

School of Physics, Astronomy and Mathematics

Title of Programme: BSc Honours Physics and Astrophysics

Programme Code: EIPHY

Programme Specification

This programme specification is relevant to students entering:
01 September 2018

Associate Dean of School (Academic Quality Assurance):
Stephen Kane

Signature



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

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

Programme Specification BSc Honours Mathematics

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 In line with the Teaching Agency Requirements and Standards
Final Qualification	BSc Hons
All Final Award titles (Qualification and Subject)	<ol style="list-style-type: none">1. BSc (Hons) Physics2. BSc (Hons) Astrophysics3. BSc (Hons) Physics with a Year Abroad4. BSc (Hons) Astrophysics with a Year Abroad5. BSc (Hons) Physics (Sandwich)6. BSc (Hons) Astrophysics (Sandwich)7. BSc (Hons) Physics (Sandwich) with a Year Abroad8. BSc (Hons) Astrophysics (Sandwich) with a Year Abroad9. BSc (Hons) Physics with Science Education10. BSc (Hons) Astrophysics with Science Education
FHEQ level of award	6
UCAS code(s)	<ol style="list-style-type: none">1. F300 BSc (Hons) Physics2. F501 BSc (Hons) Astrophysics3. F301 BSc (Hons) Physics with a Year Abroad4. F510 BSc (Hons) Astrophysics with a Year Abroad5. n/a BSc (Hons) Physics with Science Education*6. n/a BSc (Hons) Astrophysics with Science Education*
Language of Delivery	*Apply for any BSc programme and then transfer during Level 5 English

A. Programme Rationale

The Physics and Astrophysics programme aims to train physicists and astrophysicists to a level commensurate with the requirements of the profession. The modules are designed to reflect the importance of fundamental concepts and ideas that underpin physics and astrophysics. They aim to instill 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 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 fulfill 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 Investigation 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 Investigation. 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 study a module that address professional issues relevant to a professional career.

- Additionally for Physics with Science Education and Astrophysics with Science Education the programme is designed to recruit physics and astrophysics graduates who wish to train to teach in a secondary school. Students are registered onto the "with Science Education" option at Level 5. At Level 6 they achieve 45 credits in physics education modules. On successful completion of the programme, students will be recommended for Qualified Teacher Status (QTS). To obtain the recommendation for QTS students have demonstrate that they have met all of the Teachers' standards as set out by the National College of Teaching and Learning. This programme intends to equip trainees to teach 11-16 with post-16 enrichment.

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 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.

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 Mathematics, Statistics and Operational Research 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 (2016) have been used as a guiding framework for curriculum design.

Knowledge and Understanding	Teaching and learning methods	Assessment strategy
<p>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.</p> <p>A2- the mathematical and computational techniques used to frame and solve physical problems.</p> <p>A3- the techniques of practical work in Physics; to advanced levels in physics for the Physics award.</p> <p>A4- the techniques of practical work in Astrophysics; to advanced levels in astrophysics for the Astrophysics awards.</p> <p>Additionally for the with Science Education awards</p> <p>A5- subjects and terminology across the age and ability range that they are trained to teach including relevant curricula frameworks</p> <p>A6- the use of literacy, numeracy and digital learning technologies in all subject teaching</p> <p>A7- assessment and monitoring requirements and use of data to monitor and enable pupil progression</p> <p>A8- policies, legal requirements, support mechanisms, contextual factors, equality and inclusion principles that support the health, well-</p>	<p>Acquisition of knowledge and understanding of A1 through to A4 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>Acquisition of knowledge and understanding is through at level 6 for the QTS awards: A5-10 Lectures, seminars and formative tasks, Modelling by tutors and mentors. Mentoring support in school to evaluate progress and assist in personal target setting. Observation and practice in school.</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 StudyNet, the Mathematics Drop-In Centre and the 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> <p>Knowledge and understanding are assessed through at level 6 for the QTS awards: A5 Subject audits and self-assessment. [N.B. The NCTL Skills Tests in numeracy, literacy are externally administered and assessed, and have to be passed prior to commencing the programme this is statutory requirement as of 2013]</p> <p>A5-A10 Formative tasks, summative assignments, formal observations in school and evidence from School Based Training (SBT)</p>

being and achievement of pupils

A9- how to create an inclusive learning environment taking into account diversity, equality and inclusion

A10- the ability to critically evaluate a range of pedagogical approaches and appropriate use of resources

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- use mathematics and computing to describe the physical world or an investigation.

And in the case of sandwich students

B4- will have obtained significant practical experience of working in a suitable environment, alongside professionals or others engaged in scientific or commercial work.

And in the case of students studying abroad

Teaching and learning methods

Intellectual skills are developed throughout 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.

Acquisition of Learning Outcome B4 is through a professional placement in a suitable scientific or commercial organisation.

Acquisition of Learning Outcome B5 is through a studying for a period of time in a foreign country.

Intellectual skills are developed through at levels 5 and 6 for the QTS awards:

B6-9 Lectures, seminars and formative tasks
Modelling by tutors and mentors.
Mentoring support in school to evaluate progress and assist in personal target setting.
Observation and practice in school.

Throughout, the learner is encouraged to develop intellectual skills further by independent study.

Assessment strategy

Intellectual skills are assessed through a combination of unseen examinations (B1, B3), practical examinations (B3), assessed individual in-course assignments (B1-B3), laboratory/observatory reports (B2), workbooks and logbooks (B1-B3), class tests (B1,B3), presentations (B1-B3) and final year project report (B1-B3).

B4 is assessed by written/verbal reports from the student, the placement organisation and the placement tutor.

B5 is assessed through relevant modules studied at an overseas institution.

