# Programme Specification[1]

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

| *Programme Title* | *UCAS Code* | *GU Code* |
|---|---|---|
| BSc Honours in Chemical Physics | F334 | F335-2208 |

**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/chemicalphysics/

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

ATAS Certificate not required

**7. Attendance Type:**

Full Time

**8. Programme Aims:**

Chemical Physics is concerned with electrons, nuclei, atoms and molecules in all states of matter, and how they interact with their environment. For example, chemical physicists are interested in understanding the chemical, electrical and magnetic properties of substances that are of central importance in designing solid-state devices for the electronics industry and chemical

[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.

physicists can study the motions of molecules in cell membranes and hence the transport of metabolites in and out of the cells in living organisms. In the BSc programme we aim to give the student an understanding of the principles and methods of modern chemical 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 Schools of Chemistry and 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 chemical physics;

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

(3) To provide training in the principles and practice of physicochemical 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, quantum mechanics, Heterogeneous catalysis, Co-ordination Chemistry, Solid state chemistry, Biomolecular Interactions, Quantum Mechanics and Symmetry, Kinetics, Spectroscopy, Diffraction, Photochemistry, Colloids & Macromolecules, Thermodynamics, Surface Science, Inorganic Mechanisms, Homogeneous Catalysis;
- Demonstrate knowledge and understanding of two further topics chosen from: Solid State Physics, Nuclear and Particle Physics, Atomic Systems;
- Demonstrate more detailed knowledge and understanding of a subset of the following optional material: Numerical Methods, Modern Optics, Medical Imaging, Magnetism and Superconductivity, Semiconductor Physics and Devices, Electronic Signal Transmission, Particle Physics, Nuclear Physics, Molecular Recognition, Simple Fluorides, Electrochemistry, Biomolecular Separations.

**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 chemical and physical problems;
- Plan and carry out experimental investigations of chemical and 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, chemical and 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:**

Written examinations
Verbal and written reports of laboratory and IT work
Multiple choice questions
Verbal and written reports of laboratory and IT work
Verbal, written and poster presentations of project work
Verbal and written reports of laboratory and IT work
Oral and written presentations of Group project work, and assessments by supervisors
Project work is assessed by a written report, poster presentation, assessment by supervisors, and an oral exam.

**12. Programme Structure and Features:**

The B.Sc. Honours programme in Chemical Physics lasts 4 years and contains a minimum of 500 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
Chemistry 1 [CHEM1001] (40 credits)
Physics 1 [PHYS1001] (40 credits)
Mathematics 1R [MATHS1001] ] and Mathematics 1S [MATHS1002], or 1X [MATHS1004] and 1Y [MATHS1005]. (20 credits each) and Maths Skills Test

Year 2
Chemistry 2X and 2Y [CHEM2001 AND 2002] (30 credits each)
Physics 2 [PHYS2001](60 credits)
Mathematics 2A and 2B [MATHS2001 AND 2004] (10 credits each)

**Year 3 (60 credits of compulsory Physics courses):**
Mathematical Methods 1 [PHYS4011] (10 credits),
Waves & Diffraction [PHYS4031] (10 credits),
Quantum Mechanics [PHYS4025] (10 credits),
Thermal Physics [PHYS4030] (10 credits),
Honours Physics Laboratory [PHYS4009] (20 credits).

**Year 3 (60 credits of compulsory Chemistry courses):**
CHEM3011 Inorganic chemistry 3 (20 credits)
CHEM3014 Physical chemistry 3 (40 credits)

**Year 4 (40 credits of compulsory Physics courses):**
Electromagnetic Theory 1 [PHYS4004] (10 credits),
Solid State Physics [PHYS4028] (10 credits),
Nuclear & Particle Physics [PHYS4015] (10 credits),
Atomic Systems [PHYS4002] (10 credits),
Physics Project [PHYS4023P] (20 credits).

**Year 4 (40 credits of compulsory Chemistry courses):**
CHEM4014 Physical chemistry 4H (20 credits)
CHEM4010 Inorganic chemistry 4H-half (10 credits)
CHEM4002 Chemistry special topics 4H-half (10 credits)

**Year 4 (40 credits of compulsory Chemistry or Physics Project):**
CHEM4003P Chemistry project 4H (40 credits)
Or
PHYS4053P Physics project 4H (40 credits)

## Assessment

The programme is assessed on the basis of performance in compulsory courses taken in years 3 and 4 and elective level four project choice (Chemistry of Physics).

The programme includes 240 compulsory credits at H-level.

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 and 180 minute written paper for each 20-credit course.

P3LABH [PHYS4009] Honours Physics Laboratory and P4PR20H [PHYS4053P] Physics Project: continuous assessment. In each case, this will include assessment of a written report on each experiment or project carried out.

## Progress Requirements

In addition to Science general progress requirements:
Year 1 to Year 2: Physics 1, Mathematics 1R and 1S or Mathematics 1X and 1Y normally all at grade D3 or better;
Year 2 to Year 3: Physics 2 at C3 or better, Chemistry 2X and 2Y, each at C3 or better, plus Mathematics 2A and 2B 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 overall 3$^{rd}$ year courses.

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

Final degree classifications are based on the GPA of Level 3 and Level 4, weighted strictly by credits associated with the courses.

**Exit Awards and programme changes**

At the end of Year 1, students who satisfy the University requirements may leave with a Certificate of Higher Education

At the end of Year 2, students who satisfy the University requirements may leave with a Diploma of Higher Education

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

**13. Programme Accredited By:**

Institute of Physics; Recognised by the Royal Society of Chemistry

**14. Location(s):**

Glasgow

**15. College:**

College of Science and Engineering

**16. Lead School/Institute:**

Chemistry [REG30100000]

**17. Is this programme collaborative with another institution:**

No

**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):**

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| 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:**

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| No |

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|---|---|
| **25. Date of approval:** | 29/09/2017 |