| PROGRAMME SPECIFICATION |  |
|---|---|

| | | |
|---|---|---|
| **1** | **Awarding Institution** | Newcastle University |
| **2** | **Teaching Institution** | Newcastle University |
| **3** | **Final Award** | MPhys (Hons) |
| **4** | **Programme Title** | Theoretical Physics<br>Theoretical Physics with Placement Year<br>Theoretical Physics with International Study Year<br>MPhys with Hons in Science (Theoretical Physics) (exit ward)<br>MPhys with Hons in Science (Theoretical Physics) with placement year (exit award) |
| **5** | **UCAS/Programme Code** | F344<br>1180U<br>1847U<br>1567U (exit award)<br>1568U (exit award) |
| **6** | **Programme Accreditation** | F344, 1180U and 1847U - accredited by the Institute of Physics (IOP). |
| **7** | **QAA Subject Benchmark(s)** | Physics |
| **8** | **FHEQ Level** | 7 |
| **9** | **Last updated** | June 2024 |

**10 Programme Aims**

The programme aims:

1. To provide opportunities for students to undertake a broad-based education in Physics with specialist knowledge of the theoretical underpinnings 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.
3. To allow for the development of increased knowledge in areas of specialisation 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 Masters level of the National Qualifications framework.

For students on the Careers Placement Year programme:

7. Provide students with the experience of seeking and securing a position with an employer.
8. Facilitate independent self-management and proactive interaction in a non-university setting.
9. Provide a period of practical work experience that will benefit current academic study and longer-term career plans.

10. 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.

For students on the International Study Year Programme:

11. Offer students the opportunity to develop graduate attributes which increase employability, particularly communication and (where applicable) language skills, intercultural competencies, adaptability, resilience, and global awareness.
12. Gain insight into international Higher Education and experience differences in academic approach and learning environment.
13. Provide the opportunity to experience new areas of study outside of their usual programme of study at Newcastle University.

**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 2008 QAA benchmark statements for Physics (P).

**Knowledge and Understanding**

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

A1. Knowledge and understanding of the mathematics required to explain the advanced concepts in physics, which are informed by the forefront of the discipline (P)
A2. Knowledge and understanding of the fundamental physical laws and principles and competence in the application of these principles to diverse areas of physics (P)
A3. An ability to solve advanced level problems in physics using appropriate mathematical tools. Students should be able to identify the relevant physical principles, to translate problems into mathematical statements and apply their knowledge to obtain order-of-magnitude or more precise solutions as appropriate (P)
A4. The ability to execute and analyse critically the results of an experience or investigation and draw valid conclusions. This will include evaluation of the level of uncertainty in the results and the student should understand the significance of error analysis and be able to compare the obtained results with expected outcomes, theoretical predictions or published data (P)
A5. Application of IT principles in the study of physics at the level needed for project work; for example, a familiarity with a programming language, simulation software, or the use of mathematical packages for manipulation and numerical solutions of equations (P).
A6. Mathematical methods and techniques appropriate to more specialised areas of theoretical physics.

For students on the Careers 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 and 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.

For students on the International Study Year Programme:

A11. Demonstrate the ability to adapt to different learning environments.

**Teaching and Learning Methods**

Lectures are the principal vehicle for presenting the essential fundamental concepts and material which define 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 laboratory-based modules, including individual and group 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 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 (P)
B2. An ability to use mathematical techniques and analysis to model physical behaviour (P)
B3. An ability to plan, conduct and report a programme of investigate work, making use of appropriate texts, research articles and other primary sources (P)
B4. Organisation within a group to achieve a set of defined goals.

**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 Stages 1 & 2 and during the project-based activity in the final year. Theoretical, research and design skills are further developed during the latter 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 organization skills are assessed during Stage 1 laboratory, the computational modelling modules, 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. This will include the competent use of specialised equipment, the ability to identify appropriate pieces of equipment and to master new techniques and equipment (P)
C2. Take effective measurements and record them appropriately.
C3. Critically analyse experimental 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 computation modelling and data analysis packages to support project work and use the results to make predictions as to the validity of data and conclusions drawn from it.
C6. Formulate physical theories in mathematical terms solving the resulting equations analytically or numerically and give physical interpretations of the solutions.

**Teaching and Learning Methods**

Skills are introduced in dedicated laboratory sessions (for example the propagation of uncertainties supported with analysis packages such as MatLab during the Stage 1 laboratory module.

**Assessment Strategy**

Assessment of skills is through observed laboratory and project work, laboratory and project reports and assessed presentations and demonstrations during their project work. The use of computational modelling and data analysis is introduced in laboratory sessions in Stage 1 and assessed through 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. In particular the student will be required to produce clear and accurate scientific reports.
D3. Demonstrate an ability manage their own learning and to make use of appropriate texts, research-based materials, or other learning resources.

For students on the Placement Year programme:

D4. Reflect on and manage own leaning and development within the workplace.
D5. Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process.
D6. Use graduate skills in a professional manner in a workplace environment, evaluate the impact and communicate the personal development that has taken place.

For students on the International Study Year Programme:

D7. Adapt and operate in a different cultural environment.

**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.

**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.

The course normally lasts four years.

Every Honours student studies 120 credits in each Stage (or year), resulting in MPhys candidates completing 480 credits by the end of their course. Candidates must successfully complete all parts of a Stage before progressing to the next. Courses are pursued through fulltime study; the only part-time study is limited provision for the repetition of failed modules.

Students on the Careers Placement Year programme and the International Study Year Programme will be on a placement year between Stage 3 and 4 of their programme.

There is a Foundation Year for candidates not adequately qualified to embark on Stage 1 of Degree Programmes.

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

A distinctive feature of the programme curriculum is the flexible structure, operating within the University's modular system. Students can choose modules aligned to their interests at Stage 3, with the programme content related to the research interests of the staff.

The accreditation requirements of the programme require the inclusion of key concepts which ensures that there is not a significant difference between degrees at other institutions.

Students registered for the BSc and MPhys follow a common programme in Stages 1 and 2, enabling a transfer of candidature between programmes, subject to satisfactory academic prowess, as detailed in section 16.

**Programme regulations (link to on-line version)**

F344-1180U: -RF344-1180U.pdf (ncl.ac.uk)

## 13 Support for Student Learning

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

Generic Information

## 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.

Generic Information

*Accreditation reports*
F344, 1180U and 1847U - Accredited by the Institute of Physics (IoP).

*Additional mechanisms*
None

## 15 Regulation of assessment

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

Generic Information

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.