Intellectual skills are assessed at Level 6 for the QTS awards:
B6-B9 Formative tasks, summative assignments, formal observations in school and evidence from SBT

B5 – will have obtained significant practical experience of studying in a foreign country.

Additionally for the with Science Education awards

B6- plan and teach sequences of lessons that demonstrate a logical progression and individual learners’

B7- adopt suitable pedagogical approaches to teaching and learning and critically analyse and evaluate their impact on pupils’ progression

B8- assess, monitor, give feedback, set targets and keep records and critically analyse these, to enable pupil progression

B9- able to create a safe learning environment including the use of behavioural strategies

Practical skills

C1- perform experimental work and draw conclusions.

C2- apply appropriate analytical and modelling techniques to physical problems; to advanced levels in physics for the Physics award.

C3- apply appropriate analytical and modeling techniques to astrophysical problems; to advanced levels in astrophysics for the Astrophysics award,

Additionally for the with Science Education awards

C4- organise the learning environment, including

Teaching and learning methods

Practical skills are developed through a series of laboratory classes at levels 4 to 5 (C1, C2, C3) and a level 6 project (C2, C3).

Practical skills are developed through at level 6 for the QTS awards:

C4-7 Lectures, seminars and formative tasks.
Self-study:
Modelling by tutors and mentors.
Mentoring support in school to evaluate progress and assist in personal target setting.
Observation and practice in school.

Throughout, the learner is expected to consolidate their development of practical computing skills by use of

Assessment strategy

Practical skills are assessed through laboratory reports (C1) and coursework and assignments (C1, C2).

Practical skills are assessed through at level 6 for the QTS awards:
C4-7 Formal observations in school and evidence from SBT

health and safety and pupil well-being	appropriate personal computers available in the Learning Resources Centre.	
C5- produce appropriate resources for teaching		
C6- critically plan and evaluate a range of routine and complex tasks and issues rigorously and systematically.		
Transferable skills	Teaching/learning methods & strategies	Assessment strategy
D1- communicate effectively, both orally and in writing.	<p>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-D3).</p> <p>Transferable skills are developed At level 6 for QTS awards: D4-10 Lectures, seminars and formative tasks, some of which are delivered face to face and some via e-learning. Self-study through e-learning tasks and resources or school-based tasks. Workshops on campus. Modelling by tutors and mentors. Mentoring support in school to evaluate progress and assist in personal target setting. Observation and practice in school.</p> <p>Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.</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>
D2- work effectively in a team.		
D3- demonstrate time, personal management and IT skills.		
Additionally for the with Science Education awards		
D4- have high expectations and model positive behaviour		
D5- communicate confidently both orally and in writing and in a range of situations		
D6- work effectively in pairs, teams and as a whole group/staff, as a member or a leader		
D7- be reflective, evaluative and act upon advice in order to improve practice		
D8- be aware of the importance of and to identify continuing professional development goals		
D9- use digital learning technologies as a learning		

<p>tool and as a practical resource</p> <p>D10- be self-directed and learn independently, to plan, solve problems and complete tasks in schools and in self-study</p>		
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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 Science Education
4. BSc Hons Degree in Astrophysics with Science Education

In addition there are non-honours degrees (BSc degrees) with same titles as for the BSc Honour degrees but not with Science Education.

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). Direct entry to Physics with Science Education and Astrophysics with Science Education is not permitted at level 6. Intake is normally semester A (September).

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.

The Teaching Agency confers Qualified Teacher Status (QTS). For this to be awarded the student must have met the entire Teachers' Standards through the taught and school-based elements of the programme; this means that all education modules, (5EDU1040, 6EDU189, 6EDU1090, 6EDU1091, 6EDU1092), must be passed for the chosen award to be conferred. No compensation for failed education modules listed previously.

Work-Based Learning, including Sandwich Programmes

An award in the sandwich mode is made if at least 36 weeks of approved, supervised work experience is undertaken in addition to the period required for full-time award.

Erasmus Exchange programme

Erasmus students are permitted to study the course at level 5 and level 6.

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

Mode of study Full time/Part time

Entry point Semester A

Level 4 BSc (Hons) Physics

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Mathematical Techniques 1	4PAM1034	30	English	50	50	0	AB
Contemporary Physics	4PAM0009	30	English	60	40	0	AB
The Physical Universe	4PAM1013	30	English	60	40	0	AB
Applications of Computing	4PAM1044	15	English	0	100	0	B
Laboratory Physics 1	4PAM1049	15	English	0	100	0	A
Small Group Tutorial	4PAM1027	0	English	0	100	0	AB

Level 5 BSc (Hons) Physics

Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Mathematical Techniques 2	5PAM1022	15	4PAM1034	English	80	20	0	A
Graduate Skills	5PAM1027	0		English	0	100	0	AB
Professional Teaching Skills*	5PAM1025	15		English	0	100	0	A
Programming*	5PAM1023	15	4PAM1044	English	0	100	0	A
Quantum Physics	5PAM0027	15	4PAM0009	English	60	40	0	B
Thermal and Condensed Matter Physics	5PAM0013	30	4PAM0009 Or 4PAM1013	English	80	20	0	AB
Optical Physics & Electromagnetism	5PAM0026	30	4PAM0009 Or 4PAM1013	English	60	40	0	AB

*At least one of these modules

Module Titles	Module Code	Credit Points	Pre-req	Language of Delivery	% examination	% coursework	% Practical	Semesters
Differential Equations	5PAM1032	15	4PAM1034	English	80	20	0	B
Dynamics	5PAM1024	15	4PAM1034	English	70	30	0	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	English	0	100	0	B
Numerical Methods	5PAM1029	15	4PAM1034	English	80	20	0	B

Optional sandwich year

Optional Modules Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Placement	6PAM0011	0	-	English	0	100	0	AB
Year Abroad	6PAM0030	0	-	English	0	100	0	AB
Placement with Study Abroad	6PAM1033	0	-	English	0	100	0	AB

Level 6 BSc (Hons) Physics

Compulsory Modules Module Titles	Module Code	Credit Points	Pre-req	Language of Delivery	% examination	% coursework	% Practical	Semesters
Computational Physics	6PAM1004	15	4PAM0023	English	0	100	0	A
Contemporary Quantum Physics	6PAM1007	15	5PAM0027	English	0	100	0	B
Waves & Fluids	6PAM0014	30	5PAM0026	English	60	40	0	AB
Investigations in Physics	6PAM1016	15		English	0	100	0	B

Optional Modules (choose 90 credits)

Module Titles	Module Code	Credit Points	Pre-req	Language of Delivery	% examination	% coursework	% Practical	Semesters
Rocket Performance and Propulsion	6AAD0026	15		English	60	40	0	A
Space Dynamics	6PAM0027	15	4PAM0023	English	0	100	0	B
Physics of Stars	6PAM0015	30	5PAM0013	English	60	40	0	AB
Nonlinear Systems	6PAM1030	15	4PAM1034	English	80	20	0	B
Partial Differential Equations	6PAM1023	15	5PAM1022	English	80	20	0	A
Dynamics and Geometry	6PAM1026	15	5PAM1022	English	80	20	0	B
Further Numerical Methods	6PAM1027	15	5PAM1029	English	80	20	0	B

BSc (Hons) Physics with Science Education

Mode of study Full time/Part time

Entry point Semester A

Level 4 BSc (Hons) Physics with Science Education

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Mathematical Techniques 1	4PAM1034	30	English	50	50	0	AB
Contemporary Physics	4PAM0009	30	English	60	40	0	AB
The Physical Universe	4PAM1013	30	English	60	40	0	AB

Applications of Computing	4PAM1044	15	English	0	100	0	B
Laboratory Physics 1	4PAM1049	15	English	0	100	0	A
Small Group Tutorial	4PAM1027	0	English	0	100	0	AB

In addition to the compulsory modules it is the expectation that students will spend a continuous period of 10 working days undertaking a teaching observation in an assigned school at the end of semester B or start of Semester C of Level 4 studies.

Level 5 BSc (Hons) Physics with Science Education

Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules								
Mathematical Techniques 2	5PAM1022	15	4PAM1034	English	80	20	0	A
Graduate Skills	5PAM1027	0		English	0	100	0	AB
Professional Teaching Skills	5PAM1025	15		English	0	100	0	A
Quantum Physics	5PAM0027	15	4PAM0009	English	60	40	0	B
Thermal and Condensed Matter Physics	5PAM0013	30	4PAM0009 Or 4PAM1013	English	80	20	0	AB
Optical Physics & Electromagnetism	5PAM0026	30	4PAM0009 Or 4PAM1013	English	60	40	0	AB
School Based Training 1	5EDU1040	0		English	0	100	0	BC

Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Optional Modules								
Differential Equations	5PAM1032	15	4PAM1034	English	80	20	0	B
Dynamics	5PAM1024	15	4PAM1034	English	70	30	0	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	English	0	100	0	B
Numerical Methods	5PAM1029	15	4PAM1034	English	80	20	0	B

Level 6 BSc (Hons) Physics with Science Education

Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules								
Computational Physics	6PAM1004	15	4PAM0023	English	0	100	0	A
Contemporary Quantum Physics	6PAM1007	15	5PAM0027	English	0	100	0	B
Waves & Fluids	6PAM0014	30	5PAM0026	English	60	40	0	AB
Dynamics and Geometry	6PAM1026	15	5PAM1022	English	80	20	0	B
Physics Teaching Enquiry	6EDU1092	15		English	0	100	0	B
Subject Knowledge for Physics Teaching	6EDU1091	30		English	0	100	0	AB

School Based Training 2	6EDU1089	0	5EDU1040	English	0	100	0	A
School Based Training 3	6EDU1090	0	6EDU1089	English	0	100	0	BC

Note that 6EDU1089 School Based Training 2 and 6EDU1090 School Based Training 3 will both take place in the same school.

BSc (Hons) Astrophysics

Mode of study Full time/Part time

Entry point Semester A

Level 4 BSc (Hons) Astrophysics

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Mathematical Techniques 1	4PAM1034	30	English	50	50	0	AB
Contemporary Physics	4PAM0009	30	English	60	40	0	AB
The Physical Universe	4PAM1013	30	English	60	40	0	AB
Applications of Computing	4PAM1044	15	English	0	100	0	B
Laboratory Physics 1	4PAM1049	15	English	0	100	0	A
Small Group Tutorial	4PAM1027	0	English	0	100	0	AB

Level 5 BSc (Hons) Astrophysics

	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules								
Module Title								
Mathematical Techniques 2	5PAM1022	15	4PAM1034	English	80	20	0	A
Graduate Skills	5PAM1027	0		English	0	100	0	AB
Professional Teaching Skills*	5PAM1025	15		English	0	100	0	A
Programming*	5PAM1023	15	4PAM1044	English	0	100	0	A
Quantum Physics	5PAM0027	15	4PAM0009	English	60	40	0	B
Solar System Physics	5PAM0025	30	4PAM0009	English	60	40	0	AB
			Or					
			4PAM1013					
Optical Physics & Electromagnetism	5PAM0026	30	4PAM0009	English	60	40	0	AB
			Or					
			4PAM1013					

