

Faculty: Science, Technology and Creative Arts

Title of Programme: BSc Honours Physics and Astrophysics Programme

Programme Code: EIPHY

# Programme Specification

Start Date: September 2011

Date of Approval: 6<sup>th</sup> March 2011

Associate Dean (Academic Quality): PETROS KHOUDIAN

A handwritten signature in black ink, appearing to read 'Petros Khoudian', with a stylized flourish at the end.

Signature

# Programme Specification BSc Honours Physics and Astrophysics programme

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

<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
<b>Final Award</b>	BSc Hons
<b>All Final Award titles</b>	1. Physics 2. Astrophysics
<b>FHEQ level of award</b>	Honours (level 6)
<b>UCAS code(s)</b>	1. F300 BSc/Physic 2. F501 BSC/AstP

### 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 the physical sciences. They aim to instil in the student an appreciation of the beauty of the physical world and the remarkable success that analytical, observational and experimental techniques have achieved in predicting and explaining its behaviour. Emphasis is placed on practical work in the laboratories, at the observatory and in computer suites.

The programme endeavours to recruit students with a genuine enthusiasm and interest in the subject area. It seeks to foster a creative spirit in students to help them fulfil their potential, to become creative scientists and to become successful in a wide range of graduate professions where logical and analytical thinking is required.

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

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

## B. Educational Aims of the Programme

The programme has been devised in accordance with the University's general educational aims of programmes of study as set out in UPR LT01.

### 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, astrophysics and scientific computing;
- 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.

In addition, for those opting to take professional training (leading to a Sandwich award):

- provide a one year training placement in a suitable environment working alongside other professionals. This enhances the achievement of most the above aims, dependent upon the character of the placement.

In addition, for those opting to take a year abroad (leading to a 'with Year Abroad' award):

- provide students with the opportunity to expand, develop and apply the knowledge and skills gained in the first two taught years of the degree within a different organisational and cultural environment in a partner academic institution for one academic year.

The extent to which each of the above aims is met will depend upon the choices made by the student.

## 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 Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008), and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education 2003 have been used as a guiding framework for curriculum design.

Knowledge and Understanding of:	Teaching/learning methods & strategies	Assessment
A1-the fundamental concepts, ideas and theories of Physics and Astrophysics;	Acquisition of knowledge and understanding of A1 through A4 is through 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 a project undertaken at level 6.	Knowledge and understanding are assessed through a combination of unseen examinations (A1, A2), practical examinations (A2, A3), in-course assessments (A1-A3) in the form of laboratory reports and logbooks (A2, A3), class tests (A1, A2), coursework assignments (A1-A3), project report (A1-A3), oral and poster presentation (A1-A3).
A2-the mathematical and computational techniques used to frame and solve physical problems;		
A3-the techniques of practical work in Physics and Astrophysics.		

	<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>	
<b>Intellectual skills - able to:</b>	<b>Teaching/learning methods &amp; strategies</b>	<b>Assessment</b>
<p>B1-formulate and tackle problems in physics and astrophysics;</p> <p>B2-plan, execute and report the results of an experiment or an investigation;</p> <p>B3-use mathematics and computing to describe the physical world or an investigation.</p> <p>And in the case of Sandwich/Year Abroad students:</p> <p>B4-obtain experience of working in a suitable environment alongside professionals or others engaged in scientific work.</p>	<p>Intellectual skills are developed throughout the programme by the methods and strategies outlined in section A above.</p> <p>Learning Outcomes B1-B3 are developed through tutorial exercises, workshops, coursework, group-work, laboratory or observatory work and project work.</p> <p>Acquisition of Learning Outcome B4 is through a professional placement in a suitable scientific or commercial organisation.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study.</p>	<p>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).</p> <p>B4 is assessed by written/verbal reports from the student, the placement organisation and the placement tutor.</p>
<b>Practical skills - able to:</b>	<b>Teaching/learning methods &amp; strategies</b>	<b>Assessment</b>
<p>C1-perform experimental work and draw conclusions;</p> <p>C2-apply appropriate analytical and modelling techniques to physical problems.</p>	<p>Practical skills are developed through a series of laboratory classes at levels 4 to 5 (C1, C2) and final year project (C2).</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>

Transferable skills - able to:	Teaching/learning methods & strategies	Assessment
D1-communicate effectively, both orally and in writing; D2-work effectively in a team; D3-demonstrate time, personal management and IT skills.	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).  Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.	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).

