Programme Specification[1]

1. Programme Title(s) and Code(s):

Programme Title	*UCAS Code*	*GU Code*
BSc Honours in Physics	F301	F300-2208

2. Academic Session:

2018-19

3. SCQF Level (see Scottish Credit and Qualifications Framework Levels):

10

4. Credits:

480

5. Entrance Requirements:

Please refer to the current undergraduate prospectus at:
http://www.gla.ac.uk/undergraduate/degrees/physics/

6. ATAS Certificate Requirement (see Academic Technology Approval Scheme):

ATAS Certificate not required

7. Attendance Type:

Full Time

8. Programme Aims:

Physics involves the experimental and theoretical study of matter and energy and their interactions, ranging from the domain of elementary particles, through nuclear and atomic

[1] This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if full advantage is taken of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each course can be found in course handbooks and other programme documentation and online at www.gla.ac.uk/

The accuracy of the information in this document is reviewed periodically by the University and may be checked by the Quality Assurance Agency for Higher Education.

physics to the physics of solids, and ultimately to the development of the universe itself. The laws of physics form the basis of most branches of science and engineering and are the foundation of modern technology. In this BSc programme we aim to give the student an understanding of the principles and methods of modern physics, and the skills to apply this understanding to a range of theoretical and experimental problems. In order to illustrate this, we draw on a wide variety of research and applications including work performed in the School of Physics & Astronomy.

Specific Aims of the Programme

(1) To present an integrated course of study which provides the student with knowledge and understanding of key principles and methods of modern physics;

(2) To provide the opportunity to study in depth a choice of topics relevant to current developments in physics and its applications;

(3) To provide training in the principles and practice of physical measurement techniques and scientific data analysis, and give the opportunity for the student to apply these in performing an extended project;

(4) To develop the student's transferable skills, concentrating on work in a group, the writing of reports on group and individual project work, and in verbal communication of such results;

(5) To develop the students' ability to work effectively and to reinforce their individual responsibility for their own learning.

9. Intended Learning Outcomes of Programme:

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas.

Knowledge and Understanding

On completion of the programme students will be able to:

- Understand and apply a range of basic mathematical methods which are useful in solving quantitative problems in physics;
- Demonstrate knowledge and understanding of waves and diffraction, thermal physics, circuits and systems, quantum mechanics, solid state physics, nuclear and particle physics, atomic systems and electromagnetism;
- Demonstrate more detailed knowledge and understanding of a subset of the following optional material: Numerical Methods, Modern Optics, Medical Imaging, Semiconductor Physics and Devices, Magnetism and Superconductivity, Electronic Signal Transmission, Particle Physics, Nuclear Physics.

Skills and Other Attributes

Subject-specific/practical skills

On completion of the programme students will be able to:

- Programme straightforward procedures in a high level computer language and use computers to solve physical problems;
- Plan and carry out experimental investigations of physical processes using both standard and more advanced laboratory equipment;
- Evaluate random and systematic errors inherent in experimental measurements;
- Analyse and interpret experimental data, and make a critical assessment and draw valid conclusions from the results of experimental investigations.
- Apply computer software to analyse experimental data and to write scientific reports;

- Plan the course of action required to achieve self-defined goals in an open-ended physics project;
- Make an appropriate safety assessment for experimental procedures.

Intellectual skills

On completion of the programme students will be able to:

- Describe and analyse quantitatively processes, relationships and techniques related to the areas covered in the contributory courses;
- Write down, and where appropriate either prove or discuss the underlying basis of, physical laws related to topics in these areas;
- Apply ideas and techniques discussed in the courses to solve general classes of problems related to topics included in the course component outlines, which may include straightforward unseen elements;
- Discuss applications of the topics included in the course component outlines, and appreciate their relation to other topics in course components taken;

Transferable/key skills

On completion of the programme students will be able to:

- Give an oral account of experimental work performed and conclusions drawn from it;
- Prepare a detailed written report on an experimental investigation;
- Apply logical analysis to problem solving;
- Write a report containing a full description of the aims, methods, outcomes and conclusions of a piece of project work;
- Prepare and present audio-visual presentations and posters summarizing the results of a project;
- Appreciate open problems typical of business situations;
- Interact positively with colleagues in a group context;
- Apply team-working skills to address a complex physics problem and contribute significantly to the work of a group tackling such a problem, combining their own work constructively with the work of others;
- Contribute to the management of a group engaged in project work;
- Combine with colleagues to prepare and deliver a presentation and report of group work.