* Exactly one of these two

	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Optional Modules								
Module Title								
Differential Equations	5PAM1032	15	4PAM1034	English	80	20	0	B
Dynamics	5PAM1024	15	4PAM1034	English	70	30	0	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	English	0	100	0	B
Numerical Methods	5PAM1029	15	4PAM1034	English	80	20	0	B

Optional sandwich year

	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Optional Modules								
Module Title								
Professional Placement	6PAM0011	0	-	English	0	100	0	AB
Year Abroad	6PAM0030	0	-	English	0	100	0	AB
Placement with Study Abroad	6PAM1033	0	-	English	0	100	0	AB

Level 6 BSc (Hons) Astrophysics

	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules								
Module Title								
Computational Physics*	6PAM1004	15	4PAM0023	English	0	100	0	A
Physics of Stars	6PAM0015	30	5PAM0025	English	60	40	0	AB

Cosmology and Large Scale Structure	6PAM1001	30	5PAM0025	English	60	40	0	AB
Investigations in Physics	6PAM1016	15	-	English	0	100	0	B

Optional Modules Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Rocket Performance and Propulsion	6AAD0026	15		English	60	40	0	A
Space Dynamics	6PAM0027	15	4PAM0023	English	0	100	0	B
Contemporary Quantum Physics	6PAM1007	15	5PAM0027	English	0	100	0	B
Waves & Fluids	6PAM0014	30	5PAM0026	English	60	40	0	AB
Nonlinear Systems	6PAM1030	15	4PAM1034	English	80	20	0	B
Partial Differential Equations	6PAM1023	15	5PAM1022	English	80	20	0	A
Dynamics and Geometry	6PAM1026	15	5PAM1022	English	80	20	0	B
Further Numerical Methods	6PAM1027	15	5PAM1029	English	80	20	0	B

BSc (Hons) Astrophysics with Science Education

Mode of study Full time/Part time

Entry point Semester A

Level 4 BSc (Hons) Astrophysics with Science Education

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Mathematical Techniques 1	4PAM1034	30	English	50	50	0	AB
Contemporary Physics	4PAM0009	30	English	60	40	0	AB
The Physical Universe	4PAM1013	30	English	60	40	0	AB
Applications of Computing	4PAM1044	15	English	0	100	0	B
Laboratory Physics 1	4PAM1049	15	English	0	100	0	A
Small Group Tutorial	4PAM1027	0	English	0	100	0	AB

In addition to the compulsory modules it is the expectation that students will spend a continuous period of 10 working days undertaking a teaching observation in an assigned school at the end of semester B or start of Semester C of Level 4 studies.

Level 5 BSc (Hons) Astrophysics with Science Education

Compulsory Modules Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Mathematical Techniques 2	5PAM1022	15	4PAM1034	English	80	20	0	A
Graduate Skills	5PAM1027	0		English	0	100	0	AB

Professional Teaching Skills	5PAM1025	15		English	0	100	0	A
Quantum Physics	5PAM0027	15	4PAM0009	English	60	40	0	B
Solar System Physics	5PAM0025	30	4PAM0009 Or 4PAM1013	English	60	40	0	AB
Optical Physics & Electromagnetism	5PAM0026	30	4PAM0009 Or 4PAM1013	English	60	40	0	AB
School Based Training 1	5EDU1040	0		English	0	100	0	BC

Optional Modules Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Differential Equations	5PAM1032	15	4PAM1034	English	80	20	0	B
Dynamics	5PAM1024	15	4PAM1034	English	70	30	0	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	English	0	100	0	B
Numerical Methods	5PAM1029	15	4PAM1034	English	80	20	0	B

Level 6 BSc (Hons) Astrophysics with Science Education

Compulsory Modules Module Title	Module Code	Credit Points	Pre-req	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Computational Physics	6PAM1004	15	4PAM0023	English	0	100	0	A
Physics of Stars	6PAM0015	30	5PAM0025	English	60	40	0	AB
Cosmology and Large Scale Structure	6PAM1001	30	5PAM0025	English	60	40	0	AB
Physics Teaching Enquiry	6EDU1092	15	-	English	0	100	0	B
Subject Knowledge for Physics Teaching	6EDU1091	30	-	English	0	100	0	AB
School Based Training 2	6EDU1089	0	5EDU1040	English	0	100	0	A
School Based Training 3	6EDU1090	0	6EDU1089	English	0	100	0	BC

Note that 6EDU1089 School Based Training 2 and 6EDU1090 School Based Training 3 will both take place in the same school.

For the academic year 2017-18 the School based training modules occur over the following time periods:

Module	Total days
5EDU1040 School Based Training 1	40
6EDU1089 School Based Training 2	25
6EDU1090 School Based Training 3	55
	120

*These days occur during the University examination period and the examinations will be timetabled accordingly around the school based training.

Note that if required the 10 days of teaching observation in 5PAM1025 Professional Teaching Skills may be used if required as part of the 120 days of School Based Training.

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.