## 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 one of the following depending upon the study path followed.

1. BSc Hons Degree in Physics
2. BSc Hons Degree in Astrophysics

In addition there are non-Honours degrees (BSc degrees) with the same two titles as for the BSc Honours degrees.

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).

### Work-Based Learning, including Sandwich Programmes

An award in the sandwich mode is made if at least 48 weeks of approved, supervised work experience is undertaken in addition to the period required for full-time award.

### Programme Structure

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

Table 1a Outline Programme Structure for Physics

The following programme will be offered from September 2010

**Level 4 BSc (Hons) Physics**

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	% examination	% coursework	Semester
Mathematical Techniques 1	4PAM0007	30	50	50	AB
Contemporary Physics	4PAM0009	30	60	40	AB
The Physical Universe	4PAM1013	30	60	40	AB
Applications of Computing	4PAM0023	15	0	100	B
Laboratory Physics 1	4PAM0016	15	0	100	A

**Level 5 BSc (Hons) Physics**

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Mathematical Techniques 2	5PAM0012	15	4PAM0007	80	20	A
Professional Skills*	5PAM0024	15		0	100	A
Professional Teaching Skills*	5PAM0028	15		0	100	A
Quantum Physics	5PAM0027	15	4PAM0009	60	40	B
Thermal and Condensed Matter Physics	5PAM0013	30	4PAM0009 Or 4PAM1013	80	20	AB
Optical Physics & Electromagnetism	5PAM0026	30	4PAM0009 Or 4PAM1013	60	40	AB

\* Exactly one of these two.

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Differential Equations	5PAM1001	15	4PAM0007	80	20	B
Mechanics	5PAM1003	15	4PAM0007	80	20	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	0	100	B

## Optional sandwich year

Optional Modules Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Professional Placement	6PAM0011	0		0	100	ABC
Year Abroad	6PAM0030	0		0	100	ABC

## Level 6 BSc (Hons) Physics

Compulsory Modules Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Computational Physics	6PAM1004	15	4PAM0023	0	100	A
Contemporary Quantum Physics	6PAM1007	15	5PAM0027	0	100	B
Waves & Fluids	6PAM0014	30	5PAM0026	60	40	AB
Project – (Physics)	6PAM0026	30		0	100	AB

Optional Modules Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Rocket Performance and Propulsion	6AAD0026	15	-	60	40	A
Quantum Computing A	6COM0247	15	4PAM0009	0	100	A
Quantum Computing B	6COM0260	15	6COM0247	100	0	B
Space Dynamics	6PAM0027	15	4PAM0023	0	100	B
Physics of Stars	6PAM0015	30	5PAM0025	60	40	AB
Nonlinear Systems	6PAM0007	30	4PAM0007	80	20	AB
Cosmology and Large Scale Structure	6PAM1001	30	5PAM0025	60	40	AB
Boundary Value Problems	6PAM0022	30	5PAM0012	80	20	AB

Table 1b Outline Programme Structure for Astrophysics

The following programme will be offered from September 2010

## Level 4 BSc (Hons) Astrophysics

Compulsory Modules Module Title	Module Code	Credit Points	% examination	% coursework	Semester
Mathematical Techniques 1	4PAM0007	30	50	50	AB
Contemporary Physics	4PAM0009	30	60	40	AB
The Physical Universe	4PAM1013	30	60	40	AB
Applications of Computing	4PAM0023	15	0	100	B
Laboratory Physics 1	4PAM0016	15	0	100	A

## Level 5 BSc (Hons) Astrophysics

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Mathematical Techniques 2	5PAM0012	15	4PAM0007	80	20	A
Professional Skills*	5PAM0024	15		0	100	A
Professional Teaching Skills*	5PAM0028	15		0	100	A
Quantum Physics	5PAM0027	15	4PAM0009	60	40	B
Solar System Physics	5PAM0025	30	4PAM0009 Or 4PAM1013	60	40	AB
Optical Physics & Electromagnetism	5PAM0026	30	4PAM0009 Or 4PAM1013	60	40	AB

\* Exactly one of these two.