10. Typical Learning and Teaching Approaches:

Knowledge and understanding:

Lectures and class tutorials
Small group supervisions
Laboratory and project work
Private study

Intellectual skills:

Lectures and class tutorials
Small group supervisions
Laboratory work, including IT laboratory
Private study

Subject-specific/practical skills:

Laboratory work, including IT laboratory
Individual and group project work

Transferable/key skills:

Skills workshop
Group project
Extended project
Small group supervisions

11. Typical Assessment Methods:

Knowledge and understanding:

Written examinations
Verbal and written reports of laboratory and IT work
Multiple choice questions

Intellectual skills:

Written examinations
Verbal and written reports of laboratory and IT work
Multiple choice questions

Subject-specific/practical skills:

Verbal and written reports of laboratory and IT work
Verbal, written and poster presentations of project work

Transferable/key skills:

Verbal and written reports of laboratory and IT work
Oral and written presentations of Group project work, and assessments by supervisors
Written and poster presentations of project work, and assessment by supervisors

12. Programme Structure and Features:

The B.Sc. Honours programme in Physics lasts 4 years and contains a minimum of 480 credits, as required by the regulations of the College of Science and Engineering, set out in the University Calendar.

A minimum of 120 credits must be taken in Years 1 to 4. The courses which can be taken in years 3 and 4 are subject to timetabling constraints and to students having taken prerequisite courses in an earlier semester or year. In the sample degree programme listed below, all compulsory courses are taken as soon as possible.

Year 1
Physics 1 [PHYS1001] (40 credits)

Mathematics 1R [MATHS1001] or 1X [MATHS1004] and Mathematics 1S [MATHS1002], or 1Y [MATHS1005] (20 credits each)
Additional classes (A minimum of 40 credits).

Year 2
Physics 2 [PHYS2001] (60 credits)
Mathematics 2A, 2B and 2D [MATHS2001, 2004 AND 2006] (10 credits each)
Additional classes (A minimum of 30 credits).

Year 3
100 credits of compulsory courses as listed:

P301H Mathematical Methods 1 [PHYS4011] (10 credits),
P302H Waves & Diffraction [PHYS4031] (10 credits),
P303H Circuits & Systems [PHYS4003] (10 credits),
P304H Quantum Mechanics [PHYS4025] (10 credits),
P305H Thermal Physics [PHYS4030] (10 credits),
P306H Electromagnetic Theory 1 [PHYS4004] (10 credits),
P3LABH Honours Physics Laboratory [PHYS4009] (20 credits).
P3GRPRH Physics Group Project [PHYS4021P] (20 credits).

Plus 20 credits of elective courses chosen from the following list:

P307H Modern Optics [PHYS4014] (10 credits),
P308H Medical Imaging [PHYS4013] (10 credits),
P309H Numerical Methods [PHYS4017] (10 credits)

Year 4
70 credits of compulsory courses as listed:

P401H Solid State Physics [PHYS4028] (10 credits),
P402H Nuclear & Particle Physics [PHYS4015] (10 credits),
P403H Atomic Systems [PHYS4002] (10 credits),
P4GPWH General Physics Workshop [PHYS4007] (10 credits),
P4PR30H Physics Project [PHYS4022P] (30 credits).

