

Title of Programme: BSc Honours Physics and Astrophysics

Programme Code: EIPHY

# Programme Specification

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

Associate Dean of School (Academic Quality Assurance):  
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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.

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## Summary of amendments to the programme:

Section	Amendment
D	<b>4PAM2006 Mathematical Methods (Semester A) and 4PAM2016 Applications of Calculus (Semester B)</b> replace 4PAM1034.
D	<b>4PAM2018 Computational Modeling</b> replaces 4PAM1070.
D	<b>5ENT1014 Aerothermodynamics</b> phased out (last run in the academic session 2021-22).
D	<b>6PAM1027 Further Numerical Methods</b> will not be offered in the 2022-23 academic session.
D	<b>Programming 5PAM2016</b> replaces Programming 5PAM1023.
D	<b>Motion and Tensors 5PAM2018</b> replaces Motion and Tensors 5PAM1053.
D	<b>Professional Teaching Skills 5PAM2017</b> replaces Professional Teaching Skills 5PAM1025.

D	<b>Numerical Methods 5PAM2022</b> replaces Numerical Methods 5PAM1029.
D	<b>Differential Equations 5PAM2015</b> replaces Differential Equations 5PAM1032.

If you have any queries regarding the changes, please email [AQO@herts.ac.uk](mailto:AQO@herts.ac.uk)

# Programme Specification

## BSc Honours 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 they take 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).

### Section 1

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

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

**FHEQ level of award** 6

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### A. Programme Rationale

The modules are designed to reflect the importance of fundamental concepts and ideas that underpin physics and astrophysics. 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 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 host 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 Physics/Astrophysics Project with Investigative Skills 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 and 5 and are continually supported by requirements for written coursework, individual and team work and a level 6 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 must study a module that addresses professional issues relevant to a professional career.

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## B. Educational Aims of the Programme

### Diversity and Inclusion

Our programmes are purposefully designed to enable all students to engage meaningfully with the curriculum by being accessible and representative. We will support students to shape their learning experience, removing barriers and enabling them to succeed. The curriculum explicitly includes multiple and representative perspectives, valuing collective identities and individual diversity. Learning, teaching and assessment activities help students to understand how they can enhance outcomes both for themselves and for others. All students belong to a learning community, and during their studies we really want to hear their voices, encourage them to listen to others, and express themselves.

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.

### Graduate Attributes

Our graduates will be capable and professional, creative and enterprising, and will build their social and global awareness throughout. In addition to their subject expertise and proficiency, as a University of Hertfordshire graduate, they will be:

- Professionally focused
- Globally minded
- Sustainability driven
- Digitally capable and confident
- Inclusive and collaborative
- Evidence based and ethical

## 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><b>A1.</b> Demonstrate knowledge and understanding of the fundamental concepts, ideas and theories of Physics and Astrophysics; to advanced levels in physics for the Physics award, and to advanced levels in astrophysics for the Astrophysics awards.</p> <p><b>A2.</b> Demonstrate knowledge and understanding of the mathematical and computational techniques used to frame and solve physical problems.</p> <p><b>A3.</b> Demonstrate knowledge and understanding of the techniques of practical work in Physics; to advanced levels in physics for the Physics award.</p> <p><b>A4.</b> Demonstrate knowledge and understanding of the techniques of practical work in Astrophysics; to advanced levels in astrophysics for the Astrophysics awards</p> <p><b>A5.</b> Demonstrate knowledge and understanding of the techniques of practical work in Space Science; to advanced levels in space science for the Space Science awards.</p>	<p>Acquisition of knowledge and understanding is through to A5 is via 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.</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>Additional support is provided by Canvas, the Mathematics Drop-In Centre and in the case of level 4, personal tutors.</p>	<p>Knowledge and understanding are assessed through a combination of unseen examinations (A1, A2), practical examinations (A2, A3, A4), in-course assessments (A1-A4) in the form of laboratory reports and logbooks (A2, A3, A4), class tests (A1, A2), coursework assignments (A1-A4), project report (A1-A4), oral and presentation (A1-A4).</p>
Intellectual skills	Teaching and learning methods	Assessment strategy
<p><b>B1.</b> 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><b>B2.</b> Plan, execute and report the results of an experiment or an investigation; to advanced levels</p>	<p>Intellectual skills are developed throughout the programme by the methods and strategies outlined in section A above.</p> <p>Learning Outcomes B1-B4 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, B4), practical examinations (B4), assessed individual in-course assignments (B1-B4), laboratory/observatory reports (B2), workbooks and logbooks (B1-B3), class tests (B1, B3), presentations (B1-B3) and final year project report (B1-B4).</p>