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Differential Equations	5PAM1001	15	4PAM0007	80	20	B
Mechanics	5PAM1003	15	4PAM0007	80	20	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	0	100	B

## Optional sandwich year

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Professional Placement	6PAM0011	0		0	100	ABC
Year Abroad	6PAM0030	0		0	100	ABC

## Level 6 BSc (Hons) Astrophysics

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Physics of Stars	6PAM0015	30	5PAM0025	60	40	AB
Cosmology and Large Scale Structure	6PAM1001	30	5PAM0025	60	40	AB
Project – (Physics)	6PAM0026	30		0	100	AB

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Waves & Fluids	6PAM0014	30	5PAM0026	60	40	AB
Computational Physics	6PAM1004	15	4PAM0023	0	100	A
Contemporary Quantum Physics	6PAM1007	15	5PAM0027	0	100	B
Nonlinear Systems	6PAM0007	30	4PAM0007	80	20	AB
Space Dynamics	6PAM0027	15	4PAM0023	0	100	B
Rocket Performance and Propulsion	6AAD0026	15	-	60	40	A
Boundary Value Problems	6PAM0022	30	5PAM0012	80	20	AB

Table 1c Outline Programme Structure for Physics with Scientific Computing

The following programme will not recruit for September 2010 and will be withdrawn by 2013.

#### Level 4 BSc (Hons) Physics with Scientific Computing

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	% examination	% coursework	Semester
Mathematical Techniques 1	4PAM0007	30	50	50	AB
Contemporary Physics	4PAM0009	30	60	40	AB
The Physical Universe	4PAM1013	30	60	40	AB
Applications of Computing	4PAM0023	15	0	100	B
Laboratory Physics 1	4PAM0016	15	0	100	A

#### Level 5 BSc (Hons) Physics with Scientific Computing

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Mathematical Techniques 2	5PAM0012	15	4PAM0007	80	20	A
Professional Skills*	5PAM0024	15		0	100	A
Professional Teaching Skills*	5PAM0028	15		0	100	A
Quantum Physics	5PAM0027	15	4PAM0009	60	40	B
Numerical Methods	5PAM1004	30	4PAM0007	80	20	AB

\* Exactly one of these two.

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Thermal and Condensed Matter Physics*	5PAM0013	30	4PAM0009 Or 4PAM1013	80	20	AB
Optical Physics & Electromagnetism*	5PAM0026	30	4PAM0009 Or 4PAM1013	60	40	AB
Differential Equations	5PAM1001	15	4PAM0007	80	20	B
Mechanics	5PAM1003	15	4PAM0007	80	20	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	0	100	B

\* Exactly one of these two.

### Optional sandwich year

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Professional Placement	6PAM0011	0		0	100	ABC
Year Abroad	6PAM0030	0		0	100	ABC

### Level 6 BSc (Hons) Physics with Scientific Computing

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Computational Physics	6PAM1004	15	4PAM0023	0	100	A
Space Dynamics	6PAM0027	15	4PAM0023	0	100	B
Waves & Fluids	6PAM0014	30	5PAM0026	60	40	AB
Project – (Physics)	6PAM0026	30		0	100	AB

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Rocket Performance and Propulsion	6AAD0026	15	-	60	40	A
Quantum Computing A	6COM0247	15	4PAM0009	0	100	A
Quantum Computing B	6COM0260	15	6COM0247	100	0	B
Contemporary Quantum Physics	6PAM1007	15	5PAM0027	0	100	B
Physics of Stars	6PAM0015	30	5PAM0025	60	40	AB
Nonlinear Systems	6PAM0007	30	4PAM0007	80	20	AB
Cosmology and Large Scale Structure	6PAM1001	30	5PAM0025	60	40	AB
Boundary Value Problems	6PAM0022	30	5PAM0012	80	20	AB

