physics with Space Science

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

		Programme Learning Outcomes (as identified in section 1 and the following page)																																	
		Knowledge & Understanding								Intellectual Skills								Practical Skills								Transferable Skills									
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8	C1	C2	C3	C4	C5	C6	C7	C8	D1	D2	D3	D4	D5	D6	D7	D8		
Module Title	Module Code																																		
Level 4	Mathematical Methods	4PAM2006		x																															
	Applications of Calculus	4PAM2016		x																															
	Special Relativity and Quantum Physics	4PAM1066	x								x																x	x							
	The Physical Universe	4PAM1013	x		x							x															x								
	Computational Modelling	4PAM2018																																	
	Small Group Tutorial (Level 4)	4PAM1072	x	x								x																							
	Experimental Physics	4PAM1068			x								x																						
Level 5	Mathematical Techniques 2	5PAM1022		x																															
	Career Planning and Development	5PAM1049																																	
	Physics of the Solar System	5PAM1050	x			x						x																							
	Extra-solar Planets	5PAM1051	x			x						x																							
	Electromagnetism	5PAM1044	x																																
	Optics and Lasers	5PAM1045	x																																
	Thermodynamics	5PAM1046	x																																
	Quantum Mechanics	5PAM2025	x																																
	Space Science and Systems	5PAM2000		x																															
	Plasma Physics and Fusion Reactors	5PAM1052	x																																
	Differential Equations	5PAM2015		x																															
	Programming	5PAM2016		x																															
	Motion and Tensors	5PAM2018		x																															
	Numerical Methods	5PAM2022		x																															
	Small Group Tutorial (Level 5)	5PAM1048	x	x																															
Professional Teaching Skills	5PAM2017																																		

CFD Analysis for Aerospace Applications	7ENT1006	x	x							x	x					x					x				
MRI Science and Principles	7HSK0101		x	x		x				x							x	x					x		
CT Science and Principles	7HSK0102		x	x		x				x							x	x					x		
High Energy Astrophysics	7PAM1020	x							x																
Galaxy Formation and Evolution	7PAM1025	x				x			x																
Space Systems	7ENT1158		x						x								x						x	x	x

MPhys AstroPhysics with Space Science

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

		Programme Learning Outcomes (as identified in section 1 and the following page)																																			
		Knowledge & Understanding								Intellectual Skills								Practical Skills								Transferable Skills											
	Module Title	Module Code	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8	C1	C2	C3	C4	C5	C6	C7	C8	D1	D2	D3	D4	D5	D6	D7	D8			
Level 4	Mathematical Methods	4PAM2006		x									x																								
	Applications of Calculus	4PAM2016		x									x																								
	Special Relativity and Quantum Physics	4PAM1066	x								x									x	x																
	The Physical Universe	4PAM1013	x		x							x								x																	
	Computational Modelling	4PAM2018											x																								
	Small Group Tutorial (Level 4)	4PAM1072	x	x								x		x								x															
	Experimental Physics	4PAM1068			x							x								x								x									
Level 5	Multivariable Calculus	5PAM2012	x																																		
	Career Planning and Development	5PAM1049																									x	x	x								
	Space Science and Systems	5PAM2000		x							x										x						x	x	x								
	Programming	5PAM2016		x									x																	x							
	Quantum Mechanics	5PAM2025	x								x																										
	Thermodynamics	5PAM1046	x																	x	x																
	Optics and Lasers	5PAM1045	x																	x	x																
	Electromagnetism	5PAM1044	x								x									x	x																
	Small Group Tutorial (Level 5)	5PAM1048	x	x							x		x									x															
	Physics of the Solar System	5PAM1050	x			x					x									x	x																
	Extra-solar Planets	5PAM1051	x			x					x									x	x																
	Level 6	Placement Year	6PAM0011														x																				
Year Abroad		6PAM0030															x																				
Placement with Study Abroad		6PAM1033														x	x																				
Level 7	Rocket Performance and Propulsion	6AAD0026		x								x								x																	