<p>in physics for the Physics award and to advanced levels in astrophysics for the Astrophysics awards.</p> <p><b>B3.</b> 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><b>B4.</b> Use mathematics and computing to describe the physical world or an investigation .</p> <p>For the <b>Sandwich award</b>:</p> <p><b>B5.</b> Gain and reflect on practical experience of working in a suitable environment, alongside professionals or others engaged in scientific or commercial work.</p> <p>For the <b>Study Abroad awards</b>:</p> <p><b>B6.</b> Gain and reflect on practical experience of studying in a foreign country.</p>	<p>Acquisition of Learning Outcome B5 is through a professional placement in a suitable scientific or commercial organisation.</p> <p>Acquisition of Learning Outcome B6 is through a studying for a period of time in a foreign country.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study</p>	<p>B5 is assessed by written/verbal reports from the student, the placement organisation and the placement tutor.</p> <p>B6 is assessed through relevant modules studied at an overseas institution.</p>
<b>Practical skills</b>	<b>Teaching and learning methods</b>	<b>Assessment strategy</b>
<p><b>C1.</b> Perform experimental work and draw conclusions;</p> <p><b>C2.</b> Apply appropriate analytical and modelling techniques to physical problems;</p> <p><b>C3.</b> Produce clear and accurate scientific reports on complex topics, and prepare and give technical presentations;</p> <p><b>C4.</b> 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>
<b>Transferable skills</b>	<b>Teaching and learning methods</b>	<b>Assessment strategy</b>
<p><b>D1.</b> Communicate effectively, both orally and in writing.</p> <p><b>D2.</b> Work effectively in a team.</p>	<p>Transferable skills are developed through problem solving workshops and group presentations (D1-D3), individual assignments (D1, D3), writing</p>	<p>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-D3).</p>

**D3.** Demonstrate time, personal management and IT skills.

practical reports (D1) and project work (D1-D3).  
Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.

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

The programme is offered in full-time (3 years), sandwich/year abroad (4 years) and part-time (5 or 6 years) modes, and leads to the award of a

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

In addition, there are non-honours degrees (BSc degrees) with same titles as for the BSc Honour degrees

Intake 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).

### Professional and Statutory Regulatory Bodies

The BSc 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](#).

Students must normally satisfactorily complete all requirements of progression to the level 6 honours programme. The placement must be approved by the relevant Placement Tutor before the student is permitted to progress to the sandwich year.

Placements will normally be a minimum of 30 weeks, as defined in [UPR AS11](#). Assessment of the placement year will be considered at a meeting of the appropriate Module Board of Examiners.

Satisfactory completion of the sandwich placement is mandatory for a sandwich award; however, the assessment has a credit point rating of zero and will not contribute to the honours classification. Assessment will take into account initiative and effort and will include a substantial written report.

### 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.

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).

### Table 1a Outline Programme Structure

#### BSc (Hons) Physics

**Mode of study** Full Time/Part Time

**Entry point** Semester A

#### Level 4

Compulsory Modules Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
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
<b>Compulsory Modules</b>						
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
<b>Optional Modules</b> (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
<b>Optional Modules</b>						
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
<b>Compulsory Modules</b>						
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
<b>Optional Modules</b>						
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.

## Table 1a Outline Programme Structure

### BSc (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
<b>Compulsory Modules</b>						
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
<b>Compulsory Modules</b>						
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
<b>Optional Modules</b>						
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
<b>Optional Modules</b>						
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
<b>Compulsory Modules</b>						
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
<b>Optional Modules</b>						
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.

## Table 1a Outline Programme Structure

### BSc (Hons) Astrophysics

**Mode of study** Full Time/Part time

**Entry point** Semester A

#### Level 4

	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
<b>Compulsory Modules</b>						
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
<b>Compulsory Modules</b>						
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.

Optional Modules Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
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

Optional Modules Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
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

Compulsory Modules Module Title	Module Code	Credit Points	% Examination	% Coursework	% Practical	Semesters
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
<b>Optional Modules</b>						
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.

### 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
<b>Compulsory Modules</b>						
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
<b>Compulsory Modules</b>						
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
<b>Optional Modules</b>						
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
<b>Optional Modules</b>						
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
<b>Compulsory Modules</b>						
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
<b>Optional Modules</b>						
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

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.

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.