Table 1d Outline Programme Structure for Astrophysics with Scientific Computing

The following programme will be offered from September 2010

#### Level 4 BSc (Hons) Astrophysics with Scientific Computing

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	% examination	% coursework	Semester
Mathematical Techniques 1	4PAM0007	30	50	50	AB
Contemporary Physics	4PAM0009	30	60	40	AB
The Physical Universe	4PAM1013	30	60	40	AB
Applications of Computing	4PAM0023	15	0	100	B
Laboratory Physics 1	4PAM0016	15	0	100	A

#### Level 5 BSc (Hons) Astrophysics with Scientific Computing

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Mathematical Techniques 2	5PAM0012	15	4PAM0007	80	20	A
Professional Skills*	5PAM0024	15		0	100	A
Professional Teaching Skills*	5PAM0028	15		0	100	A
Quantum Physics	5PAM0027	15	4PAM0009	60	40	B
Solar System Physics	5PAM0025	30	4PAM0009 Or 4PAM1013	60	40	AB
Numerical Methods	5PAM1004	30	4PAM0007	80	20	AB

\* Exactly one of these two.

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Differential Equations	5PAM1001	15	4PAM0007	80	20	B
Mechanics	5PAM1003	15	4PAM0007	80	20	B
Laboratory Physics 2	5PAM0023	15	4PAM0016	0	100	B

### Optional sandwich year

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Professional Placement	6PAM0011	0		0	100	AB
Year Abroad	6PAM0030	0		0	100	AB

### Level 6 BSc (Hons) Astrophysics with Scientific Computing

<b>Compulsory Modules</b> Module Title	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Physics of Stars*	6PAM0015	30	5PAM0025	60	40	AB
Cosmology and Large Scale Structure*	6PAM1001	30	5PAM0025	60	40	AB
Computational Physics	6PAM1004	15	4PAM0023	0	100	A
Space Dynamics	6PAM0027	15	4PAM0023	0	100	B
Project – (Physics)	6PAM0026	30		0	100	AB

\* At least one of these modules.

<b>Optional Modules</b> Module Titles	Module Code	Credit Points	Pre-req	% examination	% coursework	Semester
Waves & Fluids	6PAM0014	30	5PAM0026	60	40	AB
Contemporary Quantum Physics	6PAM1007	15	5PAM0027	0	100	B
Nonlinear Systems	6PAM0007	30	4PAM0007	80	20	AB
Rocket Performance and Propulsion	6AAD0026	15	-	60	40	A
Boundary Value Problems	6PAM0022	30	5PAM0012	80	20	AB

Progression to level 5 requires:

A minimum of 105 credits to remain on honours award. The maximum study rate in such an instance would be 135 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:

225 credit points and above to Honours award. The maximum study rate in such an instance would be 135 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 requires 360 credit points passed with a minimum of at least 120 at level 6 including the project.

#### Honours classification

The University has approved structure and assessment regulations common to all programmes. Full details are provided in UPR AS14.

#### Table 1e Interim awards available

The programme provides the following interim awards:

Award	Minimum requirements	Available at end of Level
University Certificate	45 credit points at level 4	4
Certificate of Higher Education	120 credit points at level 4	4, 5
University Diploma	180 credit points including at least 60 at level 5	5, 6
Diploma of Higher Education	240 credit points including at least 120 at level 5	5, 6
Students with an enrolment date before September 2008 will be eligible for a BSc	270 credit points including 180 at level 6/5 of which 90 must be at level 6	6
Students with an enrolment date of September 2008, or thereafter will be eligible for a BSc	300 credit points including 240 credits at levels 4 & 5, and 60 credits at level 6, <b>or</b> 210 credits at levels 4 & 5 and 90 credits at level 6.	6
BSc (Hons)/BA (Hons)	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6

## E. Support for students and their learning

Students are supported by:

- A Programme Tutor to help students understand the programme/award structure.
- A designated Programme 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.
- An induction week at the beginning of each new academic session.