	Condensed States of Matter	6PAM1050	x		x											x	x																				
	Space Science and Astrophysics Project and Investigative Skills	6PAM2001																																			
	Space Dynamics	6PAM0027		x														x																			
	The Physics of Elementary Particles	6PAM1051	x															x																			
	Star Formation and Evolution	6PAM1055	x			x												x	x																		
	Computational Physics	6PAM1004		x																																	
	Foundations of Cosmology	6PAM1056	x			x												x	x																		
	The Physics of Astronomical Spectra	6PAM1057	x			x												x	x																		
	Lagrangian Dynamics	6PAM1061		x																																	
	Applied Photonics	6PAM2003	x		x													x	x																		
	Satellite Communications	6ENT1172	x	x	x																																
	Further Numerical Methods*	6PAM1027		x																																	
	Nonlinear Systems	6PAM1030		x																																	
	The Early Universe and Galaxy Formation	6PAM1058	x			x												x	x																		
Level 7	Astrophysics Research Project	7PAM1029				x																															
	Space Systems	7ENT1158		x																																	
	Statistics and Analysis	7PAM1035		x																																	
	Galaxy Structure and Evolution	7PAM1030	x				x																														
	High Energy Astrophysics	7PAM1020	x																																		
	CFD and Applications	7ENT1133	x	x																																	
	Aerospace Aerodynamics	7ENT1139	x	x																																	
	Nature of the Climate System	7PAM1036	x																																		

KEY TO PROGRAMME LEARNING OUTCOMES

Knowledge and Understanding

- A1. The fundamental concepts, ideas and theories of Physics and Astrophysics.
- A2. The mathematical and computational techniques used to frame and solve physical problems.
- A3. The techniques of practical work in Physics.
- A4. The techniques of practical work in Astrophysics.
- A5. Selected recent developments within some current research areas of physics, building upon the knowledge and understanding acquired through points A1-3 above.

Intellectual Skills

- B1. Formulate and tackle problems in physics and astrophysics.
- B2. Plan, execute and report the results of an experiment or an investigation.
- B3. Use mathematics and computing to describe the physical world or an investigation.
- B4. Discuss critically the role of numerical modelling, uncertainty and approximations in physics.
- B5. Critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), make judgements, and frame appropriate questions to achieve a solution or identify a range of solutions to a problem.
- B6. Obtain experience of working in a suitable environment alongside professionals or others engaged in scientific work.
- B7. Will have obtained significant practical experience of studying in a foreign country.

Practical Skills

- C1. Perform experimental work and draw conclusions;
- C2. Apply appropriate analytical and modelling techniques to physical problems.
- C3. Produce clear and accurate scientific reports on complex topics, and prepare and give technical presentations;
- C4. Make appropriate and effective use of scientific literature, such as textbooks and refereed research articles.

Transferable Skills

- D1. Communicate effectively, both orally and in writing;
- D2. Work effectively in a team;
- D3. Demonstrate time, personal management and IT skills
- D4. Retrieve, synthesize and evaluate information and data from a variety of sources

Section 2

Programme management

Relevant QAA subject benchmarking statements	Physics, Astronomy and Astrophysics
Type of programme	Undergraduate and Taught Postgraduate
Date of validation/last periodic review	October 18
Date of production/ last revision of PS	March 2023
Relevant to level/cohort	Level 4 entering September 2023
Administrative School	School of Physics, Engineering & Computer Science
Language of Delivery	English

Table 4 Course structure

Course details			
Course Code	Course Description	HECOS	UCAS
PMMPHY	MPhys Physics	100425	F304
PMMPHYSS	MPhys Physics with Space Science	100425 (75%), 100116 (25%)	F305
PMMPHYAP	MPhys Astrophysics	100415	F511
PMMPHYAPSS	MPhys Astrophysics with Space Science	100415 (75%), 100116 (25%)	F512