The award of an Honours degree in Physics or Astrophysics requires 360 credit points passed with a minimum of at least 120 at level 6 including Physics/Astrophysics Project and Investigative Skills (6PAM1052 / 6PAM1054).

The award of an Honours degree in Physics or Astrophysics with Space Science requires 360 credit points passed with a minimum of at least 120 credits at level 6 including Space Science and Physics/Astrophysics Project and Investigative Skills (6PAM2001/6PAM2000).

### 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)
BSc (Hons)	Astrophysics	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including a pass for Astrophysics Project and Investigative Skills 6PAM1054.	6	A1, A2, A4, B1, B2, B3, C1, C3, 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, including passes for Astrophysics Project and Investigative Skills 6PAM1054 and Professional Placement 6PAM0011.	6	A1, A2, A4, B1, B2, B3, B7, C1, C3, 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, including a pass for Astrophysics Project and Investigative Skills 6PAM1054.  Additionally, a minimum of an 18-week approved and supervised	6	A1, A2, A4, B1, B2, B3, B8, C1, C3, C4, D1, D2, D3, D4

		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.		
BSc (Hons)	Astrophysics with Space Science	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including a pass for Space Science and Astrophysics Project and Investigative Skills 6PAM2001.	6	A1, A2, A4, B1, B2, B3, C1, C3, 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, including passes for Space Science and Astrophysics Project and Investigative Skills 6PAM2001 and Professional Placement 6PAM0011.	6	A1, A2, A4, A6, B1, B2, B3, B6, B7, C1, C3, D1, D2, D3, D4
BSc (Hons)	Astrophysics with Space Science (Sandwich) with Study Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including a pass for Space Science and Astrophysics Project and Investigative Skills 6PAM2001. Additionally, a 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, A6, B1, B2, B3, B4, B6, B7, 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, including passes for Space Science and Astrophysics Project and Investigative Skills 6PAM2001 and Year Abroad 6PAM0030.	6	A1, A2, A4, B1, B2, B3, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Astrophysics with Year Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including passes for Astrophysics Project and Investigative Skills 6PAM1054 and Year Abroad 6PAM0030.	6	A1, A2, A4, B1, B2, B3, B8, C1, C2, C3, C4, D1, D2, D3, D4
BSc (Hons)	Physics	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including a pass for Physics Project and Investigative Skills 6PAM1052.	6	A1, A2, A3, B1, B2, B3, B4, C1, C2, 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, including passes for Physics Project and Investigative Skills 6PAM1052 and Professional Placement 6PAM0011.	6	A1, A2, A3, B1, B2, B3, B4, B7, 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, including a pass for Physics Project and Investigative Skills 6PAM1052.  Additionally, a 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)	Physics with Space Science	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including a pass for Space Science and Physics Project and Investigative Skills 6PAM2000.	6	A1, A2, A3, A6, B1, B2, B3, B4, B5, C1, C2, 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, including passes for Space Science and Physics Project and Investigative Skills 6PAM2000 and Professional Placement 6PAM0011.	6	A1, A2, A3, A6, B1, B2, B3, B4, B7, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Physics with Space Science (Sandwich) with Study Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including a pass for Space Science and Physics Project and Investigative Skills 6PAM2000.  Additionally, a 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, A6, B1, B2, B3, B4, B6, B7, B8, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Physics with Space Science with Year Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including passes for Space Science and Physics Project and Investigative Skills 6PAM2000 and Year Abroad 6PAM0030.	6	A1, A2, A3, A5, A6, B1, B2, B3, B4, B5, B8, C1, C2, C4, D1, D2, D3, D4
BSc (Hons)	Physics with Year Abroad	360 credit points including 240 at level 6/5 of which 120 must be at level 6, including passes for Physics Project and Investigative Skills 6PAM1052 and Year Abroad 6PAM0030.	6	A1, A2, A3, A4, B1, B2, B3, B4, B8, C1, C2, 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: <a href="http://sitem.herts.ac.uk/secr eg/upr/AS11.htm">http://sitem.herts.ac.uk/secr eg/upr/AS11.htm</a>
Certificate of Higher Education		120 credit points at level 4	4, 5	See UPR AS11, section 13: <a href="http://sitem.herts.ac.uk/secr eg/upr/AS11.htm">http://sitem.herts.ac.uk/secr eg/upr/AS11.htm</a>
Diploma of Higher Education		240 credit points including at least 120 at level 5	5, 6	See UPR AS11, section 13: <a href="http://sitem.herts.ac.uk/secr eg/upr/AS11.htm">http://sitem.herts.ac.uk/secr eg/upr/AS11.htm</a>
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	Astrophysics (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass for Professional Placement 6PAM0011.	6	A1, A2, A4, B1, B2, B3, B7, 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.  Additionally, a 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	Astrophysics with Year Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass for Year Abroad 6PAM0030.		A1, A2, A4, B1, B2, B3, B7, B8, 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	Astrophysics with Space Science (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass Professional Placement 6PAM0011.	6	A1, A2, A4, A6, B1, B2, B3, B7, 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.  Additionally, a 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	6	A1, A2, A4, B1, B2, B3, B6, B8, C1, C2, D2

