PROGRAMME SPECIFICATION (for an Undergraduate programme with Careers Service Placement Year)	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	BSc
4	**Programme Title**	Physics with Astrophysics Physics with Astrophysics with placement year
5	**UCAS/Programme Code**	F3F5 1557U
6	**Programme Accreditation**	Institute of physics (to be sought)
7	**QAA Subject Benchmark(s)**	Physics, Astronomy & Astrophysics Feb 17
8	**FHEQ Level**	6
9	**Last updated**	July 2021

10 Programme Aims

The programme aims to:

1. To provide opportunities for students to undertake a broad-based education in Physics, with specialise knowledge of astrophysical phenomena and to acquire the appropriate knowledge and understanding of key physical principles and their application to real world challenges.
2. To produce graduates who will be equipped to enter employment in relevant industry, the professions or public service, or to follow a postgraduate route into research, industry or academia, or to apply the skills learnt in a range of areas outside of physics or academia.
3. To allow for the development of increased knowledge in the specialist area of astrophysics and develop techniques to support self-learning of concepts.
4. To give experience of group activities.
5. To produce graduates who will meet the accreditation requirements of the Institute of Physics.
6. To provide a qualification which meets the designated learning outcomes at bachelors level of the National Qualifications framework.
7. To provide students with the opportunities to acquire astrophysics research skills through the individual project.

For students on the Placement Year programme:

8. Provide students with the experience of seeking and securing a position with an employer.
9. Facilitate independent self-management and proactive interaction in a non-university setting.
10. Provide a period of practical work experience that will benefit current academic study and longer term career plans.
11. Enable students to ethically apply their knowledge and skills in the work place, reflect upon their development and effectively evidence and articulate their learning in relevant future settings.

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have references to the benchmark statements for 2017 QAA for Physics, Astronomy & Astrophysics (PAA).

Knowledge and Understanding

On completing the programme students should:
On completing the programme a successful student will have gained and be able to demonstrate:

A1. Knowledge and understanding of the mathematics required to explain the advanced concepts in physics and astrophysics (PAA).
A2. Knowledge and understanding of the fundamental physical laws and principles and competence in the application of these principles to diverse areas of physics, particularly astrophysics (PAA).
A3. An ability to solve problems in physics and astrophysics using appropriate mathematical tools (PAA).
A4. The ability to execute and analyse critically the results of an experiment or investigation and draw valid conclusions (PAA).
A5. Application of IT principles in the study of physics and astrophysics. (PAA).
A6. The application of physical principles to cosmology; the structure, formation and evolution of stars and galaxies and high-energy phenomena in the universe (PAA).

For students on the Placement Year programme:

A7. Apply personal and professional development strategies to prioritise, plan, and manage their own skills development and learning.
A8. Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement.
A9. Demonstrate an understanding of a work environment, how it functions and their contribution to it.
A10. Relate their work based learning to other areas of personal development, including academic performance.

Teaching and Learning Methods

Lectures are the principal vehicle for presenting the essential fundamental concepts and material which defines the module, and provide the key element towards achieving the learning outcomes. Problem classes and small group tutorials are used to support lectures and enhance students' understanding by providing an opportunity to clarify issues arising from lectures and work through additional examples. Throughout the programme the student is encouraged to undertake independent reading both to supplement and consolidate the presented material and to broaden their individual knowledge and understanding of Physics.

Assessment Strategy

The knowledge base for the lecture based material is tested through the use of formal examinations. Problem solving is assessed in the stage 1 laboratory based module and the latter year project work, as well as in the tutorial sheets provided for each of the taught modules. Experimental investigations and the use of IT facilities will be assessed through the project work, stage 1 practical sessions and the related reports.

Intellectual Skills

On completing the programme students should be able to demonstrate:
B1. An ability in numerical manipulation to solve problems and analyse data (PAA).
B2. An ability to use mathematical techniques and analysis to model physical behaviour (PAA).
B3. An ability to plan, conduct and report a programme of investigate work (PAA).
B4. Organisation within a group to achieve a set of defined goals (PAA).

Teaching and Learning Methods

Small group tutorial sessions and tutorials in lectures are used to give students the opportunity to ask individual questions about exercises and to clarify issues arising from lectures. Analysis and problem solving skills are developed through these sessions, assignments set as part of modules in stage 1 and 2 and during the project based activity

in the final year. Astrophysical research and data analysis skills are further developed during the latter stage and within project based modules.