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)	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, C1, C2, D1, D2, D3
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, C2, D1, D2, D3
BSc (Hons)	Physics with Science Education	360 credit points including 240 at level 6/5 of which 120 must be at level 6. All School based training modules must be passed in addition to be recommended for QTS.	6	A1, A2, A3, A5, A6, A7, A8, A9, A10, B1, B2, B3, B4, B5, B6, B7, B8, B9, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10
BSc (Hons)	Astrophysics with Science Education	360 credit points including 240 at level 6/5 of which 120 must be at level 6. All School based training modules must be passed in addition to be recommended for QTS.	6	A1, A2, A4, A5, A6, A7, A8, A9, A10, B1, B2, B3, B4, B5, B6, B7, B8, B9, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10
BSc (Hons)	Physics (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Minimum of a 36 week approved and supervised placement plus have must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, B1, B2, B3, B4, C1, C2, D1, D2, D3
BSc (Hons)	Astrophysics (Sandwich)	360 credit points including 240 at level 6/5 of which 120 must be at level 6. Minimum of a 36 week approved and supervised placement plus have must perform	6	A1, A2, A4, B1, B2, B3, B4, C1, C2, D1, D2, D3

		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, B1, B2, B3, B5, C1, C2, D1, D2, D3
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, B5, C1, C2, D1, D2, D3
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, B5, C1, C2, D1, D2, D3
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, B4, B5, C1, C2, D1, D2, D3

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/segreg/upr/AS11.htm
Certificate of Higher Education		120 credit points at level 4	4, 5	<i>For named awards, list all relevant learning outcomes, e.g. A1, A3, A4, B1, B2, C1, C5, D1, D2, D3</i> OR <i>For untitled awards: See UPR AS11, section 13: http://sitem.herts.ac.uk/segreg/upr/AS11.htm</i>
Diploma of Higher Education		240 credit points including at least 120 at level 5	5, 6	<i>For named awards, list all relevant learning outcomes, e.g. A1, A3, A4, B1, B2, B6, C1, C5, D1, D2, D3, D6</i>

				OR For untitled awards: See UPR AS11, section 13: http://sitem.herts.ac.uk/segreg/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. Minimum of a 36 week approved and supervised placement plus have must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A3, B1, B2, B3, B4, C1, C2, D2
BSc	Astrophysics (Sandwich)	300 credit points including 180 at level 6/5 of which 60 must be at level 6. Minimum of a 36 week approved and supervised placement plus have must perform satisfactorily as assessed by the Professional Training Certification Panel.	6	A1, A2, A4, B1, B2, B3, B4, 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 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, B5, C1, C2, D2
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, B5, 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, B4, B5, 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	6	A1, A2, A4, B1, B2, B3, B4, B5, C1, C2, D2

world-wide and must perform satisfactorily as assessed by the Professional Training Certification Panel.

Programme-specific assessment regulations

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

For students enrolling on the BSc (Hons) Physics and BSc (Hons) Astrophysics programme from 2013-14 onwards are subject to the following classification algorithm:

Course Code	Course Instance	Award Title	Modules (child instance codes and Title)	Must be included in Award degree algorithm
EIPHY	PHY3F, PHY4S, PHYP5P, PHYP6P	BSc (Hons) Physics	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	yes

Course Code	Course Instance	Award Title	Modules (child instance codes and Title)	Must be included in Award degree algorithm
EIPHYAP	AST3F, AST4S, ASTP5P, ASTP6P	BSc (Hons) Astrophysics	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	yes

For the with Science Education degrees:

- No compensation for failed Education modules, (5EDU1040, 6EDU1089, 6EDU1090, 6EDU1091, 6EDU1092) is permitted; students must pass all modules to achieve the award in order to meet the QTS Standards embedded in the taught programme and the placements.

Further points of clarification and interpretation relevant to this specific programme are given below:

Students have to complete the required number days of teaching experience in two schools (or approved settings) across two consecutive age phases (see pathway points) in order to comply with the NCTL requirements.

In the event of absence for more than two complete working weeks from either of the block teaching placements, the Board will normally require students to undertake a further period of supervised teaching placement at a time to be arranged. Absence of more than 3 days during a placement may need to be made up at the end of a placement, or the beginning of the next if absence is in a first placement.

To achieve an award it is necessary to:

- Pass the School Based Training 1 against the Teachers' Standards at an initial level (published in the placement documentation)
- Pass the School Based Training 1 before being allowed to progress to Placement 2;
- Pass School Based Training 2 and 3 against the full set of Standards at a final level;
- Demonstrate evidence of meeting the Teachers' Standards, at a level of competence set out in the NCTL documentation and in the school based training documentation
- Pass each of the formally assessed written assignments.

To be recommended to the NCTL for Qualified Teaching Status it is required that

- A degree of at least lower second classification is attained in either of the degree titles Physics with Science Education or Astrophysics with Science Education
- 120 days are completed in partner secondary schools

If a degree is of third class honours then an honours degree in either Physics with Science Education or Astrophysics with Science Education is awarded but recommendation for QTS will not be made to the NCTL.

All modules must normally be completed and passed; including referred and deferred modules, within a maximum time of 3 years from date of registration on the QTS programme. Those whose modules have not been completed and passed within this time limit, will normally have to re-register and begin the programme again, as their professional currency will have become outdated without extra study and experience in school.

Further points of clarification and interpretation relevant to this specific programme 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.
- Attendance at all scheduled learning and teaching sessions is required on this programme. To pass a module, a student must have attended 75% of the learning and teaching sessions at which attendance is required.

If attendance falls below 75% and the student has not obtained at least 30% in either coursework or examination, the student will normally be deemed to have failed the module at the first attempt and will not be permitted to undertake referred assessment in the module.

Students who have a disability which might impact on their attendance should consult with their disability advisor and Programme Leader.

- In the case of a Sandwich or Year Abroad award, students must also perform satisfactorily in the professional training year, as assessed by the Placement Tutor.
- 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 6 years for Part-time.

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.
- Attendance at all scheduled learning and teaching sessions is required on this programme. To pass a module, a student must have attended 75% of the learning and teaching sessions at which attendance is required.

If attendance falls below 75% and the student has not obtained at least 30% in either coursework or examination, the student will normally be deemed to have failed the module at the first attempt and will not be permitted to undertake referred assessment in the module.

Students who have a disability which might impact on their attendance should consult with their disability advisor and programme tutor.

- 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 6 years for Part-time.

Sandwich Placement

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 36 weeks (including employer's statutory holidays). This will normally be in one establishment but may be split into two consecutive half-yearly placements in different establishments. 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.

E. Management of Programme & Support for student learning.

Management

The programme is managed and administered through:

- A Programme Leader to help students understand the programme/award structure.
- A designated Student Administrator.
- 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.
- Student representatives on programme committees.

Support

Students are supported by:

- An induction week at the beginning of each new academic session.
- Overseas Orientation.
- English language support.
- Undergraduate bursaries.
- 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.
- Computing laboratories
- Industrial Training Placements Office.
- StudyNet, 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 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.
- A Disabled Student Coordinator.
- An Equality Office
- The Students' Union.
- Guided student-centred learning through the use of StudyNet.
- Careers Enterprise and Employment Services

Additionally for the with Science Education degrees

- Designated programme administrator and an administrator to arrange school placements
- Visiting tutors for School placements to provide academic and placement monitoring
- A mentor to support training in placement schools

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;
- A Module Guide for each constituent module.

The [Herts Handbook](#) is an introduction to the academic, social, cultural and sporting services and opportunities available at the University of Hertfordshire, and includes the Student Charter and Student Code of Conduct.

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.

The UK Quality Assurance Agency for Higher Education (QAA) has confirmed the quality and standards of provision at the University of Hertfordshire. A key part of QAA's role is to review and report on how universities maintain their academic standards and quality, to inform students and the wider public. The team of QAA reviewers visited the University of Hertfordshire in 2015/16 and judged that its academic standards, the quality and enhancement of its students' learning experience, and the quality of information about this learning experience all meet UK expectations. In other words, the University meets national requirements for standards and quality. The QAA's report can be accessed at: <http://www.qaa.ac.uk/reviews-and-reports/provider?UKPRN=10007147#.V-KHajXy0nE>

G. Entry requirements

The normal entry requirements for the programme are:

- 280 points from minimum of two GCE/VCE A-levels (normally including GCE A-level Mathematics at grade C or above), or one VCE Double Award plus GCE A level Mathematics. All key skills and other tariff points counted.

or

- BTEC ND/NC with 2 distinctions and a merit profile across other units, subject to interview;

plus

- GCSE English and Mathematics at grade C or above.

The module 5PAM1025 requires satisfactory health clearance and DBS (Disclosure and Barring Service) clearance. Similar clearance may also be required for 6PAM0011 and 6PAM0030

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

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:
Suzanne Locke (s.f.locke@herts.ac.uk)

If you wish to receive a copy of the latest Programme Annual Monitoring and Evaluation Report (AMER) and/or the External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

BSc (Hons) Physics

Table 2: Development of 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	B1	B2	B3	B4	B5	C1	C2	D1	D2	D3	
Level	Module Title	Module Code													
Level 4	Mathematical Techniques 1	4PAM1034		x			x								
	Contemporary Physics	4PAM0009	x								x				
	The Physical Universe	4PAM1013	x		x		x								
	Applications of Computing	4PAM1044									x				
	Small Group Tutorial	4PAM1027	x	x		x					x				
Level 5	Laboratory Physics 1	4PAM0016			x		x			x			x		
	Mathematical Techniques 2	5PAM1022		x											
	Laboratory Physics 2	5PAM0023			x		x			x			x		
	Graduate Skills	5PAM1027										x	x	x	
	Thermal and Condensed Matter Physics	5PAM0013	x			x					x				
	Optical Physics & Electromagnetism	5PAM0026	x								x				
	Quantum Physics	5PAM0027	x			x									
	Differential Equations	5PAM1020		x											
	Programming	5PAM1023		x										x	
	Dynamics	5PAM1024		x											
	Numerical Methods	5PAM1029		x											
Level 6	Professional Teaching Skills	5PAM1025										x	x	x	
	Professional Placement	6PAM0011													
	Year Abroad	6PAM0030									x				
	Placement with Study Abroad	6PAM1033									x	x			
	Nonlinear Systems	6PAM1030		x											
	Waves & Fluids	6PAM0014	x		x						x	x			
	Physics of Stars	6PAM0015	x		x										
	Space Dynamics	6PAM0027		x		x					x	x	x	x	
	Computational Physics	6PAM1004		x							x				
	Further Numerical Methods	6PAM1027		x											
	Contemporary Quantum Physics	6PAM1007	x	x		x						x	x		
	Rocket Performance and Propulsion	6AAD0026		x								x			
	Partial Differential Equations	6PAM1023		x											
Investigations in Physics	6PAM1016											x	x		
Dynamics and Geometry	6PAM1026		x												

BSc (Hons) Astrophysics

Table 2: Development of 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	A4	B1	B2	B3	B4	B5	C1	C2	D1	D2	D3
Level 4	Mathematical Techniques 1	4PAM1034		x				x							
	Contemporary Physics	4PAM0009	x									x			
	The Physical Universe	4PAM1013	x		x		x								
	Applications of Computing	4PAM1044						x							
	Small Group Tutorial	4PAM1027	x	x		x		x				x			
Level 5	Laboratory Physics 1	4PAM0016			x		x				x			x	
	Mathematical Techniques 2	5PAM1022		x				x							
	Laboratory Physics 2	5PAM0023			x		x				x			x	
	Graduate Skills	5PAM1027											x	x	x
	Solar System Physics	5PAM0025	x		x										
	Optical Physics & Electromagnetism	5PAM0026	x									x			
	Quantum Physics	5PAM0027	x			x									
	Differential Equations	5PAM1020		x				x							
	Programming	5PAM1023		x				x							x
	Dynamics	5PAM1024		x				x							
	Numerical Methods	5PAM1029		x				x							
	Professional Teaching Skills	5PAM1025											x	x	x
	Professional Placement	6PAM0011							x						
	Year Abroad	6PAM0030								x					
	Placement with Study Abroad	6PAM1033							x	x					
Level 6	Cosmology and Large Scale Structure	6PAM1001	x		x										
	Nonlinear Systems	6PAM1030		x				x							
	Waves & Fluids	6PAM0014	x		x						x	x			
	Physics of Stars	6PAM0015	x		x										
	Space Dynamics	6PAM0027		x		x						x	x	x	x
	Computational Physics	6PAM1004		x				x				x			
	Further Numerical Methods	6PAM1027		x				x							
	Contemporary Quantum Physics	6PAM1007	x	x		x						x	x		
	Rocket Performance and Propulsion	6AAD0026		x				x				x			
	Partial Differential Equations	6PAM1023		x				x							
	Investigations in Physics	6PAM1016											x		x
Dynamics and Geometry	6PAM1026		x				x								

BSc (Hons) Physics with Science Education (with recommendation for QTS)

Table 2: Development of 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	A5	A6	A7	A8	A9	A10	B1	B2	B3	B6	B7	B8	B9	C1	C2	C4	C5	C6	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Level 4	Mathematical Techniques 1	4PAM1034		x										x																			
	Contemporary Physics	4PAM0009	x																	x													
	The Physical Universe	4PAM1013	x		x									x																			
	Applications of Computing	4PAM1044													x																		
	Small Group Tutorial	4PAM1027	x	x								x		x						x													
	Laboratory Physics 1	4PAM0016			x								x						x							x							
Level 5	Mathematical Techniques 2	5PAM1022		x										x																			
	Laboratory Physics 2	5PAM0023			x								x						x							x							
	Graduate Skills	5PAM1027																						x	x	x							
	Thermal and Condensed Matter Physics	5PAM0013	x									x								x													
	Optical Physics & Electromagnetism	5PAM0026	x																	x													
	Quantum Physics	5PAM0027	x									x																					
	Differential Equations	5PAM1020		x										x																			
	Dynamics	5PAM1024		x										x																			
	Numerical Methods	5PAM1029		x										x																			
	Professional Teaching Skills	5PAM1025																						x	x	x							
	School Based Training 1	5EDU1040				x	x	x	x	x	x				x	x	x	x			x	x	x				x	x	x	x	x	x	x
Level 6	Waves & Fluids	6PAM0014	x		x														x	x													
	Computational Physics	6PAM1004		x									x						x														
	Contemporary Quantum Physics	6PAM1007	x	x							x								x						x								
	Dynamics and Geometry	6PAM1026		x									x																				
	Physics Teaching Enquiry	6EDU1092				x	x	x	x	x	x				x	x	x	x			x	x	x				x	x	x	x	x	x	x
	Subject Knowledge for Physics Teaching	6EDU1091				x	x	x	x	x	x				x	x	x	x			x	x	x				x	x	x	x	x	x	x
	School Based Training 2	6EDU1089				x	x	x	x	x	x				x	x	x	x			x	x	x				x	x	x	x	x	x	x
School Based Training 3	6EDU1090				x	x	x	x	x	x				x	x	x	x			x	x	x				x	x	x	x	x	x	x	

BSc (Hons) Astrophysics with Science Education (with recommendation for QTS)

Table 2: Development of 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)

Module Title	Module Code	Knowledge & Understanding										Intellectual Skills							Practical Skills						Transferable Skills											
		A1	A2	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B6	B7	B8	B9	C1	C3	C4	C5	C6	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10				
Level 4	Mathematical Techniques 1	4PAM1034		x																																
	Contemporary Physics	4PAM0009	x																x																	
	The Physical Universe	4PAM1013	x		x										x																					
	Applications of Computing	4PAM1044														x																				
	Small Group Tutorial	4PAM1027	x	x											x		x																			
	Laboratory Physics 1	4PAM0016				x											x																			
	Mathematical Techniques 2	5PAM1022				x												x																		
	Laboratory Physics 2	5PAM0023				x														x																
	Graduate Skills	5PAM1027																						x	x	x										
Level 5	Solar System Physics	5PAM0025	x		x																															
	Optical Physics & Electromagnetism	5PAM0026	x																	x																
	Quantum Physics	5PAM0027	x														x																			
	Differential Equations	5PAM1020				x																														
	Dynamics	5PAM1024				x																														
	Numerical Methods	5PAM1029				x																														
	Professional Teaching Skills	5PAM1025																																		
	School Based Training 1	5EDU1040				x	x	x	x	x	x																									
	Cosmology and Large Scale Structures	6PAM1001	x		x																															
	Computational Physics	6PAM1004			x																x															
	Physics of Stars	6PAM0015	x			x																														
Level 6	Physics Teaching Enquiry	6EDU1092				x	x	x	x	x	x																									
	Subject Knowledge for Physics Teaching	6EDU1091				x	x	x	x	x	x																									
	School Based Training 2	6EDU1089				x	x	x	x	x	x																									
	School Based Training 3	6EDU1090				x	x	x	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. Subjects and terminology across the age and ability range that they are trained to teach including relevant curricula frameworks
- A6. The use of literacy, numeracy and digital learning technologies in all subject teaching
- A7. Assessment and monitoring requirements and use of data to monitor and enable pupil progression
- A8. Policies, legal requirements, support mechanisms, contextual factors, equality and inclusion principles that support the health, well-being and achievement of pupils
- A9. How to create an inclusive learning environment taking into account diversity, equality and inclusion
- A10. The ability to critically evaluate a range of pedagogical approaches and appropriate use of resources

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. Use mathematics and computing to describe the physical world or an investigation.
- B4. Will have obtained significant practical experience of working in a suitable environment,

Practical Skills

- C1. Perform experimental work and draw conclusions.
- C2. Apply appropriate analytical and modelling techniques to physical problems; to advanced levels in physics for the Physics award.
- C3. Apply appropriate analytical and modeling techniques to astrophysical problems; to advanced levels in astrophysics for the Astrophysics award,
- C4. Organise the learning environment, including health and safety and pupil well-being
- C5. Produce appropriate resources for teaching
- C6. Critically plan and evaluate a range of routine and complex tasks and issues rigorously and systematically.