		satisfactorily as assessed by the Professional Training Certification Panel.		
BSc	Astrophysics with Year Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass for Year Abroad 6PAM0030.	6	A1, A2, A4, B1, B2, B3, B8, C1, C2, D2
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	Physics (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass for Professional Placement 6PAM0011.	6	A1, A2, A3, B1, B2, B3, B7, 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.  Additionally, a 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	Physics (Sandwich) with Year Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass for Year Abroad 6PAM0030.	6	A1, A2, A3, 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	Physics with Space Science (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass for Professional Placement 6PAM0011.	6	A1, A2, A3, A6, B1, B2, B3, B7, C1, C2, D2
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.  Additionally, a 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	Physics with Space Science with Year Abroad	300 credit points including 180 at level 6/5 of which 60 must be at level 6, including a pass for Year Abroad 6PAM0030.	6	A1, A2, A3, A6, B1, B2, B3, B8, C1, C2, D2
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## Programme-specific assessment regulations

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

None.

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:

Students enrolling on the BSc (Hons) Physics and BSc (Hons) Astrophysics degrees are subject to the following classification algorithms:

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
EIPHY	PHY3F, PHY4S, PHYP5P, PHYP6P	<b>BSc (Hons) Physics</b>	All level 5 and level 6 modules to be included in the degree classification calculation at a ratio of 25% level 5 and 75% level 6.  Physics Project and Investigative Skills 6PAM1052.	yes

Course Code	Course Instance	Award Title	Modules	Must be included in Award degree algorithm
EIPHYAP	AST3F, AST4S, ASTP5P, ASTP6P	<b>BSc (Hons) Astrophysics</b>	All level 5 and level 6 modules to be included in the degree classification calculation at a ratio of 25% level 5 and 75% level 6  Astrophysics Project and Investigative Skills 6PAM1054	yes

Course Code	Course Instance	Award Title	Modules	Must be included in Award degree algorithm
EIPHYSS	PHYSS3F, PHYSS4S, PHYSS5P, PHYSS6P	<b>BSc (Hons) Physics with Space Science</b>	All level 5 and level 6 modules to be included in the degree classification calculation at a ratio of 25% level 5 and 75% level 6  Space Science and Physics Project and Investigative Skills 6PAM2000	yes

Course Code	Course Instance	Award Title	Modules	Must be included in Award degree algorithm
EIPHYAPSS	ASTSS3F, ASTSS4S, ASTSS5P, ASTSS6P	<b>BSc (Hons) Astrophysics with Space Science</b>	All level 5 and level 6 modules to be included in the degree classification calculation at a ratio of 25% level 5 and 75% level 6  Space Science and Astrophysics Project and Investigative Skills 6PAM2001	yes

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

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, incorporating Chaplaincy, Counselling and Nursery.
- Medical Centre.
- A Mathematics Support Service.
- University Disability Advisors.
- A School Equality Committee.
- Hertfordshire Student's Union.
- Guided student-centred learning on Canvas module sites
- Careers Enterprise and Employment Services

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## **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 dedicated programme site
- 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/>.

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## 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).

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

## BSc (Hons) Physics and BSc (Hons) Astrophysics

**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	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D1	D2	D3
Level 4	Mathematical Methods	4PAM2006		x						x										
	Applications of Calculus	4PAM2016	x					x						x	x					
	Special Relativity and Quantum Physics	4PAM1066	x		x				x					x						
	The Physical Universe	4PAM1013								x										
	Computational Modelling	4PAM2018	x	x				x		x					x					
	Small Group Tutorial (Level 4)	4PAM1072			x				x					x					x	
	Experimental Physics	4PAM1068		x						x										
Level 5	Mathematical Techniques 2	5PAM1022																x	x	x
	Career Planning and Development	5PAM1049	x			x		x						x	x					
	Physics of the Solar System	5PAM1050	x			x		x						x	x					
	Extra-solar Planets	5PAM1051	x											x	x					
	Electromagnetism	5PAM1044	x											x	x					
	Optics and Lasers	5PAM1045	x					x						x	x					
	Thermodynamics	5PAM1046	x					x												
	Quantum Mechanics	5PAM1047	x					x									x	x		
	Plasma Physics and Fusion Reactors	5PAM1052		x						x										
	Differential Equations	5PAM2015		x						x										x
	Programming	5PAM2016		x						x										
	Motion and Tensors	5PAM2018		x						x										