- Overseas Orientation.
- English language support.
- Undergraduate bursaries.
- 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 Faculty of Science, Technology and Creative Arts.
- The Faculty of Science, Technology and Creative Arts 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 Drop-in Centre.
- A Faculty-based Disabled Student Co-ordinator.
- An Equal Opportunities Officer.
- The Students' Union.
- Guided student-centred learning through the use of StudyNet.
- A Careers Service for all current students and graduates.

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## F. 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 Physics and Mathematics or VCE A-level Science) or one VCE Double Award in Science. All key skills and other tariff points counted;

**or**

- BTEC ND/NC with 5 merits in science or engineering;

**plus**

- GCSE English and Mathematics at grade C or above.

The programme is subject to the University's Principles, Policies, Regulations and Procedures for the Admission of Students to Undergraduate and Taught Postgraduate Programmes and will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

## Section 2

### Programme management

<b>JACS code(s)</b>	F300
<b>Modes of study</b>	F/T, P/T, Sandwich, Year Abroad
<b>Intakes</b>	Semester A
<b>Relevant QAA subject benchmarking group</b>	Physics, Astronomy and Astrophysics
<b>Date of validation/last periodic review</b>	March 2010
<b>Date of production/ last revision of PS</b>	March 2010, March 2011
<b>Relevant cohorts</b>	All
<b>Faculty</b>	Science, Technology and Creative Arts
<b>Administrative School(s)/Departments</b>	Physics, Astronomy and Mathematics

### Course (i.e. pathway) details

Course (i.e. Pathway Point) Titles	Course (i.e. Pathway Point) Codes
BSc Honours Physics	PHY1, PHY2, PHY3, PHY4
BSc Honours Astrophysics	AST1, AST2, AST3, AST4
BSc Honours Physics with Scientific Computing	PSC1, PSC2, PSC3, PSC4
BSc Honours Astrophysics with Scientific Computing	ASC1, ASC2, ASC3, ASC4
BSc non-Honours, Physics, Astrophysics	PHYU2, PHYU3, PHYU4

The programme is managed by:

- Head of School;
- Associate Head of School who has overall responsibility in Physics, Astronomy and Mathematics;
- a Programme Tutor who is responsible for the day-to-day management of the programme;
- an Admissions Tutor with specific responsibility for open days and selection;
- a Placements Tutor to assist with procurement of placements and to advise on placements;
- a designated Administrator to deal with day-to-day administration associated with the programme;
- Module Co-ordinators who are responsible for individual modules;
- a programme committee, the membership of which includes student representatives, academic staff teaching modules, Head and Associate Head of School, and chaired by the Programme Tutor.

### Programme-specific assessment regulations

The programme is compliant with the University's generic assessment regulations (Structure and Assessment Regulations for Academic Programmes, UPR AS14) with the exception of those listed below, which have been specifically approved by the University:

- For the purpose of degree classification the module 6PAM0026 Project may not be substituted for 30 credits of level 5 modules on all the Physics and Astrophysics programmes.

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

- The Programme operates a Faculty-wide policy for the treatment of extenuating circumstances (see Student Handbook).
- Progression from one level to the next depends on meeting the pre-requisite requirements of specific chosen modules as detailed in Table 1a to 1d and 1e above.
- To be eligible for any of the above awards a student must attain pass grades in compulsory courses listed in Table 1a to 1d.
- In the case of a Sandwich or Year Abroad award, students must also perform satisfactorily in the professional training year, as assessed by the Professional Training Certification Panel.

- To qualify for a specialised degree the Project must have been deemed appropriate to the named route by the Project Viva Panel.
- The programme includes a significant amount of group working, as a consequence specific regulations governing cheating and plagiarism are provided in the student handbook.
- 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 7 years for Part-time.

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## Other sources of information

- Definitive Module Documents
- Module Guides
- Student Handbook
- Programme Specification website:  
(StudyNet → Staff → Department Lists → Academic Quality Office → Programme Management → Programme Specifications)
- University of Hertfordshire Course website:  
<http://www.herts.ac.uk/courses/>
- QAA Benchmark Statement website:  
<http://www.qaa.ac.uk/academicinfrastructure/benchmark/default.asp>
- The Framework for Higher Education Qualifications in England, Wales and Northern Ireland, 2008:  
<http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI08/default.asp>
- SEEC Credit Level Descriptors for Further and Higher Education 2003: <http://www.seec-office.org.uk/creditlevel descriptors2003.pdf>
- External Quality Review report website:  
[http://www.qaa.ac.uk/revreps/inst\\_reports.asp?instID=H-0060](http://www.qaa.ac.uk/revreps/inst_reports.asp?instID=H-0060)
- UNISTATS website:  
<http://www.unistats.com/>
- University of Hertfordshire Academic Quality Office website:  
(StudyNet → Staff → Department Lists → Academic Quality Office)
- Structure & Assessment Regulations - Undergraduate & Taught Postgraduate Programmes, UPR AS14:  
<http://herts.ac.uk/secreg/upr/AS14.htm>
- Learning and Teaching Policy and General Educational Aims, UPR TL01:  
<http://herts.ac.uk/secreg/upr/TL01.htm>
- Admissions - Undergraduate & Taught Postgraduate Students, UPR SA03:  
<http://herts.ac.uk/secreg/upr/SA03.htm>
- Academic Quality, UPR AS17:  
<http://herts.ac.uk/secreg/upr/AS17.htm>
- Index of UPRs for students:  
[http://www.herts.ac.uk/secreg/upr/upr\\_azlist\\_student\\_info.htm](http://www.herts.ac.uk/secreg/upr/upr_azlist_student_info.htm)  
A-Z of the University of Hertfordshire – downloadable pdf file from Student Support StudyNet website.

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## Other information relevant to the programme

Successful Honours students will be eligible for Graduate membership of the Institute of Physics (IoP) and can apply for Chartered Physicist status. The IoP is the professional body for physics in the UK.

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## University policies relevant to the Programme

The University undertakes to use all reasonable endeavours to deliver, assess and administer this programme in accordance with this Programme Specification. At the same time it is recognised that it is in the nature of academic developments that changes, for example to the structure, curriculum, and assessment of a programme may be necessary in order to ensure that the programme remains up to date, in response to issues raised as a result of on-going monitoring and evaluation, and/or in order to

conform to new regulatory requirements imposed by this institution, by professional or statutory bodies, or by national or governmental bodies.

The programme operates within the guidelines and policies relating to equal opportunities and environmental issues which may be agreed from time to time by the Board of Governors and/or the Academic Board of the University.

Where the programme is offered in collaboration with another institution these policies and guidelines will normally be those of the partner institution.

The programme operates in accordance with the University's Regulations Governing Studies Involving the Use of Human Subjects (UPR RE01) agreed from time to time by the Academic Board of the University. However, where the programme is offered in collaboration with another institution (for example through a franchise arrangement for all or part of the programme) then specific approval must be obtained from the University for the operation of the programme within ethical guidelines prepared by the partner institution. The partner institution will be responsible for all insurance liability in connection with the observance of ethical guidelines.



Signed  
Chair of Faculty Academic Quality Enhancement Committee

Date: 6<sup>th</sup> March 2011

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If you would like this information in an alternative format please contact:  
the Senior Administrator

## BSc Honours Physics

**Table 2a: 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	B1	B2	B3	B4	C1	C2	D1	D2	D3
Level 4	Mathematical Techniques 1	4PAM0007		X				X						
	Contemporary Physics	4PAM0009	X								X			
	The Physical Universe	4PAM1013	X		X		X							
	Applications of Computing Laboratory Physics 1	4PAM0023 4PAM0016			X		X	X		X			X	
Level 5	Mathematical Techniques 2	5PAM0012		X				X						
	Thermal and Condensed Matter Physics	5PAM0013	X			X					X			
	Laboratory Physics 2	5PAM0023			X		X			X			X	
	Professional Skills	5PAM0024										X	X	X
	Optical Physics & Electromagnetism	5PAM0026	X								X			
	Quantum Physics	5PAM0027	X			X								
	Differential Equations	5PAM1001		X				X						
	Mechanics	5PAM1003		X				X						
Professional Teaching Skills	5PAM0028										X	X	X	
Placement Year	6PAM0011							X						
Year Abroad	6PAM0030							X						
Level 6	Nonlinear Systems	6PAM0007		X				X						
	Waves & Fluids	6PAM0014	X		X					X	X			
	Physics of the Stars	6PAM0015	X		X									
	Space Dynamics	6PAM0027		X		X					X	X	X	X
	Computational Physics	6PAM1004		X				X			X			
	Cosmology and Large Scale Structure	6PAM1001	X		X									
	Contemporary Quantum Physics	6PAM1007	X	X		X					X	X		
	Rocket Performance and Propulsion	6AAD0026		X				X			X			
	Boundary Value Problems	6PAM0022		X				X						
	Project (Physics)	6PAM0026										X		X
	Quantum Computing A	6COM0247	X	X				X						
Quantum Computing B	6COM0260	X	X				X							

## BSc Honours Astrophysics

**Table 2b: 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	B1	B2	B3	B4	C1	C2	D1	D2	D3
Level 4	Mathematical Techniques 1	4PAM0007		X				X						
	Contemporary Physics	4PAM0009	X								X			
	The Physical Universe	4PAM1013	X		X		X							
	Applications of Computing	4PAM0023						X						
	Laboratory Physics 1	4PAM0016			X		X			X			X	
Level 5	Mathematical Techniques 2	5PAM0012		X				X						
	Laboratory Physics 2	5PAM0023			X		X			X			X	
	Professional Skills	5PAM0024										X	X	X
	Solar System Physics	5PAM0025	X											
	Optical Physics and Electromagnetism	5PAM0026	X								X			
	Quantum Physics	5PAM0027	X			X								
	Differential Equations	5PAM1001		X				X						
	Mechanics	5PAM1003		X				X						
	Professional Teaching Skills	5PAM0028										X	X	X
Level 6	Placement Year	6PAM0011							X					
	Year Abroad	6PAM0030							X					
Level 6	Nonlinear Systems	6PAM0007		X				X						
	Waves & Fluids	6PAM0014	X		X					X	X			
	Physics of the Stars	6PAM0015	X		X									
	Space Dynamics	6PAM0027		X		X					X	X	X	X
	Computational Physics	6PAM1004		X				X			X			
	Cosmology and Large Scale Structure	6PAM1001	X		X									
	Contemporary Quantum Physics	6PAM1007	X	X		X					X	X		
	Rocket Performance & Propulsion	6AAD0026		X				X			X			
	Boundary Value Problems	6PAM0022		X				X						
	Project (Physics)	6PAM0026										X		X
	Quantum Computing A	6COM0247	X	X				X						
Quantum Computing B	6COM0260	X	X				X							

**BSc Honours Physics with Scientific Computing** (Programme will not recruit for September 2010 and will be withdrawn by 2014)

**Table 2c: 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	B1	B2	B3	B4	C1	C2	D1	D2	D3
Level 4	Mathematical Techniques 1	4PAM0007		X				X						
	Contemporary Physics	4PAM0009	X								X			
	The Physical Universe	4PAM1013	X		X		X							
	Applications of Computing	4PAM0023						X						
	Laboratory Physics 1	4PAM0016			X		X			X			X	
Level 5	Mathematical Techniques 2	5PAM0012		X				X						
	Laboratory Physics 2	5PAM0023			X		X			X			X	
	Professional Skills	5PAM0024										X	X	X
	Solar System Physics	5PAM0025	X											
	Numerical Methods	5PAM1004		X				X						
	Optical Physics and Electromagnetism	5PAM0026	X								X			
	Quantum Physics	5PAM0027	X			X								
	Differential Equations	5PAM1001		X				X						
	Mechanics	5PAM1003		X				X						
Professional Teaching Skills	5PAM0028										X	X	X	
Level 6	Placement Year	6PAM0011							X					
	Year Abroad	6PAM0030							X					
Level 6	Nonlinear Systems	6PAM0007		X				X						
	Waves & Fluids	6PAM0014	X		X					X	X			
	Physics of the Stars	6PAM0015	X		X									
	Space Dynamics	6PAM0027		X		X					X	X	X	X
	Computational Physics	6PAM1004		X				X			X			
	Cosmology & Large Scale Structure	6PAM1001	X		X									
	Contemporary Quantum Physics	6PAM1007	X	X		X					X	X		
	Rocket Performance and Propulsion	6AAD0026		X				X			X			
	Boundary Value Problems	6PAM0022		X				X						
	Project (Physics)	6PAM0026										X		X
	Quantum Computing A	6COM0247	X	X				X						
Quantum Computing B	6COM0260	X	X				X							

**BSc Honours Astrophysics with Scientific Computing** (Programme will not recruit for September 2010 and will be withdrawn by 2014)

**Table 2c: 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	B1	B2	B3	B4	C1	C2	D1	D2	D3
Level 4	Mathematical Techniques 1	4PAM0007		X				X						
	Contemporary Physics	4PAM0009	X								X			
	The Physical Universe	4PAM1013	X		X		X							
	Applications of Computing	4PAM0023						X						
	Laboratory Physics 1	4PAM0016			X		X			X			X	
Level 5	Mathematical Techniques 2	5PAM0012		X				X						
	Laboratory Physics 2	5PAM0023			X		X			X			X	
	Professional Skills	5PAM0024										X	X	X
	Solar System Physics	5PAM0025	X											
	Numerical Methods	5PAM1004		X				X						
	Optical Physics & Electromagnetism	5PAM0026	X								X			
	Quantum Physics	5PAM0027	X			X								
	Differential Equations	5PAM1001		X				X						
	Mechanics	5PAM1003		X				X						
	Professional Teaching Skills	5PAM0028										X	X	X
Placement Year	Placement Year	6PAM0011							X					
	Year Abroad	6PAM0030							X					
Level 6	Nonlinear Systems	6PAM0007		X				X						
	Waves & Fluids	6PAM0014	X		X					X	X			
	Physics of the Stars	6PAM0015	X		X									
	Space Dynamics	6PAM0027		X		X					X	X	X	X
	Computational Physics	6PAM1004		X				X			X			
	Cosmology and Large Scale Structure	6PAM1001	X		X									
	Contemporary Quantum Physics	6PAM1007	X	X		X					X	X		
	Rocket Performance and Propulsion	6AAD0026		X				X			X			
	Boundary Value Problems	6PAM0022		X				X						
	Project (Physics)	6PAM0026										X		X
	Quantum Computing A	6COM0247	X	X				X						
Quantum Computing B	6COM0260	X	X				X							

**Key:** Learning Outcome which is assessed as part of the module ☒

## Key to Programme Learning Outcomes

### Knowledge and Understanding

- A1. the fundamental concepts, ideas and theories of Physics and Astrophysics;
- A2. the mathematical and computational techniques used to frame and solve physical problems;
- A3. the techniques of practical work in Physics and Astrophysics.

### Intellectual Skills

- B1. formulate and tackle problems in physics and astrophysics;
- B2. plan, execute and report the results of an experiment or an investigation;
- B3. use mathematics and computing to describe the physical world or an investigation;
- B4. obtain experience of working in a suitable environment alongside professionals or others engaged in scientific work.

### Practical Skills

- C1. perform experimental work and draw conclusions;
- C2. apply appropriate analytical and modelling techniques to physical problems.

### Transferable Skills

- D1. communicate effectively, both orally and in writing;
- D2. work effectively in a team;
- D3. demonstrate time, personal management and IT skills.