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. Have high expectations and model positive behaviour

- B5. Will have obtained significant practical experience of studying in a foreign country
- B6. Plan and teach sequences of lessons that demonstrate a logical progression and individual learners' needs
- B7. Adopt suitable pedagogical approaches to teaching and learning and critically analyse and evaluate their impact on pupils' progression
- B8. Assess, monitor, give feedback, set targets and keep records and critically analyse these, to enable pupil progression
- B9. Able to create a safe learning environment including the use of behavioural strategies

- D5. Communicate confidently both orally and in writing and in a range of situations
- D6. Work effectively in pairs, teams and as a whole group/staff, as a member or a leader
- D7. Be reflective, evaluative and act upon advice in order to improve practice
- D8. Be aware of the importance of and to identify continuing professional development goals
- D9. Use digital learning technologies as a learning tool and as a practical resource
- D10. Be self-directed and learn independently, to plan, solve problems and complete tasks in schools and in self-study

Section 2

Programme management

Relevant QAA subject benchmarking statements	Physics, Astronomy and Astrophysics
Type of programme	Undergraduate
Date of validation/last periodic review	February 13
Date of production/ last revision of PS	March 2018
Relevant to level/cohort	All students entering September 2018
Administrative School	School of Physics, Astronomy and Mathematics

Table 3 Course structure

Course details					
Course code		Course description			JACS
EIPHY		BSc/BSc (Hons) Physics and Astrophysics (Physics)			F300
Course Instances					
Instances code	Intake	Stream	Instances Year	Location:	Mode of study
PHY1S	A	Physics	1	Hatfield	Full-time/sandwich
PHY2S	A	Physics	2	Hatfield	Full-time/sandwich
PHY3F	A	Physics	3	Hatfield	Full-time
PHY3S	A	Physics	3	Hatfield	Sandwich Placement/Study Abroad
PHY4S	A	Physics	4	Hatfield	Sandwich
PHYP1P	A	Physics	1	Hatfield	Part-time
PHYP2P	A	Physics	2	Hatfield	Part-time
PHYP3P	A	Physics	3	Hatfield	Part-time
PHYP4P	A	Physics	4	Hatfield	Part-time
PHYP5P	A	Physics	5	Hatfield	Part-time
PHYP6P	A	Physics	6	Hatfield	Part-time
PHYU2SNH	A	Physics	2	Hatfield	Full-time/sandwich
PHYU3FNH	A	Physics	3	Hatfield	Full-time

Relevant QAA subject benchmarking statements
Type of programme
Date of validation/last periodic review
Date of production/ last revision of PS
Relevant to level/cohort
Administrative School

Physics, Astronomy and Astrophysics
 BSc (Honours)
 February 13
 March 2018
 All students entering September 2018
 School of Physics, Astronomy and Mathematics

Course details					
Course code		Course description			JACS
EIPHYAP		BSc/BSc (Hons) Physics and Astrophysics (Astrophysics)			F510
Course Instances					
Instances code	Intake	Stream	Instances Year	Location:	Mode of study
AST1S	A	Astrophysics	1	Hatfield	Full-time/sandwich
AST2S	A	Astrophysics	2	Hatfield	Full-time/sandwich
AST3F	A	Astrophysics	3	Hatfield	Full-time
AST3S	A	Astrophysics	3	Hatfield	Sandwich Placement/Study Abroad
AST4S	A	Astrophysics	4	Hatfield	Sandwich
ASTP1P	A	Astrophysics	1	Hatfield	Part-time
ASTP2P	A	Astrophysics	2	Hatfield	Part-time
ASTP3P	A	Astrophysics	3	Hatfield	Part-time
ASTP4P	A	Astrophysics	4	Hatfield	Part-time
ASTP5P	A	Astrophysics	5	Hatfield	Part-time
ASTP6P	A	Astrophysics	6	Hatfield	Part-time

Relevant QAA subject benchmarking statements
Type of programme
Date of validation/last periodic review
Date of production/ last revision of PS
Relevant to level/cohort
Administrative School

Physics, Astronomy and Astrophysics
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Course details					
Course code		Course description			JACS
EIPHYSE		BSc Honours Physics with Science Education			F300
Course Instances					
Instances code	Intake	Stream		Instances Year	Location: Mode of study
PHYSE2F	A	Physics with Science Education		2	Hatfield Full-time
PHYSE3F	A	Physics with Science Education		3	Hatfield Full-time

Relevant QAA subject benchmarking statements
Type of programme
Date of validation/last periodic review
Date of production/ last revision of PS
Relevant to level/cohort
Administrative School

Physics, Astronomy and Astrophysics
 BSc (Honours)
 February 13
 March 2018
 All students entering September 2018
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Course details					
Course code		Course description			JACS
EIPHYASE		BSc Honours Astrophysics with Science Education			F510
Course Instances					
Instances code	Intake	Stream		Instances Year	Location: Mode of study
ASTE2F	B	Astrophysics with Science Education		2	Hatfield Full-time
ASTE3F	A	Astrophysics with Science Education		3	Hatfield Full-time