	Module Title	Module Code	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D1	D2	D3
	Numerical Methods	5PAM2022	x	x				x		x					x					
	Small Group Tutorial (Level 5)	5PAM1048																x	x	x
	Professional Teaching Skills	5PAM2017																		
	Placement Year	6PAM0011											x							
	Year Abroad	6PAM0030																		
	Placement with Study Abroad	6PAM1033											x	x	x	x	x			
Level 6	Condensed States of Matter	6PAM1050	x		x			x	x					x	x			x		
	The Physics of Elementary Particles	6PAM1051	x					x												
	Foundations of Cosmology	6PAM1056	x			x		x	x					x	x			x		
	The Early Universe and galaxy Formation	6PAM1058	x			x		x	x					x	x			x		
	Nonlinear Systems	6PAM1030		x						x										
	Geophysical Fluid Dynamics	6PAM1053	x		x									x	x					
	Star Formation and Evolution	6PAM1055	x			x		x	x					x	x			x		
	The Physics of Astronomical Spectra	6PAM1057	x			x		x	x					x	x			x		
	Space Dynamics	6PAM0027		x				x							x			x	x	x
	Computational Physics	6PAM1004		x						x					x					
	Further Numerical Methods	6PAM1027		x						x										
	Quantum Optics and Information Theory	6PAM1059	x	x				x							x			x		
	Rocket Performance and Propulsion	6AAD0026		x						x					x					
	Partial Differential Equations	6PAM1023		x						x										
	Physics Project and Investigative Skills	6PAM1052							x						x	x		x		x
	Lagrangian Dynamics	6PAM1061		x						x										
	Applied Photonics	6PAM2003	x		x			x	x					x	x			x		

**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.

**BSc (Hons) Physics with Space Science and BSc (Hons) Astrophysics with Space Science**

			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	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D1	D2	D3
Level 4	Mathematical Methods	4PAM2006		x						x										
	Applications of Calculus	4PAM2016	x					x						x	x					
	Special Relativity and Quantum Physics	4PAM1066	x		x				x					x						
	The Physical Universe	4PAM1013								x										
	Computational Modelling	4PAM2018	x	x				x		x					x					
	Small Group Tutorial (Level 4)	4PAM1072			x				x					x					x	
	Experimental Physics	4PAM1068		x						x										
Level 5	Mathematical Techniques 2	5PAM1022																x	x	x
	Career Planning and Development	5PAM1049	x			x		x						x	x					
	Physics of the Solar System	5PAM1050	x			x		x						x	x					
	Extra-solar Planets	5PAM1051	x											x	x					
	Electromagnetism	5PAM1044	x											x	x					
	Optics and Lasers	5PAM1045	x					x						x	x					
	Thermodynamics	5PAM1046	x					x												
	Quantum Mechanics	5PAM1047		x				x							x			x	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



## KEY TO PROGRAMME LEARNING OUTCOMES

### Knowledge and Understanding

- A1- the fundamental concepts, ideas and theories of Physics and Astrophysics;  
to advanced levels in physics for the Physics award, and to advanced levels in astrophysics for the Astrophysics awards.
- A2- the mathematical and computational techniques used to frame and solve physical problems.
- A3- the techniques of practical work in Physics; to advanced levels in physics for the Physics award.
- A4- the techniques of practical work in Astrophysics; to advanced levels in astrophysics for the Astrophysics awards
- A5 - the techniques of practical work in Space Science; to advanced levels in space science for the Space Science awards.

### Intellectual Skills

- 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.
- 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.
- B3 – plan, execute and report the results of an experiment or an investigation to advanced levels in space science for the Space Science awards.
- B4- use mathematics and computing to describe the physical world or an investigation.
- B5- will have obtained significant practical experience of working in a suitable environment, alongside professionals or others engaged in scientific or commercial work.
- B6 – 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.

## Section 2

### Programme management

Relevant QAA subject benchmarking statements	Physics, Astronomy and Astrophysics
Type of programme	Undergraduate
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
EIPHY	BSc (Hons) Physics and Astrophysics	100415	F501