Plus 50 credits of elective courses chosen from the following list:

P307H Modern Optics [PHYS4014] (10 credits),
P308H Medical Imaging [PHYS4013] (10 credits),
P309H Numerical Methods [PHYS4017] (10 credits),
P404H Particle Physics [PHYS4018] (10 credits),
P405H Nuclear Physics [PHYS4016] (10 credits),
P406H Semiconductor Physics [PHYS4027] (10 credits),
P407H Magnetism & Superconductivity [PHYS4010] (10 credits),
P408H Electronic Signals Transmission [PHYS4005] (10 credits),
P409H Mathematical Methods 2 [PHYS4012] (10 credits),
P416H Energy & the Environment [PHYS4006] (10 credits)
P417H Physics Education & Communication [PHYS4034] (10 credits)
P418H Quantum Theory [PHYS4026] (10 credits)
P422H Peer to Peer Teaching & Learning in Physics [PHYS4045] (10 credits)
AA01H Stellar Structure & Evolution [ASTRO4011] (15 credits, alternate years, starting 2009-10),
AA02H High Energy Astrophysics [ASTRO4009] (15 credits, alternate years, starting 2009-

10),
AB01H Instruments for Optical & Radio Astronomy [ASTRO4010] (15 credits, alternate years, starting 2008-09),
AB02H Cosmology [ASTRO4006] (15 credits, alternate years, starting 2008-09)

Assessment

The programme is assessed on the basis of performance in compulsory and elective courses taken in years 3 and 4.

The programme includes 170 compulsory credits at H-level and at least 70 credits of elective courses at H-level. If a greater number of elective courses is taken than required, the performance in elective courses will be based on the best combination of elective courses meeting the minimum requirement.

The classification of marks for each course is made according to the University Code of Assessment and the programme assessment is based on the average mark of all contributing courses, weighted according to the number of credits for each course.

Lecture Course assessment: 90 minute written paper for each 10-credit lecture course; 120 minute written paper for each 15-credit lecture course.

The P4GPWH General Physics Workshop course: 90 minute written paper, weighted 2/3, and continuous assessment, weighted 1/3.

P3LABH Honours Physics Laboratory, P3GRPRH Physics Group Project and P4PR30H Physics Project: continuous assessment. In each case, this will include assessment of a written report on each experiment or project carried out.
For P4PR30H the weighting will also include an explicit component of 45 % assessment of the project work, by the project supervisor(s). For P4PR30H an additional 15 % of the assessment weighting will derive from an oral and poster presentation, assessed by a panel of three staff members (including the project co-ordinators).

Progress Requirements

In addition to Science general progress requirements :
Year 1 to Year 2: Physics 1, Mathematics 1R or 1X and Mathematics 1S, or 1Y normally all at grade D3 or better;
Year 2 to Year 3: Physics 2 at C3 or better, plus Mathematics 2A and 2B and 2D at an average of D3 or better, all normally at first diet of examination;
Year 3 to Year 4: An average grade of D3 or better over all 3rd year courses.

Marks which define progression are awarded in accordance with the University Code of Assessment.

Exit Awards

At the end of Year 3, students who satisfy the University requirements, may graduate with a Designated Degree in Physics.

13. Programme Accredited By:

Institute of Physics

14. Location(s):

Glasgow

15. College:

College of Science and Engineering

16. Lead School/Institute:

Physics and Astronomy [REG30600000]

17. Is this programme collaborative with another institution:

Select...

18. Awarding Institution(s):

University of Glasgow

19. Teaching Institution(s):

20. Language of Instruction:

English

21. Language of Assessment:

English

22. Relevant QAA Subject Benchmark Statements (see Quality Assurance Agency for Higher Education) and Other External or Internal Reference Points:

This Programme Specification is informed by the QAA Benchmark Statement for Physics, Astronomy and Astrophysics which can be found at:
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Physics08.pdf

The Programme Specification also addresses the requirements of the "Core of Physics" programme identified by the Institute of Physics (IoP).

23. Additional Relevant Information (if applicable):

Support for students is provided by the Postgraduate/Undergraduate Adviser(s) of Studies supported by University resources such LEADS (www.gla.ac.uk/myglasgow/leads/), Counselling & Psychological Services (www.gla.ac.uk/services/counselling/), the Disability Service (www.gla.ac.uk/services/studentdisability/) and the Careers Service (www.gla.ac.uk/services/careers/).

Further information for intending students is available on the School of Physics and Astronomy Website at http://www.gla.ac.uk/schools/physics/

24. Online Learning:

No

25. Date of approval:	