Assessment Strategy

Analysis and problem solving skills are assessed through the use of formal university examination and assignments set during modules. Experimental, creative and organisation skills are assessed during stage 1 laboratory, the computational modelling module and project based activity, through the assessment of reports and laboratory notebooks.

Practical Skills

On completing the programme students should be able to:

C1. Demonstrate successful and safe use of basic laboratory apparatus and techniques (PAA).
C2. Take effective measurements and record them appropriately.
C3. Critically analyse experimental data including observational astrophysics data, in terms of error analysis, to determine their strength and validity.
C4. Give technical presentations on scientific data generated by the student.
C5. Use computational modelling and data analysis packages.

Teaching and Learning Methods

Skills are introduced in dedicated laboratory sessions (for example the propagation of uncertainties are supported with packages such as MatLab during the stage 1 laboratory modules).

Assessment Strategy

Assessment of skills is through observed laboratory and project work, laboratory and project reports and assessed presentations and demonstrations during the project work. The use of computational modelling and data analysis is introduced in laboratory sessions in stage 1; assessed through lab-books and reports.

Transferable/Key Skills

On completing the programme students should be able to:

D1. Demonstrate the ability to present and interpret information graphically.
D2. Demonstrate an ability to effectively communicate scientific information clearly. In particular the student will be required to produce clear and accurate scientific reports.
D3. Demonstrate an ability manage their own leaning and to make use of appropriate texts, research-based materials or other learning resources.
D4. Demonstrate problem solving skills.
D5. Demonstrate exceptional levels of numeracy.

For students on the placement year programme:

D6 Reflect on and manage own learning and development within the workplace.
D7 Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process.
D8 Use graduate skills in a professional manner in a workplace environment, evaluate the impact and communicate the personal development that has taken place.

Teaching and Learning Methods

Transferable skills are developed throughout the programme. The presentation of information is developed during laboratory sessions, using a variety of methods, from report writing, laboratory notebooks and oral presentations. The use of external information, in terms of scientific journals will be developed during the project work in the latter stages. Numeracy and problem solving skills are developed throughout the programme through worked examples in lectures, small group tutorials, fortnightly problem sheets for most modules, experimental and computational laboratories.

Assessment Strategy

The skills will primarily be assessed through the use of reports on experimental investigations at stage 1 and the subsequent project work.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The normal Undergraduate year is arranged in three terms and is divided into two semesters. Semester 1 is twelve weeks, preceded by an induction week and followed by a period of examination for those topics completed in semester 1. Semester 2 is also twelve weeks long and is followed by a second examination period.

Candidates study 120 credits in each stage (or year), resulting in BSc candidates completing 360 credits by the end of their course. Candidates must successfully complete all parts of a stage before progressing to the next. Programmes are pursued through full-time study; the only part-time study is limited provision for the repetition of failed modules.

Students on the Placement Year programme will be on placement year between stages 2 and 3 of their programme.

There is a foundation year for candidates not adequately qualified to embark on stage 1 of the degree programme.

Key features of the programme (including what makes the programme distinctive)

The accreditation requirements of the programme require coverage of a specified curriculum, which ensures that there is a not a significant difference between degrees at other institutions. The final year allows students to apply the physics principles learned in stages 1 and 2 to astrophysical applications. The mix of modules available at stage three is unique to Newcastle. The individual project gives the student a chance to further specialise in their chosen area of astrophysics working in either the astrophysics or cosmology research groups.

Programme regulations (link to on-line version)

F3F5 1557U 2021 Regulations

13 Support for Student Learning

Generic information regarding University provision is available at the following link.
https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

14 Methods for evaluating and improving the quality and standards of teaching and learning

Generic information regarding University provision is available at the following link.
https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

Accreditation reports
This programme will be submitted to the Institute of Physics (IoP) for accreditation.

Additional mechanisms

15 Regulation of assessment

Generic information regarding University provision is available at the following link.

https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

In addition, information relating to the programme is provided in:
The University Prospectus: http://www.ncl.ac.uk/undergraduate/degrees/#subject Degree Programme and University Regulations: http://www.ncl.ac.uk/regulations/docs/

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided.